

# The Impact of The Three-Dimensional Cultivation Model on the Development of the Suzhou Tea Industry: Estimating Value of Output Per Acre and Diversified Sales Models

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**Abstract:** This article explores the impact of the three-dimensional cultivation mode on the development of the Suzhou tea industry, focusing on the diversified estimation of the value of output per acre and sales mode. It introduces the history and traditional cultivation practices of tea in Suzhou, as well as the current challenges and problems faced by the industry. An in-depth analysis was conducted on the overview and improvement plans of the three-dimensional cultivation mode, covering relevant technical methods. Based on this analysis, the impact of the three-dimensional cultivation on the value of output per acre was studied and predicted. Its potential and advantages were explored and compared with the effectiveness of traditional cultivation models. Additionally, the impact of the three-dimensional cultivation mode on sales was analyzed, examining its market adaptability and competitiveness, as well as its advantages in expanding sales channels and market coverage. The study also focused on the promoting effect of diversified sales models on the Suzhou tea industry, including direct consumption market development, tea processing product development and promotion, and the integration of tea culture and the tourism industry. To ensure sustainable development, the article evaluates the environmental impact, economic feasibility, social benefits, and farmer benefits of the three-dimensional cultivation model. Finally, the prospects for the development of the Suzhou tea industry were discussed, and the positioning and response strategies of the three-dimensional cultivation model were proposed.

**Keywords:** Suzhou tea industry; Stereoscopic cultivation mode; Value of output per acre; Sales model; Diversification

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## 1. Introduction

Tea, as one of China's traditional famous specialties, has a long history of cultivation and a profound cultural heritage in Suzhou<sup>[1]</sup>. However, with increasingly fierce economic development and market competition, the Suzhou tea industry is facing many challenges, such as unstable production and a single sales model. To seek the sustainable development and prosperity of the Suzhou tea industry, the three-dimensional cultivation model

has gradually received attention as an innovative planting method. The three-dimensional cultivation model implements multi-variety combination cultivation, landscaping to improve the ecological environment, and cultivating high-yield tea trees with three-dimensional picking surfaces. Compared to the traditional horizontal planting mode, the three-dimensional cultivation mode has advantages such as increased output value per acre and land conservation. Therefore, this article will take the Suzhou tea industry as an example to deeply study the impact of the three-dimensional cultivation mode on its development.

## **2. Overview of the Suzhou tea industry**

### **2.1. Suzhou tea planting history and traditional cultivation models**

Suzhou has a long history of tea cultivation and has always been an important economic pillar and cultural symbol in the local area <sup>[2]</sup>. The climate and soil characteristics in Suzhou provide unique conditions for the growth of tea trees. The traditional cultivation mode mainly adopts fruit-tea intercropping, with a relatively low planting density, allowing the tea tree to fully expand on the surface <sup>[3]</sup>. Although this traditional model is experienced and relatively stable, it also has some problems. The traditional planting mode limits the efficiency of land use, resulting in a relatively low value of output per acre. During the growth of tea trees, insufficient ventilation and light from the bottom branches and leaves affect the growth and quality of tea. In the increasingly competitive market, the traditional tea sales model appears to be lagging and difficult to meet the diverse needs of modern consumers <sup>[4]</sup>.

### **2.2. Current challenges and issues**

With the opening of the global tea market and competition from domestic and foreign tea industries, the Suzhou tea industry is facing new challenges. The instability of tea production has become an important factor restricting the development of the Suzhou tea industry. Climate change, pests and diseases, and other uncertain factors impact the growth and yield of tea, causing significant fluctuations in the income of tea farmers and increasing the uncertainty of production and operation <sup>[5]</sup>. Consumers have increasingly diverse demands for tea, no longer satisfied with traditional quality alone, but also pursuing the uniqueness and cultural connotations of tea products.

## **3. Introduction to the improvement of the three-dimensional cultivation mode**

### **3.1. Overview of three-dimensional cultivation mode**

The three-dimensional cultivation mode, as a modern planting method, aims to fully utilize limited spatial resources and improve the production efficiency and quality of tea. This mode allows the branches and leaves of tea trees to stretch with good ventilation, which is conducive to photosynthesis and water evaporation and improves the nutrient absorption and utilization efficiency of tea trees <sup>[6]</sup>. The three-dimensional cultivation mode is not only applicable to the cultivation of tea but is also widely used in the cultivation of other crops <sup>[7]</sup>. Through scientific and rational planning and design, optimal utilization of different planting spaces can be achieved, improving crop yield and quality.

