

# Guangdong Tropical Agriculture Regional Distribution and Industrial Structure Situation: Perspective of Choice for Optimization and Adjustment

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**Abstract:** It is necessary to clarify the current regional layout and industrial structure of Guangdong tropical agriculture. Speed up the research on the selection of suitable industries for tropical agriculture, scientifically guide the concentration of various agricultural industries in the most suitable areas, help all kinds of social funds clarify the investment direction and key areas, promote the professional division of labor in agricultural regions, deepen the structural reform of agricultural supply side, and form a reasonable distribution of agricultural productivity, are of great importance. Focus on situation of agricultural regional distribution and industrial structure in tropical area of Guangdong, this research analyzes the characteristics, industrial development model and existing problems, and puts forward the optimization and adjustment path and policy suggestions of tropical agriculture in Guangdong. The characteristics include agricultural environment rich in resources, the industrial regional characteristics are distinct, advantageous industries gradually concentrated on advantageous regions, industrial structure become more and more reasonable, modern agricultural model has taken shape with good basic conditions, the "dumbbell" characteristics of agricultural industrial organization structure have gradually emerged, agricultural operation service organization led by supply and marketing cooperatives has been preliminarily established. The existing problems in developing tropical agriculture in sub-tropical areas of Guangdong include industrial structure and variety structure among counties need to be optimized, imperfect industrial chain, land fragmentation leads to the miniaturization of production and operation, the agricultural socialized service system needs to be further improved, imperfect agricultural technology extension system. The optimization and adjustment path of tropical agriculture in sub-tropical areas of Guangdong are making efficient tropical agricultural industrial structure and layout with appropriate scale regional agricultural products as the main body, selecting suitable industries and extend their industrial chain, constructing professional agricultural socialized service system, strengthening construction of grass-roots agricultural technology popularization system, enhancing agricultural cooperation between Guangdong-Hong Kong-Macao Greater Bay Area and Hainan Free Trade Port.

**Keywords:** Guangdong, Tropical Agriculture, Regional Distribution, Industrial Structure, Optimization and Adjustment

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## 1. Introduction

Located in sub-tropical area, Guangdong has her advantage of resource endowment and regional differentiation. She is the largest sub-tropical agricultural production area in China, and

the planting industry, animal husbandry industry, fishery industry and other agricultural industries are diversified, the differences between industries are also very significant. The

total output value, the average profit and the developing trend of each agricultural industry are different, and there are great differences in developing bottle-necks. Cities or counties have different support for various tropical agricultural industries. And the contribution rate of cost-benefit of various industries to the growth of farmers' income is different. Therefore, it is necessary to clarify the current regional layout and industrial structure of her tropical agriculture. So speed up the research on the selection of suitable industries for tropical agriculture, scientifically guide the concentration of various agricultural industries in the most suitable areas, help all kinds of social funds clarify the investment direction and key areas, promote the professional division of labor in agricultural regions, deepen the structural reform of agricultural supply side, and form a reasonable distribution of agricultural productivity, are of great importance.

## 2. Regional Distribution and Industrial Structure of Tropical Agriculture in Guangdong

Guangdong has unique advantage in developing sub-tropical crops. She has sufficient heat and evergreen seasons. Her total annual solar radiation is about 5000 MJ / m<sup>2</sup>, and the annual average temperature in the hot areas is 20-23°C. She has an average annual precipitation of 1500-2100 mm. In 2020, her population in sub-tropical area

is 82.46 million, and the rural per capita income is 17168 Yuan. From 2010 to 2019, the agricultural GDP increased year by year with an average annual growth rate of 7.65%, and the comprehensive agricultural production capacity continued to improve.

### 2.1. Regional Distribution Status

The distribution area of sub-tropical agriculture in Guangdong is mainly located in 20 prefecture level cities and 108 counties (districts) in the south of 24° north latitude (refer to Figure 1). The total area of subtropical region is 142,000 km<sup>2</sup>, accounting for 79.1% of the land area. Among them, the sub-tropical area of Guangdong Agribusiness Group Corporation is mainly distributed in 19 cities and counties (districts). They are Leizhou of Zhanjiang, Gaohua of Maoming, Jiangyang of Yangjiang, Daping of Jieyang, and Hailufeng of Shanwei. The total land area is about 1470.86 km<sup>2</sup>, accounting for 64.82% of the total land area of the whole reclamation area. The area suitable for planting subtropical crops is 120 kilo hm<sup>2</sup>, accounting for 81.59% of the total area of this area. The lowest altitude is the farms distributed in Xuwen of Leizhou, Suixi and Mazhang of Zhanjiang, with an average altitude of around 50m. In 2020, the total population of Guangdong agricultural reclamation is about 390000, with 40000 employees, the per capita salary of employees is 62353 Yuan per capita [1].

*Table 1. Distribution (planting scale) of main tropical fruits in Guangdong in 2019 (per 6.67 hm<sup>2</sup>).*

City	Total	Orange	Banana	Pineapple	Litchi	Longan
Guangzhou	95.69	5.50	9.08	0.16	45.50	11.95
Shenzhen	5.37	0.53	0.22	0.17	2.60	0.75
Zhuhai	8.84	0.21	0.83	0.01	4.17	0.60
Shantou	19.28	1.28	2.96	0.10	3.47	0.61
Foshan	3.03	0.13	1.29	0	0.26	0.73
Huizhou	91.57	26.74	14.57	0.60	28.41	12.21
Shanwei	48.68	1.50	3.34	2.00	20.77	3.57
Dongguan	19.31	0.01	2.96	0	13.44	1.85
Zhongshan	5.46	0.16	1.63	0.39	0.86	0.67
Yangjiang	76.80	7.17	6.60	0.09	35.03	15.52
Zhanjiang	147.59	8.43	43.18	42.95	25.88	7.18
Maoming	359.31	13.12	44.43	0.30	135.54	78.36
Zhaoqing	117.11	82.83	9.71	0.67	2.69	3.22
Qingyuan	73.72	38.55	1.22	0.01	2.13	1.31
Chaozhou	25.41	3.08	1.02	0.64	3.50	4.75
Jieyang	76.19	6.65	6.94	4.95	17.33	8.37
Yunfu	69.71	23.85	5.43	0.16	12.07	6.96

Note: The data are from Guangdong Statistical Yearbook (2020).

Income of agricultural reclamation is 25887 Yuan. The tropical crop industry with the highest output value accounts for about 50% of the total output value of agriculture in the sub-tropical region of Guangdong. She formed three advantageous industries with “Lingnan” Characteristic fruits, “Beiyun” vegetables and other local characteristic excellent and rare products, and developed a large number of

high-efficiency industries with local characteristics, such as tea, southern medicine, sericulture, oil tea and flowers. Her tropical crop industry and tropical fruits accounts for the highest proportion (88.92% of the total output value of tropical crops) (referred to Table 1). The distribution of other cash-able crops, livestock, poultry and aquatic products is shown in Figures 1-10.

