

# **Development History, Current Situation and Countermeasures of Agricultural Mechanization in Fujian Province**

**Qingqing Yuan<sup>1</sup>, Xiaoling Huang<sup>2</sup>, Xingwei Deng<sup>1</sup>, Shiya Zhang<sup>1</sup>, Yang Cheng<sup>1</sup>, Huangwei Li<sup>1</sup>,  
Minling Ling<sup>1</sup>, Renshan Xie<sup>3</sup>, Zhizhong Xie<sup>2,\*</sup>**

<sup>1</sup>*Anxi College of Tea Science (College of Digital Economy), Fujian Agriculture and Forestry University, Quanzhou, Fujian, China*

<sup>2</sup>*Chen Shouren College of Business, Quanzhou Normal University, Quanzhou, Fujian, China*

<sup>3</sup>*Quanzhou Rural Revitalization Group Co, Ltd, Quanzhou, Fujian, China*

*\*Corresponding Author.*

**Abstract:** Agricultural machinery, as the main force of modern agricultural production, is an important foundation for transforming traditional agricultural production methods and improving agricultural productivity. This paper systematically combs the development history of agricultural machinery in Fujian Province in the order of the timeline, summarizes the current situation of the development of agricultural mechanization in Fujian Province as well as the problems, and further puts forward countermeasures and suggestions to promote the high-quality development of agricultural mechanization in Fujian Province. It puts forward countermeasures and suggestions to promote the high-quality development of agricultural mechanization in Fujian Province.

**Keywords:** Agricultural Mechanization; Development Course; Development Status; Countermeasures and Suggestions

## **1. Introduction**

Fujian as a coastal economic province, "eight mountains, one water, one field" of Fujian, the territory of mountains and hills accounted for about 80% of the total land area, is a typical hilly and mountainous areas, the topography is complex, large differences, climate change is varied, the farmland infrastructure is relatively weak. Agricultural machinery is the key hand of agricultural and rural modernization and the main force of modern agricultural development [1], providing strong equipment support for the development of modern agriculture in Fujian Province. In recent years, the People's Government of Fujian Province

vigorously promote agricultural mechanization, based on the characteristics of the hilly and mountainous areas of Fujian, to serve the strategy of rural revitalization, to meet the needs of agricultural production as the goal, to accelerate the promotion of transformation and upgrading of the agricultural machinery and equipment industry, and continue to promote the whole process of comprehensive mechanization of agricultural production, and accelerate the enhancement of the ability of socialized services of agricultural machinery. Since 2010, the comprehensive mechanization level of crop cultivation, planting and harvesting in Fujian Province has been growing steadily year by year, and the mechanization level has reached 73.5% by 2022, surpassing the national average of 73%. Agricultural mechanization as a major boost to the rapid development of agriculture in Fujian Province, review the development of agricultural machinery in Fujian Province, there are a number of experiences that can be drawn on, but behind the rapid development of agricultural mechanization there are also some long-term constraints on the development of agricultural mechanization problems that need to be resolved. Therefore, this paper summarizes the current situation of the development of agricultural mechanization and the existing problems by sorting out the history of the development of agricultural mechanization in Fujian Province, in order to provide a certain factual basis and development suggestions for the healthy and high-quality development of agricultural mechanization in Fujian Province.

## **2. Development History of Agricultural Mechanization in Fujian Province**

Since the founding of New China in 1949, Fujian Province has been moving forward in the development of agricultural mechanization. Especially after the implementation of the reform and opening-up policy in 1978, Fujian Province has made efficient achievements in the development of agricultural mechanization, contributing to the construction of new rural areas and the modernization of agriculture and rural development. Agricultural mechanization, as the main force of modern agricultural development, is the key to high-quality agricultural development [2]. Reviewing the history of agricultural machinery development in Fujian Province for more than 70 years, it can be roughly divided into the following five stages.