### **3.2. Improvement plan and technical means**

To better apply the three-dimensional cultivation model in the Suzhou tea industry, it is necessary to optimize the improvement plan and technical means based on the local climate and soil conditions. A reasonable design of the structure and layout of three-dimensional cultivation is crucial. Based on the actual situation in Suzhou,

selecting suitable intercropping tree species and pruning methods ensures sufficient spacing and ventilation space between tea trees, while maximizing the utilization of sunlight resources. Through scientific planning, the incidence of diseases and pests can be effectively reduced, and the use of pesticides minimized<sup>[8]</sup>. The introduction of efficient irrigation and fertilization techniques is key to the success of the three-dimensional cultivation model. At the same time, precise fertilization technology is adopted to apply chemical and organic fertilizers reasonably according to the growth needs of tea trees and soil nutrient conditions, improving the quality and yield of tea<sup>[9]</sup>. By using sensors and monitoring equipment, the growth status, soil moisture, and environmental parameters of tea trees are monitored in real time, allowing management measures to be adjusted timely to improve planting efficiency and tea quality.

## **4. The impact of three-dimensional cultivation on the value of output per acre**

### **4.1. The potential and estimation of increasing the value of output per acre**

The three-dimensional cultivation mode, as an efficient planting method, has enormous potential to increase the value output per acre of the Suzhou tea industry. It is estimated that after the reasonable application of the three-dimensional cultivation mode in the Suzhou area, the value output per acre may increase by 10% to more than 20%.

### **4.2. Analysis of the effect of comparing traditional cultivation models**

To gain a more intuitive understanding of the impact of the three-dimensional cultivation mode on the value of output per acre, a comparative analysis was conducted between it and the traditional horizontal planting mode. The three-dimensional cultivation mode is more convenient in planting management, utilizing mechanized equipment and intelligent technology, which can effectively reduce labor costs and improve production efficiency. However, traditional cultivation models require more manual cultivation and management, resulting in relatively high labor costs<sup>[10]</sup>.

## **5. The impact of three-dimensional cultivation mode and diversified sales mode on sales mode**

### **5.1. Market adaptability and competitiveness analysis**

With the development of the social economy and the diversification of consumer demand, the traditional tea sales model has gradually faced pressure. These two models have brought higher quality and high-yield tea to the Suzhou tea industry, making it more competitive in the market. Through three-dimensional cultivation, the quality of tea has improved, with a more delicate taste and richer aroma. At the same time, the three-dimensional cultivation mode increases the yield of tea and ensures a stable supply. This is crucial for expanding the market and meeting the growing demand for tea.

### **5.2. Advantages in expanding sales channels and market coverage**

Traditional tea sales mainly rely on wholesale markets and retail stores, limiting the market reach. By directly cooperating with tea processing enterprises or brands, tea farmers can supply high-quality tea directly to processing enterprises, achieving production and sales integration, reducing intermediate links, and improving profit margins. At the same time, tea processing enterprises can obtain a stable supply, ensuring product quality and supply stability. With the rapid development of the Internet, online sales channels have become an important trend in the tea industry. Tea farmers can directly communicate with consumers through online

platforms, achieve online sales of agricultural products, and expand market coverage. Additionally, developing the tea culture tourism industry can attract more tourists to visit, pick tea, experience the tea processing process, and engage in tea-tasting culture. The integration of tea culture and tourism can increase the added value of tea and bring more economic benefits to the Suzhou tea industry.

## **6. Sustainability assessment of three-dimensional cultivation models**

### **6.1. Environmental impact assessment**

To achieve the sustainable development of the Suzhou tea industry, it is necessary to comprehensively evaluate the impact of the three-dimensional cultivation mode on the environment. Compared to traditional horizontal planting models, the three-dimensional planting model has certain environmental advantages <sup>[11]</sup>. However, scientific evaluation of the following aspects is needed to ensure sustainability:

- (1) Soil protection: Through scientific management, the three-dimensional cultivation model can reduce the risk of soil erosion and loss, helping with soil conservation and improvement. However, excessive use of fertilizers or pesticides may negatively impact soil quality and requires reasonable control <sup>[12]</sup>.
- (2) Water resource utilization: The high-density planting of the three-dimensional cultivation mode makes water resource utilization more efficient, but attention should also be paid to whether it increases the pressure on irrigation water. The irrigation system should be planned reasonably to avoid waste <sup>[13]</sup>.
- (3) Pesticide use: The three-dimensional cultivation mode can help reduce the occurrence of diseases and pests, but attention should be paid to the reasonable use of pesticides to prevent adverse effects on the ecological environment and the impact of pesticide residues on consumer health.
- (4) Ecological balance: The introduction of three-dimensional cultivation models may impact the agricultural ecosystem. Comprehensive consideration should be given to the protection of ecological balance, such as preserving flowers and plants and maintaining ecological diversity <sup>[14]</sup>.