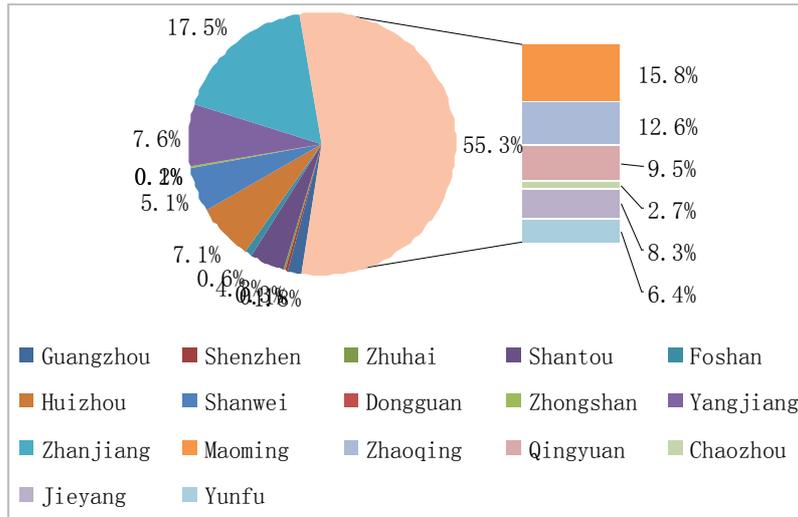


Figure 1. Distribution map of main grain crops.

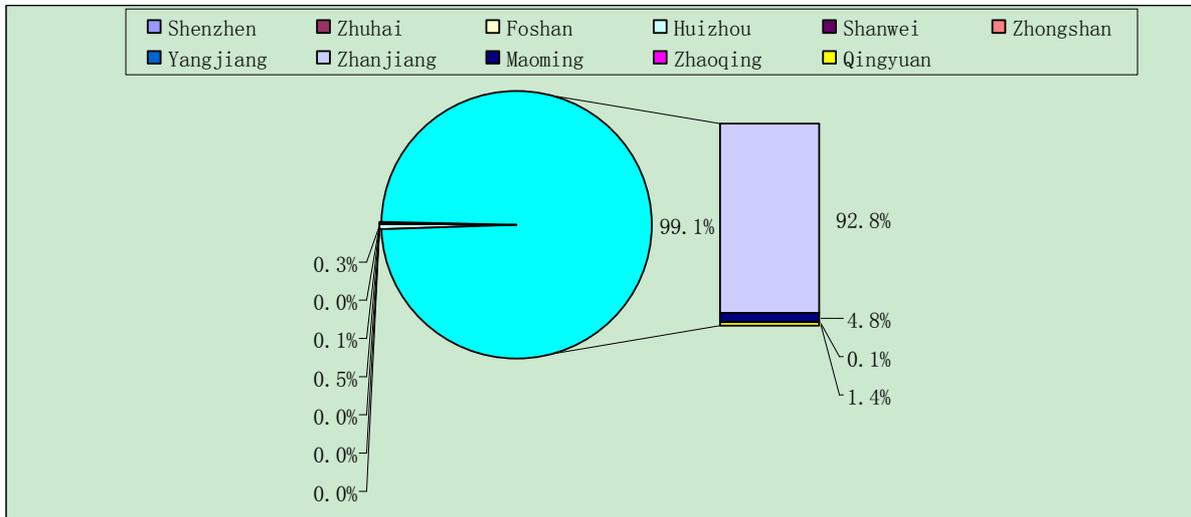


Figure 2. Distribution map of sugarcane.

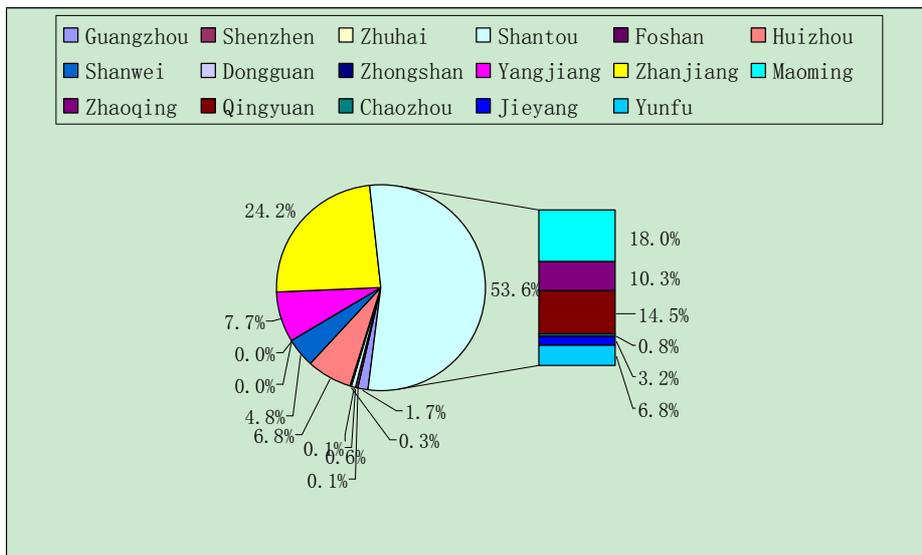


Figure 3. Distribution map of peanut.

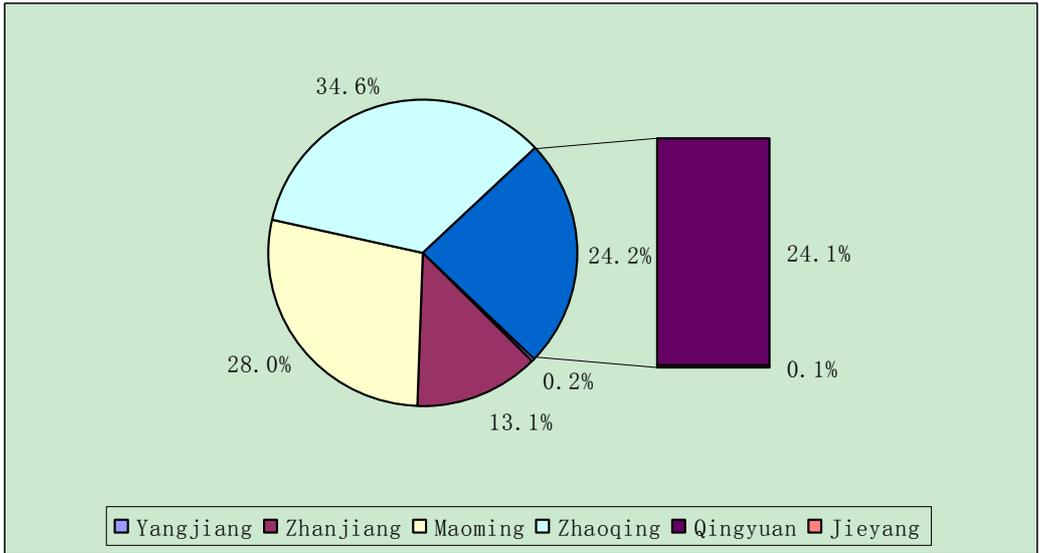


Figure 4. Distribution map of tobacco.