### **2.1 Initial Development Stage**

From 1949 to 1978, agricultural mechanization in Fujian Province had a weak foundation and was still in the initial stage of development. As a result of the highly centralized planned economy system in China at this stage, agricultural machinery was owned and operated collectively by the State. Agricultural machinery production and management activities are planned and deployed by the State, and the State promotes the development of agricultural mechanization through a variety of administrative means, encourages and promotes the masses to carry out technological innovations related to agricultural machinery and equipment, helps mature production teams to set up special agricultural machinery stations, and increases the input of farmers in the education, promotion and use of agricultural machinery and technical maintenance. Between 1966 and 1978 and held three successive national conference on agricultural mechanization, the meeting determined that by 1980 China's basic realization of the goal of agricultural mechanization, to the pre-reform and opening up China has formed a basic system of agricultural machinery development. During this period of development, agricultural machinery in Fujian Province has been developed to a certain extent, and the total power of agricultural machinery increased from 0.2 million kilowatts at the beginning of the founding of the People's Republic of China to 1,380,800 kilowatts in 1978, but in general, agricultural machinery is still relatively small,

and mainly relies on manual labor and animal power for cultivation.

### **2.2 Autonomous Development Stage**

From 1979 to 1983, agricultural mechanization in Fujian Province began to step into the stage of farmers' autonomy. In December 1978, the State established the policy of reform and opening up. Since then, China's internal reform and opening up to the outside world opened the curtain, the implementation of the household contract responsibility system, making the original pattern of agricultural machinery development change [3]. Since 1980, the national policy system of agricultural mechanization has been adjusted to the mechanism of "plan + market", and farmers have autonomy over the operation and use of agricultural machinery and have begun to buy and use agricultural machinery to replace traditional human and animal labor, and the ownership of agricultural machinery has been increasing rapidly. By the end of 1983, the total power of agricultural machinery in Fujian Province had grown to 3,239,900 kilowatts, the number of tractors in the province exceeded 75,000, and the types of agricultural machinery were more abundant. Although the mechanization of agriculture has been developing rapidly, the administrative management and technical service system of agricultural machinery has not been able to meet the needs of the rapid development of agricultural machinery at that time, and the quality and type of agricultural machinery have not been sufficient to meet the rapid development of the rural economy. In addition, constrained by the natural environment of "eight mountains, one water, one field", farmers are more inclined to buy or lease small-scale agricultural product processing and transportation machinery with higher efficiency, and are less in favor of the use of large-scale agricultural machinery and so on.

### **2.3 Marketization Stage**

From 1984 to 1992, with the deepening of rural reform, the State's control of agricultural machinery gradually changed to a market-oriented development, and in-depth development of agricultural machinery socialization services. Agricultural mechanization to farmers as the main body of the independent founding, completely

breaking the pattern of collective management of agricultural machinery, and the formation of a variety of forms of farmer-dominated forms of operation, such as agricultural machinery cooperatives, etc. [4]. By the end of 1992, the total power of agricultural machinery in Fujian Province amounted to 6,456,200 kilowatts, the number of agricultural machinery in the province in the private operation of farmers has amounted to more than 90 per cent of the province's investment in agricultural machinery in the composition of the capital of the province's agricultural investment in the purchase of agricultural machinery by farmers accounted for more than 80 per cent of the funds. Farmers' demand for agricultural mechanization favors small agricultural machinery suitable for home operations, and the demand for large and medium-sized agricultural machinery is on a downward trend. The provincial agricultural machinery department, in order to synergize the new situation of the development of agricultural mechanization, focuses on the reform of the transformation of functions and the strengthening of services, and strongly supports the development of agricultural machinery service organizations, with the township agricultural machinery management station as the leader, and supports the township agricultural machinery management station to co-ordinate the management and to drive the village-level civil agricultural machinery service team. In the market-oriented stage, a four-level agricultural machinery service-oriented network has been formed in Fujian Province at the city, county, township and village levels.