### **6.2. Economic feasibility analysis**

Evaluating the economic feasibility of three-dimensional cultivation models is crucial for ensuring their sustainability. The following factors are examined:

- (1) Investment cost: The construction of a three-dimensional cultivation model may involve high initial investments, including scaffolding, irrigation systems, and technical equipment. However, these investments will bring long-term stable returns to tea farmers.
- (2) Production cost: Compared to traditional models, the three-dimensional cultivation model may have higher production costs. This part of the cost can be compensated by increasing the yield and selling price of high-quality tea, ensuring investment returns.
- (3) Market demand: The evaluation of economic feasibility needs to fully consider the demand and price fluctuations of the tea market to ensure the stability of tea sales. Tea farmers can ensure that the produced tea meets market demand through market research.
- (4) Policy support: Government support policies for three-dimensional cultivation models, such as subsidies and preferential policies, play a positive role in improving economic benefits and providing policy guarantees for the sustainable development of three-dimensional cultivation models.

### **6.3. Social benefits and considerations of farmer benefits**

The promotion of the three-dimensional cultivation mode needs to consider its positive impact on social benefits and farmer benefits:

- (1) Employment opportunities: The three-dimensional cultivation model may create more employment opportunities, including technical personnel, management personnel, and farmers, helping alleviate rural employment problems.
- (2) Farmer benefits: The production and diversified sales model of high-quality tea will help improve the income level of farmers, enhance the living standards of rural residents, and achieve rural revitalization.
- (3) Local economic development: The development of the tea industry will promote local economic growth, drive the prosperity of related industries, and contribute to the healthy development of the local economy.
- (4) Social image: The promotion of the three-dimensional cultivation model helps enhance the image and reputation of Suzhou's tea industry, promote the development of the local culture and tourism industry, and boost the local brand influence.

Based on the evaluation of the above aspects, scientifically and reasonably promoting the three-dimensional cultivation model will help achieve the sustainable development of the Suzhou tea industry, ensuring balance and coordination in environmental, economic, and social benefits.

## **7. The prospects of Suzhou tea industry development**

### **7.1. The positioning of three-dimensional cultivation mode in Suzhou tea industry**

As an innovative planting method, the three-dimensional cultivation model has brought many advantages to the Suzhou tea industry. The three-dimensional cultivation mode maximizes the use of space and sunlight resources through scientific management and technical means, resulting in more robust tea trees and superior tea quality <sup>[15]</sup>. The high yield and quality of tea produced by the three-dimensional cultivation model provide a solid foundation for the Suzhou tea industry to expand its market and enhance its competitiveness.

### **7.2. Development advantages and response strategies**

The prospects for the development of the Suzhou tea industry are optimistic, with the three-dimensional cultivation model bringing new opportunities and challenges. By deeply exploring the development advantages of the three-dimensional cultivation model and formulating corresponding response strategies, the Suzhou tea industry will usher in a more prosperous future.

- (1) Improving tea quality: The three-dimensional cultivation mode provides a better ecological environment for tea growth and improves tea quality. The Suzhou tea industry should continue to strengthen scientific management and technical support to continuously improve tea quality and meet consumer demand for high-quality tea. Promoting the brand and establishing a certification system can enhance the visibility and reputation of Suzhou tea, further increasing its added value.
- (2) Diversified sales model: The Suzhou tea industry should actively expand online sales channels, develop e-commerce platforms, engage in social media marketing, and push tea to a wider market. Strengthening the packaging and brand promotion of tea products, creating personalized tea gifts, and attracting more consumer attention and purchases are essential strategies.
- (3) Tea culture inheritance: The Suzhou tea industry can develop tea culture tourism products, hold tea culture experience activities, attract more tourists to visit and taste, and promote the inheritance and development of tea culture. Strengthening tea culture education, cultivating more talents for tea culture inheritance, and promoting the innovation of tea culture are also vital.
- (4) Green and sustainable development: The Suzhou tea industry should adhere to the concept of green and sustainable development, strengthen environmental protection, reduce the use of chemical pesticides,

promote organic planting models, protect the tea ecological environment, and achieve long-term healthy development. Encouraging tea farmers to participate in ecological restoration and environmental protection projects will improve the sustainability and social responsibility of the tea industry.

## 8. Conclusion

The Suzhou tea industry has achieved an increase in tea production and quality through the three-dimensional cultivation model, opened up a direct consumption market, strengthened the development and promotion of tea processing products, and promoted the integration of tea culture and the tourism industry. The sustainability assessment of the three-dimensional cultivation model covers environmental impact, economic feasibility, and social benefits. Scientific promotion helps ensure the sustainable development of the Suzhou tea industry. In the future, the three-dimensional cultivation model will play a key role in the Suzhou tea industry, and measures such as improving tea quality, diversified sales, and tea culture inheritance will help the Suzhou tea industry achieve greater success. Emphasis on environmental protection and farmer benefits ensures that the development achievements of the Suzhou tea industry will better benefit society and the people.

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