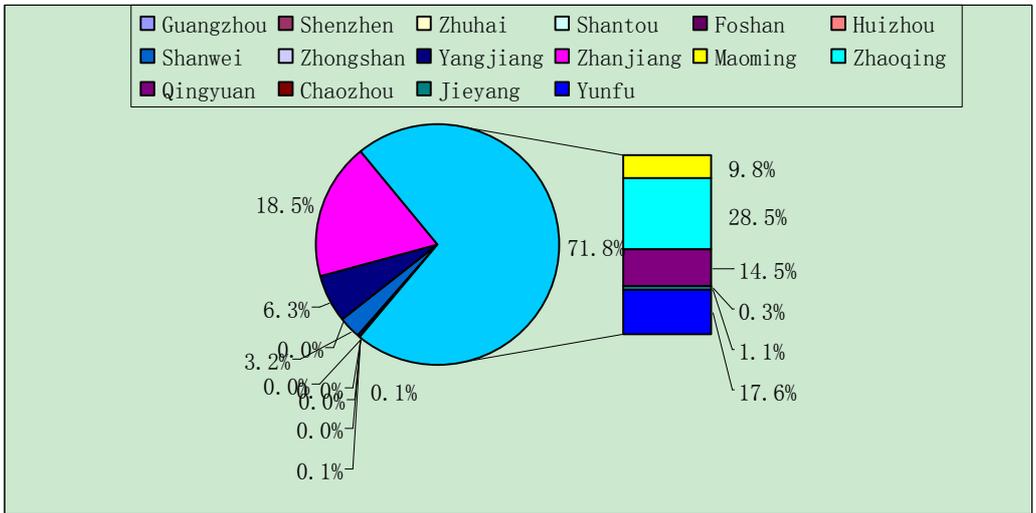


Figure 5. Distribution map of cassava.

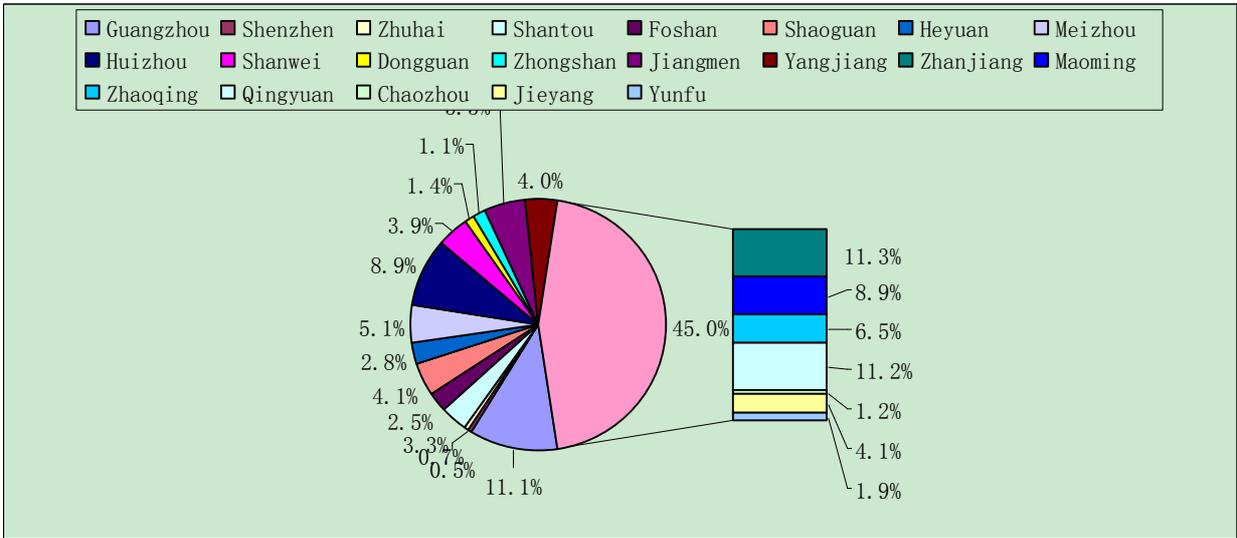


Figure 6. Distribution map of vegetables.

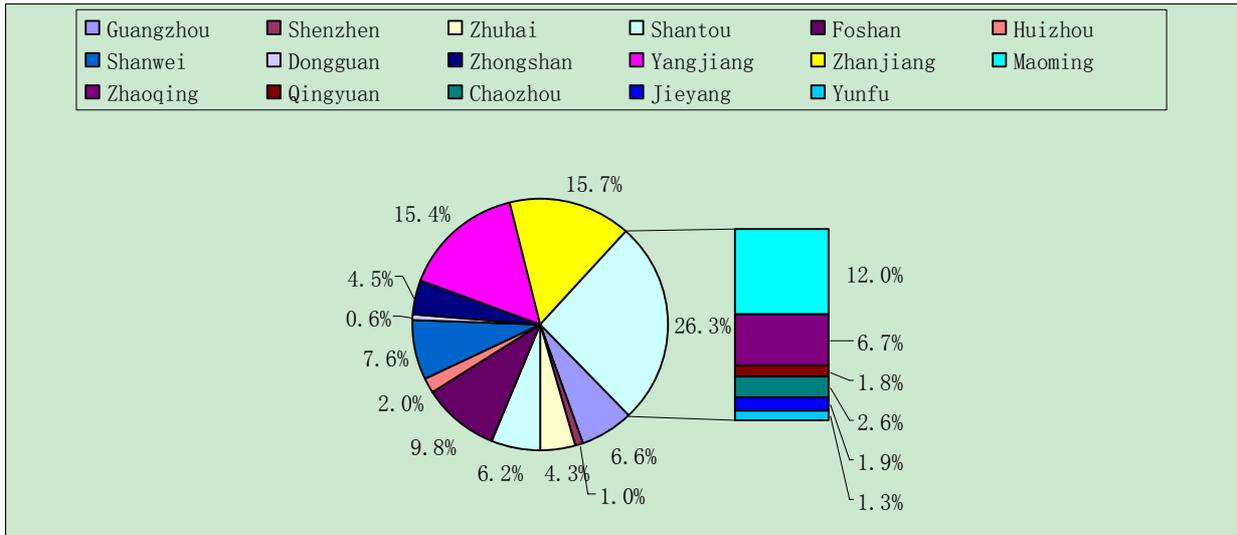


Figure 7. Distribution map of aquatic product.