#### **2.4 Advancement of the Legal System Stage**

From 1993 to 2013, agricultural mechanization was oriented to the market economy, and agricultural mechanization was in the stage of using the legal system to strengthen its promotion in accordance with the law. Market-oriented agricultural machinery and related products in the production, sale and use of agricultural machinery and related products in the production, sale and use of local laws and regulations introduced one after another related to the development of agricultural machinery, so the development of agricultural machinery into the market-oriented and legal construction track. According to the market

supply and demand information, agricultural machinery manufacturing enterprises to independently arrange production, determine the price, the formation of benign market competition, benign competition to promote agricultural machinery price competition gradually turned to the quality of competition and after-sales service competition, prompting the agricultural machinery from the production of after-sales service to the use of the whole chain is more perfect. The provincial agricultural machinery department focuses on the strategy of "developing agriculture through science and technology", and strives to implement the grain self-sufficiency project, focusing on supporting large grain-growing households and actively promoting their use of agricultural mechanization to improve production. Beginning in 2000, the administrative functions of agricultural mechanization in Fujian Province were reallocated to the Provincial Department of Agriculture, which implemented a preferential subsidy policy for the purchase of agricultural machinery by farmers. For example, between 2006 and 2008, Fujian Province issued a special amount of 87 million yuan for agricultural machinery subsidies. The external environment for the development of agricultural machinery in this period has undergone significant changes, forming a new pattern of development of agricultural machinery and equipment oriented by market demand, with farmers' input as the main body and the government guided by law [5].

#### **2.5 New Normal Development Stage**

From 2014 to the present, as the country's economic development has entered a new normal, the development direction of agricultural mechanization has also shifted and begun to enter a new normal development stage. Agricultural machinery industry is developing rapidly, but the original only the pursuit of large-scale development of the road has not been applied to the current requirements of the development of agricultural machinery. The future development of agricultural mechanization not only requires a certain scale, but also needs to inject fresh energy into its sustainable development through continuous innovation of agricultural technology. In 2022, the mechanization rate of crop cultivation,

planting and harvesting in Fujian Province has reached 73.5%, basically equal to the national crop cultivation, planting and harvesting rate. But for the "eight mountains, one water, one field" in Fujian, in the vast hilly areas are still facing the "no machine available" situation, so Fujian Province, efforts to crack the blockage of agricultural mechanization, the Provincial Department of Agriculture organized a team to go to the counties and districts on the agricultural mechanization of agricultural mechanization to carry out research, aimed at cracking the current predicament of the agricultural machinery as well as the shortcomings. In addition, Fujian Province continues to optimize and adjust subsidized agricultural machinery, innovate agricultural machinery purchase subsidy policies, and focus on promoting key agricultural machinery, especially the promotion and application of innovative agricultural machinery and equipment, to promote agricultural mechanization to achieve high-quality development.

### **3. Status of Agricultural Mechanization Development in Fujian Province**

#### **3.1 Continuous Growth in the Total Amount of Agricultural Machinery and Equipment**

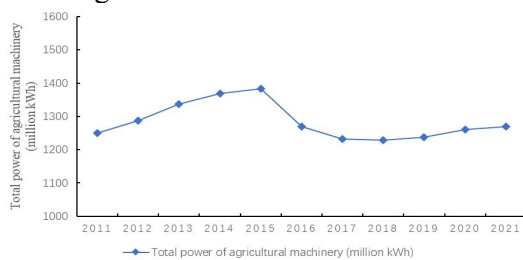
In recent years, the promotion of agricultural mechanization in Fujian Province has always been focused on agricultural development, to promote agricultural food production, farmers to increase income, agricultural efficiency as the goal, the use of advanced agricultural machinery and production technology in accordance with local conditions, so that the agricultural mechanization presents a healthy and coordinated and rapid development trend. As shown in Figure 1, the trend of the total power of agricultural machinery in Fujian Province from 2011 to 2021 is first increasing, then decreasing and then slowly increasing. The main reason why the total power of agricultural machinery in Fujian Province showed a sharp decline between 2015 and 2017 was the large reduction in the ownership of small agricultural machinery. As can be seen from the above analysis, removing the factor of a large reduction in small agricultural machinery between 2015 and 2017, the total power of agricultural machinery in Fujian Province has shown a steady upward trend in

general. Figure 2 presents the main source composition of the total power of agricultural machinery in Fujian Province from 2011 to 2021, and it can be seen that the source composition of the total power of agricultural machinery mainly consists of diesel engines, gasoline engines, electric motors and so on. The total power of agricultural machinery in Fujian Province mainly comes from diesel engines, and the mechanical power provided by diesel engines has been dominant, exceeding 50% of the total power of agricultural machinery. However, the national requirements for environmental protection, and diesel engines in the daily use of often insufficient power and other problems, affecting the quality of agricultural machinery operations, making the use of diesel agricultural machinery to reduce the amount of diesel engines to provide power in the total power of agricultural machinery in the proportion of a continuous decline. Gasoline engines and electric motors relative to diesel engines are more green, environmentally friendly, economical, and provide relatively sufficient power, easy to maintain and repair, so in the power they provide in the proportion of the total power of agricultural machinery continues to rise. Generally speaking, since nearly a decade, agricultural mechanization in Fujian Province has shown a healthy, coordinated and stable development trend, the total amount of agricultural machinery grows steadily and healthily, and is in the "golden period" of agricultural mechanization development.

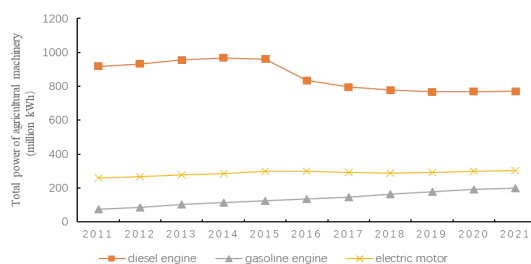
#### **3.2 Increasing Level of Agricultural Machinery Operations**

In 2022, the comprehensive mechanization rate of crop cultivation, planting and harvesting in Fujian Province has reached 73.5%, with an average increase of 1 percentage point higher than that of the whole country in the past five years, exceeding the national average (71.25%). As shown in Figures 3 and 4, the observation shows that the number of medium and large tractors shows a significant upward trend, increasing from 2,964 units in 2011 to 6,089 units in 2021; The number of small tractors, on the other hand, is decreasing rapidly, from 111,841 in 2011 to 77,978 in 2021, but still dominates in terms of volume. Due to the continuous upgrading of

the national standards for agricultural machinery, many small agricultural machines that are not in line with the national standards for a long time continue to be eliminated; and small agricultural machines are generally diesel engines, which are often underpowered, noisy and polluting in daily use; In addition to the government's requirements for environmental protection, different subsidies for small and large farm machinery, and other issues, the number of small tractors is decreasing. Although Fujian is mostly mountainous and hilly, the trend of the number of large and medium-sized tractors has not declined in the past ten years, indicating that the demand for large and medium-sized tractors for the current agricultural production in Fujian Province has not yet reached a saturated state. In addition, Figure 5 shows that the number of combine harvesters has shown rapid growth in the past decade, which makes the level of agricultural machinery operations in Fujian Province continue to improve and helps to promote the completion of the goal of full-scale agricultural production. In recent years, under the efforts of the Fujian Provincial Government and relevant departments, agricultural machinery to make up for the shortcomings of the work has also achieved certain results, "plowing oxen to go, the iron oxen can not enter the" phenomenon is gradually being improved, "iron oxen" in the field of the last kilometer of the march is in full swing.