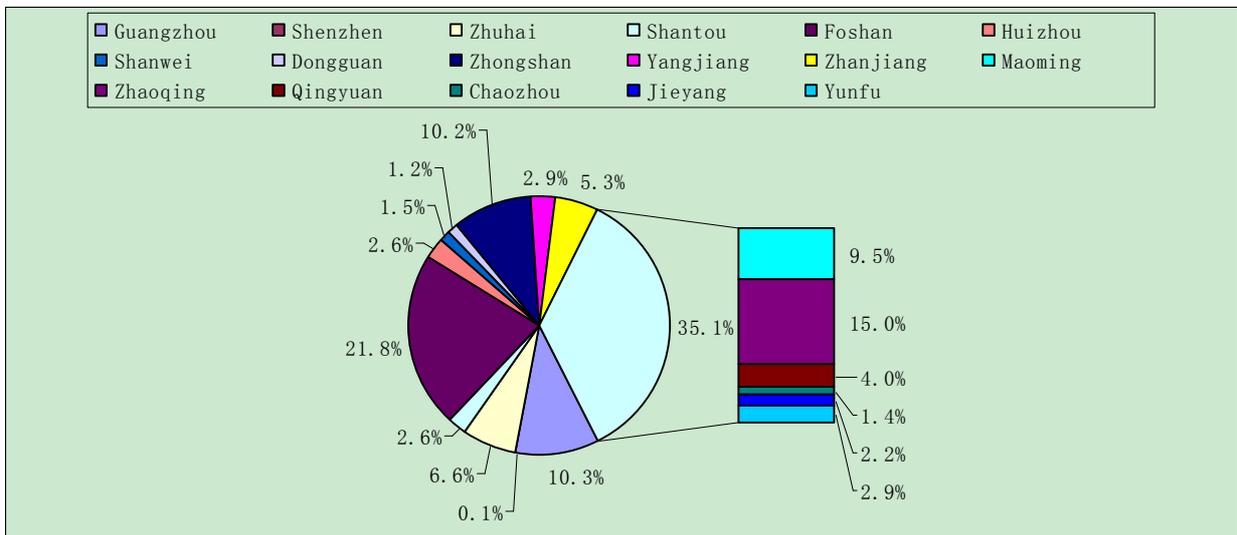


Figure 8. Distribution map of fresh water breeding.

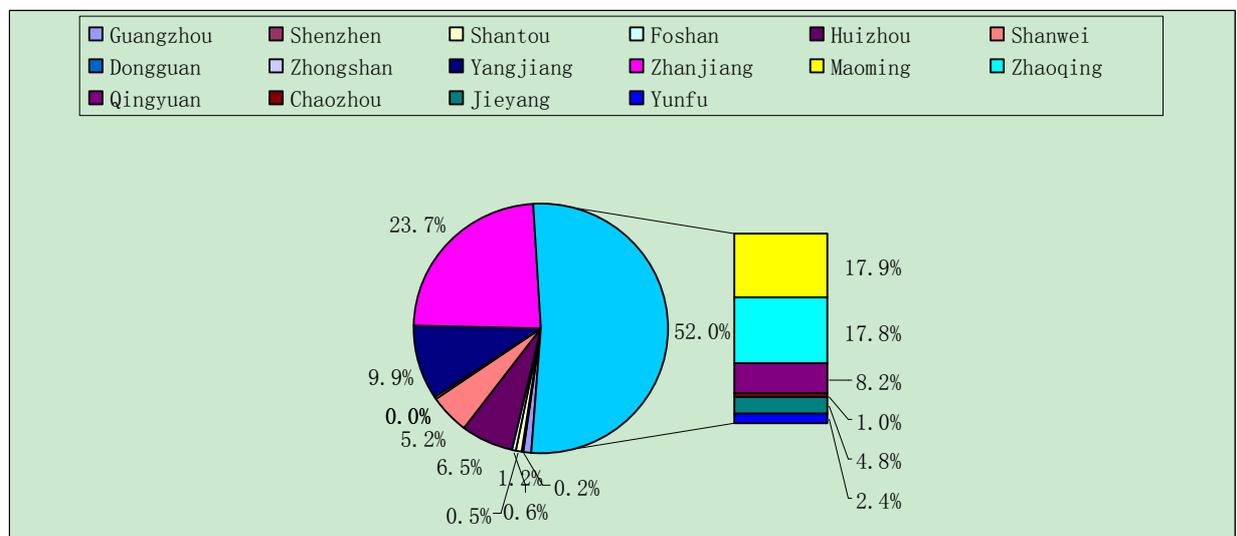


Figure 9. Distribution map of cattle.

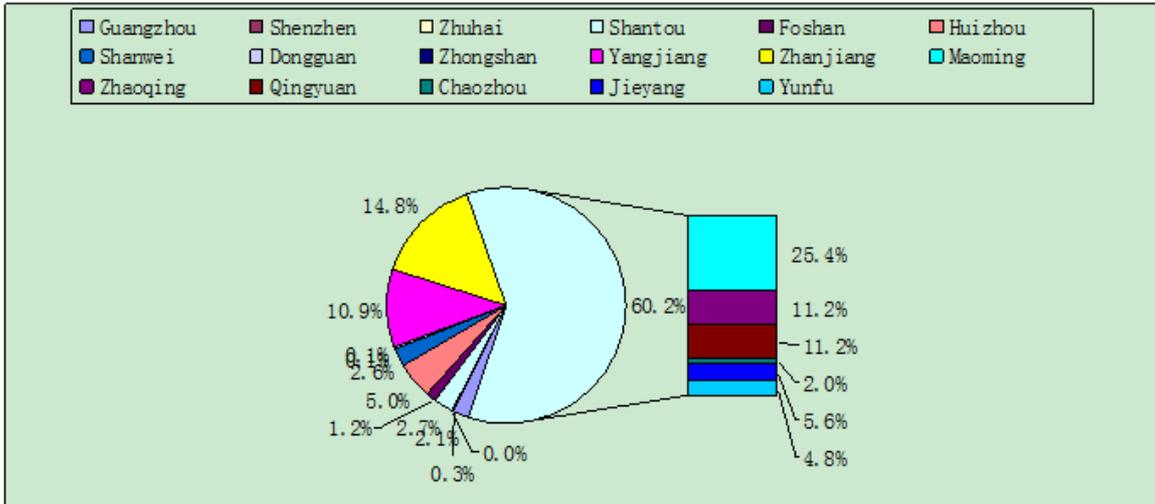


Figure 10. Distribution map of swine.