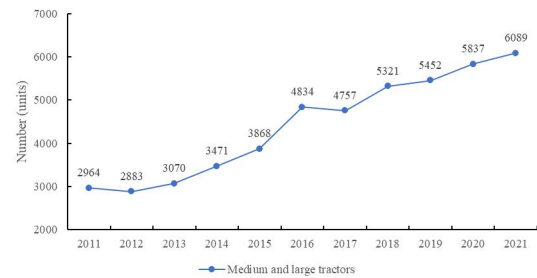


**Figure 1. Trend of Total Power of Agricultural Machinery in Fujian Province, 2011-2021**

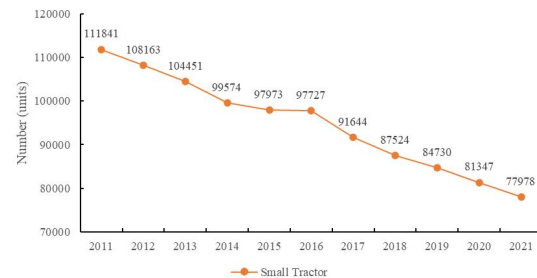


**Figure 2. Trend of Total Power Source of**

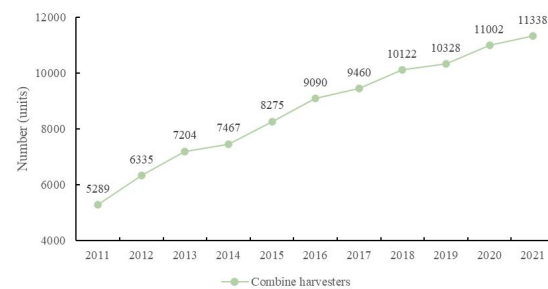
### **Agricultural Machinery in Fujian Province, 2011-2021**



**Figure 3. Number of Medium and Large Tractors in Fujian Province, 2011-2021**



**Figure 4. Number Of Small Tractors in Fujian Province, 2011-2021**



**Figure 5. Number of Combine Harvesters in Fujian Province, 2011-2021**

### **3.3 Rapid Development of Agricultural Machinery Operation Service System**

In order to cultivate strong agricultural machinery service organizations and enhance the synergy of agricultural machinery embracing, Fujian Province has vigorously developed agricultural machinery socialized service organizations adapted to the needs of small farmers by means of government-purchased services, award in lieu of subsidy, and subsidy after service. Focusing on the cultivation of agricultural machinery cooperatives, improving the quality of development, creating "five" agricultural machinery cooperatives (i.e., well-equipped facilities, a good operating mechanism, a sound management system, a large scale of service, and significant comprehensive

benefits), and attracting farmers to join cooperatives. Farmers to land, personnel, machinery into shares, cooperatives for farmers to provide land preparation, sowing, seeding, transplanting, transplanting, fertilizer, watering, plant protection, harvesting, drying and other production of the entire mechanized services, not only so that more people see with their own eyes the convenience of agricultural mechanization of production, but also solved the drawbacks in the decentralized operation, from planting to management, from receiving to selling, the power of grouping together, quietly change the mode of agricultural production. As of 2021, there are 690 agricultural cooperatives in Fujian Province, of which 293 are "five" agricultural cooperatives, and the operation service area of the province's agricultural cooperatives has reached 4.49 million mu, an increase of 41.2% compared with the same period in 2019. At the same time, the province's organization of 700 sets of agricultural machinery to carry out cross-area operations, agricultural machinery socialized operation services show good development trend. In addition, Fujian Province also innovated the mechanism of agricultural machinery services, and organized the establishment of "full mechanization + comprehensive agricultural" service centers; It also promotes the "drip farming machine" service model throughout the province, organizes municipalities to carry out pilot projects for the new drip farming machine model, accelerates the application of "Internet + farming machine operation", realizes the goals of resource information sharing, order-based operation and "more information, more work for the farming machine, and more benefits for the farmers", and promotes a powerful step towards docking small farmers with the big market.

### **3.4 Continuous Improvement of Agricultural Machinery Purchase Subsidy Policies**

In order to promote the development of agricultural mechanization, Fujian Province has fully implemented the agricultural machinery purchase subsidy policy and continuously optimized and adjusted the subsidized agricultural machinery; Continuous innovation of agricultural machinery purchase subsidy policies; Efforts to promote key

agricultural machinery. Firstly, focusing on the needs of modern agriculture and green agriculture development in mountainous and hilly terrain, Fujian Province has issued the Implementation Plan for Agricultural Machinery Purchase Subsidies in Fujian Province for the Period of 2021-2023, aiming at continuously optimizing and adjusting the scope of subsidized machinery types. The range of subsidized machinery types has reached 126 categories, basically covering the province's agricultural production of applicable agricultural machinery; There are a total of 8,469 products in the subsidized product catalog, basically covering the agricultural machinery needed for the production of major crops, characteristic advantageous agriculture, and green agriculture development in Fujian Province. Secondly, Fujian Province is the first in the country to fully implement the market-oriented reform of the qualification conditions of subsidized products; the first to carry out the pilot subsidy for the purchase of new agricultural machinery products; and the first to explore the issuance of certificates for the promotion and appraisal of agricultural machinery by third-party agencies. These initiatives have effectively solved the problem of difficult and impossible identification of special agricultural machinery in hilly and mountainous areas that could not be included in the subsidies and expanded the number of subsidized products. Furthermore, Fujian Province in the promotion of key agricultural machinery and equipment to carry out pilot innovative agricultural machinery and equipment "543" subsidy policy to support the popularization and application of innovative agricultural machinery and equipment and encourage agricultural machinery manufacturers to innovate and research and development of machinery and equipment suitable for operation in hilly and mountainous areas.

## **4. Problems in the Development of Agricultural Mechanization in Fujian Province**

### **4.1 Large Differences in Mechanization Productivity among and Within Various Types of Industries and Uneven Development**

Industries in Fujian Province that use mechanized production in agriculture include grain and oil crops, animal husbandry, aquaculture, primary processing of agricultural products, advantageous crops, and facility agriculture. According to the research data on the development level of agricultural mechanization by the "four points" research task force of Fujian Provincial Department of Agriculture and Rural Affairs in 2021 [6]: With regard to major grain and oil crops, the integrated mechanized productivity of rice has reached 77.26%, and the efficiency of machine ploughing and machine harvesting is 98.40% and 89.35% respectively, but the rate of machine sowing is only 36.99%. In addition, the differences between the rates of mechanized plowing, sowing and harvesting of crops other than rice, such as sweet potatoes and peanuts, are also evident. In the livestock sector, for example, the integrated mechanized farming rate of egg-laying hens, pigs and dairy cows has reached over 80%, but the integrated mechanized farming rate of broilers is only 58.1%. In the aquaculture industry, the rate of integrated mechanized aquaculture in freshwater ponds was 63.6%, while the rate of integrated mechanized aquaculture in marine culture was only 44.3%. The mechanized productivity of primary processing of agricultural products is 66.73%, of which the mechanization rate of the shedding link and the preservation link is over 70%, while the mechanization rate of the agricultural products clearing link is only 42.16%. With regard to the dominant crops, the combined mechanized productivity of edible mushrooms and tea was 79.95% and 67.96%, while that of vegetables and fruits was only 26.21% and 54.16%. In the case of facility agriculture, except for ploughing, irrigating fertilizer and applying fertilizer with an integrated mechanization rate of more than 50%, the integrated mechanization rate of the remaining aspects of the operation is less than 40%. From the above data, it can be seen that the mechanization operation rate between various types of industries in Fujian Province varies greatly, and the level of the comprehensive mechanization rate of various types of products or operational links between various industries also has its own high and low levels, which maps out that there is an uneven and insufficient development of the use of

mechanized production in various fields of agricultural production.