2.2. Current Situation of Industrial Structure

For the agricultural industrial structure of Guangdong sub-tropical area, agriculture, forestry, husbandry, fishery and service industries accounts for 48.95%, 5.41%, 18.91%, 21.98% and 4.75% respectively, and the evolution index of industrial structure is 0.57. From the perspective of internal structure, the proportion of agriculture and fishery has been increasing since 2010. At current prices, agriculture accounted for 48.95% in 2019, up 3.82 percent from 45.13% in 2010; Fishery accounted for 21.98%, an increase of 2.05 percent over 19.93 in 2011. The proportion of husbandry decreased year by year, down 6.89 percent; the overall proportion of forestry increased by 0.82 percent. The proportion of agriculture, forestry, husbandry and fishery services increased slowly year by year. Among the main crops, the planting area and yield of grain crops in hot areas have decreased year by year since 2010, and the planting area

and yield in 2019 have decreased by 9.46% and 0.67% respectively compared with 2010. Planting area and yield of the fruit increased by 0.54% and 56.73% respectively; planting area and yield of sugarcane increased by 9.16% and 16.69%; planting area and yield of peanut increased by 10.78% and 33.21% respectively; planting area and yield of tobacco decreased by 22.86% and 16.60% respectively; vegetable planting area and yield increased by 19.96% and 38.30% respectively; planting area and yield of tea increased by 72.61% and 105.95% respectively; meat production decreased by 9.40%, of which pork production decreased by 22.17%; the output of aquatic products increased by 25.46%, aquatic area decreased by 15.29% (while the maritime culture area decreased by 15.34%). The above data show that the planting area and yield of inefficient crops a downward trend, and the breeding area of livestock and poultry products and aquatic products has decreased due to the delimitation of the forbidden area [1, 2].

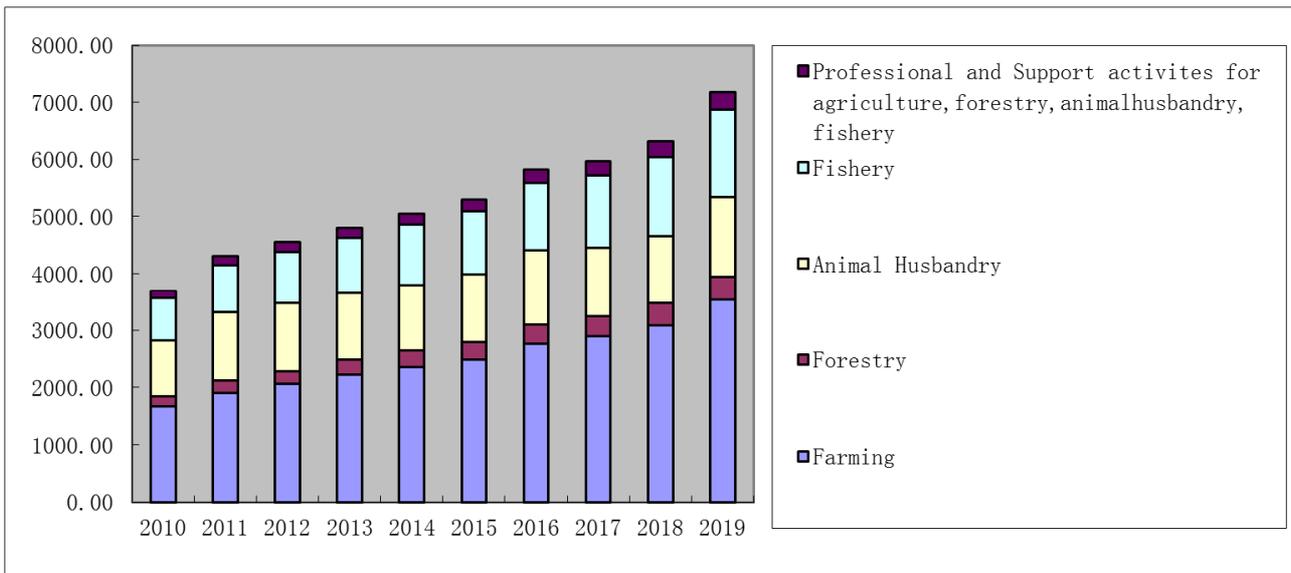


Figure 11. The trend of agriculture, forestry, husbandry, fishery and others from 2010 to 2019.

### 3. Guangdong Sub-tropical Area Characteristics, Developing Model and Potential of Tropical Agriculture

#### 3.1. Characteristics

##### 3.1.1. *The Agricultural Environment Is Rich in Resources and the Industrial Regional Characteristics Are Distinct*

Guangdong is the largest sub-tropical climate region in China. She is rich in water and heat resources, bio-diversity and variety resources. Many crop products have the characteristics of irreplaceable, scarcity and high commodity rate. Many products have strong competitiveness in domestic and foreign markets. It is an extremely favorable region for the development of planting and breeding industry, which is the inherent advantage of developing characteristic agriculture in Guangdong. As a lateritic soil region, Guangdong has different soil conditions and fertility, which constitute diversified agricultural products and their differential quality. Moreover, her agricultural products have large planting and breeding scale, excellent varieties and high yield, which are not available in other provinces. For example, the self-sufficiency rate of vegetables has reached more than 100%, and the “characteristics” of tropical agriculture in Guangdong are prominent and have distinct regional characteristics.

##### 3.1.2. *Advantageous Industries Gradually Concentrated on Advantageous Regions, Industrial Structure Becoming More Reasonable*

Driven by economies of scale and also by abundant capital, tropical agricultural industry in Guangdong breaks through administrative regions and concentrates on specific geographical areas of agricultural resources, so as to form industrial belts or industrial clusters with certain scale and obvious regional characteristics, such as the pineapple industrial belt in Xuwen as “boluo de hai” (Pineapple Sea). The industrial structure is also constantly adjusted, reducing the planting scale of inefficient crops such as rice and soybeans, increasing the planting scale of efficient crops such as tropical fruits and vegetables, and increasing the output of aquatic products [3].

##### 3.1.3. *Good Basic Conditions, Modern Agricultural Model*

Guangdong has a strong economic foundation, complete service system, modern information means, open agricultural market and advanced development concept, and the quality of farmers is high (senior high school and above account for 11.4%, higher than the national average level of 8.3%), which provide favorable conditions for the implementation of modern agriculture [4]. At present, Guangdong has formed a modern agricultural model of “platform, knowledge-based characteristics, park standardization, modernization and informatization”. The effective application of these achievements has promoted the mutual promotion and

coordinated development of tropical characteristic agriculture and modern agriculture.

##### 3.1.4. *The “Dumb-Bell” Characteristics and the Agricultural Operation Service*

The industrial organization in the agricultural system began to appear polarization, and the industrial organization structure showed the characteristics of “dumb-bell”, that is the whole industry composed of the vast majority of small and medium-sized enterprises and a small number of large multinational corporations. Large numbers of small and medium-sized enterprises in the industrial system provide huge spaces and conditions for the development of agricultural and rural economy. At the same time, as one of the pilot provinces of comprehensive reform in China, Guangdong has initially formed a modern agricultural management and service system connected with the grass-roots organization system through the leading drive of provincial supply and marketing cooperatives, market operation and joint cooperation in recent years, so as to play a positive role in the organic connection between small farmers and modern agriculture [5]. In addition, focusing on the high-quality life circle in Guangdong-Hong Kong-Macao Greater Bay Area and the new development pattern of “one core, one belt and one area” in Guangdong, the construction of a cold chain logistics backbone network of Guangdong supply and marketing public agricultural products is promoting. Meanwhile creating “one center + two regional networks + three operation platforms”, and building a main production area and main sales area of characteristic and advantageous agricultural products covering the whole province Integrated cold chain logistics guarantee system of agricultural products from field to table [6].

#### 3.2. Developing Model

The developing model of tropical characteristic agriculture in Guangdong is diversified. According to her own regional characteristics, she can develop an ecological resource-based model based on the basic conditions for regional agricultural characteristic industries, a consumption market-based model based on the consumption market of product market supply and demand, and a scale benefit model based on its own development (scale and organization) conditions, the industrial chain benefit model based on the industrial chain related to and supporting industry construction. The variety of industrial developing models provides rich paths for developing characteristic agriculture. The main models are summarized into the following four categories.

##### 3.2.1. *Transformation and Quality Improvement Model of Traditional Advantageous Agriculture*

The main performance models are cultural and creative agriculture, facility agriculture, adoption agriculture, etc.

It includes the following aspects.

Firstly, adjust and optimize the variety structure of traditional advantageous industries such as litchi, banana and

citrus, select advantageous varieties for differential planting, and realize the listing in different peaks and seasons.

Secondly, promote the construction of advantageous industrial belts and large industrial bases such as shrimp, tilapia and vegetables, create a new pattern of development of one village, one product, one county and one industry, focus on supporting leading enterprises and farmers' cooperatives engaged in processing, production and circulation, and realize regional industrialization and clustering.

Thirdly, it is needed to strengthen the brand building of advantageous industries, implement the strategy of rejuvenating agriculture by quality and green, optimize the internal quality and external packaging of products, and improve brand awareness, market influence and international competitiveness through investment attraction, grafting transformation and export promotion [7-9].

### **3.2.2. Green Agricultural Development Model**

The main modes include “rice +” green production mode, livestock and poultry ecological circulation breeding mode, etc.

It is included the following aspects.

Firstly, improve subsidy policies, increase the transparency of subsidy information, implement existing subsidies such as the purchase of agricultural machinery and the resource utilization of livestock and poultry manure, add preferential subsidies, and mobilize farmers' enthusiasm for production investment.

Secondly, strengthen the construction of standardized bases for broilers, pigs and rice, focus on supporting and expanding key pig farms and a number of large-scale broiler farms in western Guangdong, support 42 major rice producing counties to build high-yield, stable and high-standard farmland, and consolidate the foundation of agricultural production capacity.

Thirdly, promote environmental protection breeding, actively carry out large-scale breeding of livestock and poultry, pollution control and comprehensive utilization, scientifically deal with livestock manure and sewage, and develop resource-saving and environment-friendly industries.

Finally, strengthen the quality, safety and price supervision of pigs and grain, improve the ability of market emergency regulation, and establish and improve the safe production norms, quality and safety supervision system and product traceability system of agricultural products “from field to table” [10].

### **3.2.3. Diversified Developing Model**

The main performance mode is “characteristic industry + cultural industry + leisure tourism industry” and so on. It includes the following aspects.

Firstly, improve the support policies for characteristic industries, establish a risk compensation fund for characteristic industries, establish a new insurance mechanism and credit support system with multiple types and structures to protect farmers' interests and promote farmers' income.

Secondly, promote the construction of innovation team of industrial technology system, improve the independent innovation ability of key industrialization technologies, and use high and new technologies such as information technology,

biotechnology and new materials to expand and strengthen characteristic industries.

Thirdly, establish a modern market logistics and marketing system for characteristic industries, and create a new consumption mode of online negotiation marketing and offline picking experience through “e-commerce + constant temperature cold chain logistics + cultural marketing + quality and safety traceability” system.

Fourthly, encourage leading enterprises to participate in poverty alleviation in poor villages, drive scattered small farmers and poor households to carry out projects such as base supporting, new rural construction and modern characteristic agricultural industrial park construction, gather human resources, land and other factors, and promote the organization and large-scale development of characteristic industries.

Finally, adopt talent incentive policies and talent flow policies to encourage professionals in characteristic industries to join the front line of production, carry out technical reporting, or attract high-end talents to return home to guide the development of characteristic industries by hiring township talents [11].

### **3.2.4. Linkage Developing Model of Upstream and Downstream Industries**

While developing the agricultural industry, the linkage development with its upstream and downstream industries must be strengthened.

It includes the following aspects.

Firstly, strengthen variety improvement, actively select, develop and apply new varieties, conduct in-depth research on deep processing, cold storage and preservation, Internet information and other technologies, and develop various new technologies.

Secondly, build a new agricultural socialized service system based on public service institutions, agricultural cooperatives, leading enterprises and the combination of public welfare services and operational services, expanding on the basis of traditional services such as technical training and means of production supply, and provide all-round services for warehousing and logistics, e-commerce and brand publicity.

Thirdly, promote the integrated development of primary, secondary and tertiary industries. Through the cross penetration, optimization and reorganization of capital, technology, talents, market and management methods between agriculture and related industries, realize the integrated development of agricultural production and upstream breeding R & D, downstream processing and preservation, e-commerce sales, leisure agriculture and rural tourism, open up and extend the industrial chain, improve the value chain and improve the interest chain.

## **3.3. Developing Potential Analysis**

### **3.3.1. Abundant Available Land Resources and Water Resources**

The sub-tropical areas of Guangdong have great development potential in agricultural land resources, land

efficiency and water resource utilization. In 2019, the total area of Sub-tropical crop land in the tropical region of her is 142000 km<sup>2</sup>, accounting for 79.1% of the land area of the province, with large land use space.

### 3.3.2. Adequate Good Varieties and Seedlings

With the implementation of the rural revitalization strategy, the scientific and technological level of tropical agriculture in Guangdong has been continuously improved with sufficient excellent varieties and seedlings available. In 2020, Guangdong has 150 new varieties of high-quality, green and efficient crops, and the breeding capacity of new seedlings will exceed 100 million. The number of national and provincial livestock and poultry genetic resources conservation farm reserves, national pig core breeding farms, national broiler core breeding farms and improved seed expansion and promotion bases will rank first in China. The continuously improved scientific and technological level provides a technical guarantee for the tropical agriculture will be future developing [12].