#### **4.2 Low Level of R&D and Innovation of Agricultural Machinery and Insufficient Vitality of Scientific and Technological Innovation**

The main body of technological progress innovation and technological efficiency improvement of agricultural machinery in Fujian Province comes from agricultural machinery enterprises. 773 agricultural machinery enterprises are included in the 2023 Fujian Provincial Agricultural Machinery Enterprises Directory, which are mainly based on agricultural machinery limited companies and agricultural machinery professional cooperatives, which is lower than the number of agricultural machinery enterprises in the neighboring Jiangxi Province (931) and Zhejiang Province (1666). First of all, most of the enterprises have an output value of less than 100 million yuan, and the enterprise scale is basically small, which makes it difficult to continuously provide the costs needed to support the technological innovation and research and development of new agricultural machinery [7]. They tend to concentrate on the production of the original old type of agricultural machinery, and the number of innovative agricultural machinery manufacturing is insufficient. Secondly, there is a lack of R&D capacity for innovative agricultural machinery technologies and a lack of physical technology incubation centers and R&D teams. At present, new agricultural machinery or technology mostly relies on the purchase and introduction from other provinces, and because the use of agricultural machinery is greatly affected by the regional geographic environment, many agricultural machineries or introduced new technologies are not sufficiently well adapted to be highly integrated into local operations and production. Furthermore, the production capacity of agricultural machinery enterprises is not strong, most of the agricultural machinery enterprises in the production of agricultural machinery production link precision is not enough, the production method is still relatively backward, only applies to meet the production capacity needs of the standard, and the production precision of agricultural machinery is often closely related to the use of life, operational

efficiency and so on. Finally, the lack of synergistic cooperation and exchanges among relevant departments and upstream and downstream enterprises, such as the lack of deep cooperation and exchanges with upstream enterprises of the industrial chain, such as basic process materials and electronic information components, often results in the final production of finished products of a low grade, which can only satisfy the most basic needs for use, and is difficult to produce an advantage in comparison with the pre-production of products and operations. In addition, the R&D infrastructure for agricultural machinery science and technology is weak, the number of R&D industry-academia-research platforms is still insufficient, the promotion of new agricultural machinery technology is insufficient, and the rate of transformation of its achievements is low, making it difficult to provide sustained and obvious vitality for agricultural machinery science and technology innovation.

#### **4.3 Lack of the Number of Agricultural Machinery Professionals, Team Building Needs to be Strengthened Urgently**

The main body of the agricultural machinery talent pool is still mainly from individual farmers who own agricultural machinery in rural areas. As the level of urbanization continues to increase, more and more rural laborers are heading to the towns, causing many farmers who were originally engaged in agricultural machinery-type work to give up engaging in agriculture in order to achieve higher incomes. In particular, the phenomenon of the loss of young and middle-aged labor force is becoming more and more serious in rural areas, which makes the original number of agricultural machinery professionals even more scarce, and the remaining rural labor force is often skewed towards aging and feminization [8], so that it becomes more difficult for agricultural machinery professional cooperatives and production organizations to absorb high-quality agricultural machinery personnel. Affected by the employment outlook, agricultural colleges and universities related to agricultural machinery were once in a cold position, enrollment is more difficult. The training of agricultural machinery professionals not only need to learn the professional knowledge of

agricultural machinery, but also need to be combined with agronomy courses in order to better utilize the use of agricultural machinery. For this kind of cross-disciplinary agricultural machinery talents in the training program there are many limitations, so it is difficult to stabilize the agricultural machinery team to provide talent security [9]. In addition, the low level of management personnel in the agricultural machinery management departments at the township level and their serious ageing, as well as insufficient training of the existing agricultural machinery talent team, have not yet resulted in the formation of a group of high-quality, technically sound agricultural machinery professional leaders, etc., which has made the construction of the agricultural machinery talent team progress slowly.

#### **4.4 Insufficient Combination of Agronomy and Agricultural Machinery, and Difficulties in Working with Agricultural Machinery**