### 3.3.3. High Brand Maturity

Driven by a series of measures, the development of tropical agriculture in Guangdong has changed from potential to strength. Through the vigorous development of tropical agricultural industry, the characteristic planting and breeding industry ranks in the forefront of the country.

Through the construction of agricultural brands, 6 national regional public brands were cultivated, 3571 “three products and one standard” agricultural products and 1400 business card agricultural products were identified.

Moreover, by strengthening the quality and safety supervision of agricultural products, a national quality and safety city was created, and the qualified rate of national routine monitoring of vegetables, fruits, livestock and poultry products and aquatic products ranked first in the country.

Modernization, marketization and specialization are the future development direction of Chinese agriculture. The tropical agriculture of Guangdong has been realized the development from potential to strength, through industrial structure adjustment, agricultural brand construction and rural industry development [13].

### 3.3.4. Improving Social Resources and Environment

In recent years, various agricultural related policies and measures have been effectively implemented in the tropical areas of Guangdong, and remarkable achievements have been made in the reform of rural land system, rural collective property right system and new rural construction. In 2019, the confirmation rate of rural land rights in this area was 97.21%, and the rate of equity certificates issued by rural collective property rights also reached 97%. 99.7% of all villages have access to roads, 98.5% have access to broadband Internet, and 95.36% have access to harmless sanitary household toilets in rural areas.

The cultural quality of agricultural production and operation personnel has been improved, and the proportion of education level of production and operation personnel has

increased by 5.3%, 4.8% and 0.9% respectively compared with 10 years ago.

The improvement of environment and personnel quality has greatly changed the backward situation of farmers' ideas, improved the cohesion of farmers, and various agricultural management measures such as building a new business entity and accelerating land transfer have been recognized by farmers, providing a stable social environment for developing tropical agriculture [14].

## 4. Problems in Developing Tropical Agriculture in Subtropical Areas of Guangdong

Although the development of tropical agriculture in hot areas of Guangdong has made remarkable achievements in the “13<sup>th</sup> Five Year Plan” period, there is still a certain distance from the full realization of agricultural modernization.

In particular, as the national agricultural development enters the “double high and double tight” stage of “high cost and high risk, tighter resource and environmental constraints, and shortage of rural young and middle-aged labor force”, coupled with the deepening and sustainability of the new economic normal characterized by weak foreign trade, insufficient domestic demand and economic slowdown, there are many problems in the development of tropical agriculture in Guangdong, such as more people and less land, fragmented land, miniaturized operation problems such as service decentralization have become more prominent.

### 4.1. The Industrial Structure and Variety Structure Among Counties Need to Be Optimized

Although the benefit of tropical agriculture in Guangdong is higher than that of traditional agriculture, on the whole, the agricultural industrial structure and variety structure are still unreasonable, and a characteristic agricultural industrial zone or industrial belt with high international competitiveness have not been formed.

For example, although the planting industry has formed characteristic product industrial areas such as banana industrial belt and pineapple industrial cluster, the international competitiveness of products in these industrial areas or industrial belts is low, and there are often unsalable phenomena.

Moreover, there are still some problems in the sub-tropical area of Guangdong, such as the similarity of product production among counties, product homogeneity and many low-end products, which are difficult to fully and effectively meet the market demand of diversified, characteristic and high-quality agricultural products.

In terms of animal husbandry, mainly grain consuming pigs and chickens, and the production scale of beef, mutton and other products is relatively insufficient [15].

### 4.2. Imperfect Industrial Chain

From the perspective of industrial chain, the added value of

tropical agricultural products is not high, and the industrial value chain as a whole is still in the low-end link. From the perspective of industrial integration, the degree of industrial integration in subtropical areas is low and the level is shallow. In addition, although Guangdong has many advantages and characteristic agricultural products, it obviously lacks well-known brands famous in domestic and foreign markets.

There are only a few well-known brands in Guangdong with high prominence and influence in the international market. We need to strengthen efforts to develop a number of independent brands carrying “Lingnan” culture.

At present, the United States, Japan, France and other countries have entered the era of agricultural industrialization and branding earlier. Above of countries take brand building as their national strategy to participate in global agricultural competition.

#### ***4.3. Land Fragmentation Leads to the Miniaturization of Production and Operation***

Although the tropical agricultural industry in the subtropical area of Guangdong has formed a certain scale. However, the phenomenon of land fragmentation is wide-spread. The output rate is low. The scale benefit is low. The agricultural labor cost and logistics cost are increasing. The traditional measures increased agricultural income are becoming weaker and weaker. The continuous growth of farmers' income is facing great downward pressure, and the scale benefit of agricultural production needs to be further improved.

#### ***4.4. The Agricultural Socialized Service System Needs to Be Further Improved***

At present, the cold chain logistics guarantee system of agricultural products in Guangdong is becoming much more perfect, but the professional agricultural socialized service system of the whole industrial chain still needs to be further improved.

Due to the increasing shortage of rural labor force engaged in agriculture and the serious aging phenomenon, agriculture is generally extensive managed. Facing the fierce competition and ever-changing market, scattered and weak farmers are difficult to overcome their own weaknesses.

The farmers have “functional defects” to enter the market and participate in market competition, and most of the transaction methods of sales channels are more traditional. However, there isn't enough local professional socialized service organization for production links, and the development of agricultural product market operators is not perfect.

Agricultural product marketing mainly depends on the marketing network established by brokers. These brokers had put their own interests first, ignored the interests of farmers. Farmers are unwilling to join various cooperative organizations.

Small production is difficult to connect with large markets and large circulation at home and abroad. It is difficult to

improve the competitiveness of tropical agricultural products.

#### ***4.5. Imperfect Agricultural Technology Extension System***

Due to the shortage of agricultural technology extension personnel and imperfect system in subtropical areas of Guangdong, farmers basically rely on their own agricultural experience to carry out agricultural production, and have less contact with new technologies and varieties. Moreover, with the rapid development of Guangdong economy in recent years, a large number of agricultural labor force has been transferred from rural areas to urban areas to work and do business. The people left behind in rural areas engaged in agricultural production are mostly old, weak, sick and disabled and women. Most of them have low cultural quality, poor acceptance of new varieties and technologies, and their investment in agriculture is also very limited, accustomed to the current production mode and agricultural products. Various factors lead to difficult and slow promotion of new tropical varieties and technologies, slow increase of farmers' income and low industrial benefits.

## **5. Adjustment and Optimization Path of Tropical Agriculture in Subtropical Areas of Guangdong**

### ***5.1. Making an Efficient Tropical Agricultural Industrial Structure and Layout with Appropriate Scale Regional Agricultural Products as the Main Body***

On the whole, tropical agriculture in the subtropical area of Guangdong is still in the development stage, and the development of tropical characteristic agricultural products will be greatly improved in the future. At present, tropical fruit and vegetable products, livestock and poultry products and other characteristic agricultural products have begun to take shape and have achieved certain popularity. In the next step, it is suggested to take the overall urban planning and overall land use planning as the guide, integrate multiple regulations, do a good job in market research, reasonably allocate land resources required by the industry, reasonably plan industrial land, and do a good job in land reserve, technology reserve and talent reserve according to the positioning of Tropical Agriculture in the “14<sup>th</sup> Five Years” plan of Guangdong agriculture, Meet the construction and facility land needs of enterprises intending to settle in to meet the industrial needs. On the basis of improving the basic conditions necessary for agricultural production, with interests as the link and under the guidance of village administrative organizations and party organizations, develop an appropriate scale operation dominated by the joint operation of “leading enterprises + village collectives + planters or village collectives + small farmers”, so as to avoid the problem of property right integration formed under the discourse of giving farmers greater land rights,

At the same time, it can stimulate farmers' labor enthusiasm and initiative, give full play to the flexibility of small-scale

farmers' management, create an efficient tropical agricultural industrial system with appropriate scale regional agricultural products as the main body, and form a diversified industrial structure and layout while improving the scale efficiency of leading industries.

### ***5.2. Select SUITABLE Industries and Extend Their Industrial Chain***

According to the resource endowment, industrial characteristics and location characteristics of subtropical areas in Guangdong, it is suggested as follows.

Leizhou of Zhanjiang should take tropical fruits as the leading industries, develop characteristic breeding industry, vegetables, tea industry, sightseeing and leisure agriculture in combination with regional characteristics, and build a well-known brand of coastal leisure agricultural products.

Gaohua of Maoming takes Litchi and Longan as the leading industries, and develops the modern logistics industry and modern marketing system of livestock, poultry and agricultural products with Gaozhou chicken, pig and other characteristics in combination with regional characteristics.

Taking vegetable industry as the leading industry, Jiangyang of Yangjiang develops characteristic breeding industries such as characteristic fruit trees and Jiangyang geese in combination with regional characteristics, supplemented by sightseeing agriculture, and which ensures the development of natural rubber industry.

For the characteristic agricultural products in each region, the government, joint enterprises and growers improve brand awareness, market influence and international competitiveness through investment attraction, grafting transformation and export promotion, so as to promote the transformation of parks into scenic spots, rural parks and agricultural products into commodities.

At the same time, the following measures should be taken into account to promote the "succession" of the industry.

Firstly, strengthen variety improvement, actively select, develop and apply new varieties, conduct in-depth research on deep processing, cold storage and preservation, Internet information and other technologies, and develop various new technologies.

Secondly, coordinate and promote the coordinated development of intensive and deep processing, primary processing and comprehensive utilization processing of agricultural products, and organically connect and deeply integrate with upstream and downstream industries such as special raw material production, warehousing logistics (including cold chain logistics) and market consumption. At the same time, it is necessary to regularly monitor and analyze the production capacity layout of intensive processing and comprehensive utilization of bulk agricultural products, and optimize the industrial chain layout.

Thirdly, guide the intensive processing capacity of agricultural products to gather in the layout of important agricultural product production protection areas, characteristic agricultural product advantage areas, modern agricultural demonstration areas and modern agricultural industrial parks,

promote the local and nearby transformation and value-added of agricultural products, develop to processing parks, industrial agglomeration areas and logistics nodes, achieve energy conservation, emission reduction, cost reduction and consumption reduction, improve the market competitiveness of tropical agricultural products, and rely on big data cloud computing and other information-based means to accelerate the formation of a new mode of production development led by intensive processing with special varieties, customized production and marketing.

Fourthly, build a new agricultural socialized service system based on public service institutions, agricultural cooperatives, leading enterprises and the combination of public welfare services and operational services, expand on the basis of traditional services such as technical training and means of production supply, and provide all-round services for warehousing and logistics, e-commerce and brand publicity.

Finally, vigorously promote the integrated development of primary, secondary and tertiary industries. Through the cross penetration, optimization and reorganization of capital, technology, talents, market and management methods between agriculture and related industries, realize the integrated development of agricultural production and upstream breeding R & D, downstream processing and preservation, e-commerce sales, leisure agriculture and rural tourism, open up and extend the industrial chain, improve the value chain and improve the interest chain.

### ***5.3. Constructing a Professional Agricultural Socialized Service System***

Guided by the strategy of "putting forward one after another cross-border transformation and development", we should pay attention to reform, promote circulation and flexible marketing, cultivate new professional agricultural socialized service subjects by means of reward and punishment policies, constantly innovate service organization forms, circulation methods and marketing means, promote the effective connection between the production and marketing of agricultural products, and improve the marketing level of tropical agricultural products in Guangdong.

### ***5.4. Strengthening the Construction of Grass-roots Agricultural Technology Popularization System***

It is necessary to further deepen the construction of grass-roots agricultural technology popularization system, and provide financial guarantee according to regulations. At the same time, the government would guide social resources to actively participate in agricultural technology popularization, encourage and support agricultural related majors in universities and colleges to engage in agricultural technology extension services in villages and towns, and optimize the agricultural technology extension team. It is Necessary to improve the level of information technology in the Internet plus, build a batch of agricultural science and technology demonstration bases, establish a long-term mechanism for the training of new professional farmers and agricultural

management talents, comprehensively improve the quality and management level of agricultural workers, accelerate the development of specialized and socialized agricultural service organizations, reasonably allocate elements based on the market, and support large professional households and various business entities to take the lead in organizing professional service organizations. Also it is necessary to strengthen the cooperation between relevant departments, and exploring the establishment and improvement of system design and subsidy methods for new professional farmers to participate in social security.

### 5.5. Enhancing Agricultural Cooperation Between Guangdong-Hong Kong-Macao Greater Bay Area and Hainan Free Trade Port

Guiding of the outline of the developing plan for Guangdong-Hong Kong-Macao Greater Bay, combining with the planning outline of the reform and development plan of the Pearl River Delta (2008-2020), the Joint Declaration on deepening cooperation in the Pan Pearl River Delta (2015-2025) and etc, it is essentially study the Belt and Road Initiative, identify the location, find the industrial integration development point, break the policy barriers and regional segmentation situation in the region, build a complementary development platform with the advantages of Guangdong and the city, and do the best to make the agricultural brand of the high agricultural industry high and strong.

Meanwhile, with the help of the policy dividend of “zero tariff, low tax rate, customs closure operation, free trade and free personnel movement” of Hainan FTP [16], and the strong capital of Hong Kong and Macao, local and abroad cooperation to build high-quality and efficient agricultural production bases, support the leading industries going out, and develop “the Belt and Road” agriculture and build a platform for agricultural international service trade must be done.

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