Agricultural machinery operations are not only affected by the natural geographical environment, the level of agronomy is also very important to the impact of agricultural machinery operations. Currently in Fujian Province, agronomy and agricultural machinery with the production of certain difficulties, the reason for this phenomenon is that for a long time in the development of agricultural mechanization plan, ignoring the biological characteristics of various crops, not according to the biological characteristics of different crops and agricultural machinery for screening and adaptation, often because of the level of agronomy can not meet the requirements of the mechanical operation, resulting in the process of the agricultural machinery in the ground operation encountered a lot of inconvenience. At the level of agronomic development, the use of traditional planting methods and farming systems in Fujian Province still occupies a dominant position, and under the influence of mountainous terrain and other factors, the standard of crop cultivation in various places is not uniform, and it is difficult to make a reasonable allocation of agronomy and agricultural machinery in various places. The lack of communication between the relevant agricultural machinery research institutes and

the relatively independent scientific research system will also hinder the combination of agronomy and agricultural machinery from the source, resulting in the lagging of the development of agronomy and agricultural machinery, and the difficulty of coordinating operations with each other [10]. In addition, in terms of the promotion of agricultural machinery, agricultural technology promotion stations and agricultural machinery promotion stations are separated from each other, which makes the promotion of agronomic support for agricultural machinery operations difficult to some extent.

### **5. Conclusions and Responses**

In this study, the development history of agricultural machinery in Fujian Province is firstly sorted out and chronologically summarized into the following five stages: Initial development stage, Autonomous development stage, Marketization Stage, Advancement of the legal system stage, and New Normal Development Stage. Secondly, the current situation of the development of agricultural mechanization in Fujian Province and the existing problems are summarized, and it is concluded that the current situation of the development of agricultural mechanization in Fujian Province is manifested in the trend of the total amount of agricultural machinery and equipment growing year by year, the level of operation improving, the rapid development of the operation service system and the continuous improvement of the purchase subsidy policy, and so on; Secondly, the current situation of the development of agricultural mechanization in Fujian Province and the existing problems are summarized, and it is concluded that the current situation of the development of agricultural mechanization in Fujian Province is characterized by the trend of year-on-year growth in the total amount of agricultural machinery and equipment, continuous improvement in the level of operation, rapid development of the operation service system, and continuous improvement of the purchase subsidy policy. However, there are also problems such as uneven development of mechanized productivity in various industries, low level of research and development and innovation of agricultural machinery, lack of agricultural machinery professionals, and insufficient combination of

agronomy and agricultural machinery. Based on this, the following countermeasures are proposed:

First, it promotes high quality improvement in the level of agricultural mechanization and growth in the mechanization rate of various agricultural production segments. Promote the development of labor-saving agricultural mechanization, continue to promote the substitution of traditional human and animal labor by agricultural machinery in all aspects of agricultural production, focus on upgrading the weak links in the mechanized production of rice, edible mushrooms, fruits, vegetables, tea and other specialty crops and facility-based agricultural production, and improve the imbalance in the development of agricultural mechanization in Fujian Province among various industries, fields and areas through the research, development and innovation of intelligent and adaptable agricultural machinery, the transformation of farmland into a "mechanized" production area, and the adoption of 5G technology, Internet of Things (IoT) technology, BeiDou positioning system, sensor technology, and unmanned technology, among other means.

Second, strengthen the new agricultural machinery and equipment technology innovation, and promote the transformation of scientific research results. Actively build government, industry, academia and research platforms, and strongly support universities, research institutes and agricultural machinery enterprises to study the development and use of agricultural machinery in Fujian Province, to promote the efficient innovation of existing agricultural machinery technology, to promote the transformation of new practical and adaptive agricultural technology achievements, to focus on tackling the plight of the agricultural machinery into the mountains and fields, to make up for the short boards of the agricultural machinery in the operation of the mountainous and hilly areas, and to actively promote the use of new adaptive agricultural machinery, to accelerate the overcoming of the "last kilometer" between agricultural machinery and agricultural production. In addition, it is also necessary to improve the intellectual property rights system of agricultural machinery scientific and technological innovations and the system of popularizing and transforming the results, so

as to maintain the enthusiasm of agricultural machinery scientific and technological talents in their innovative activities and to promote the popularization and use of new types of agricultural machinery.

Third, increase the cultivation of agricultural machinery service personnel, improve the quality of agricultural machinery practitioners and optimize the organization of agricultural machinery services. Agricultural mechanization of production needs the support of agricultural personnel, due to land production fragmentation reasons, most of the users of agricultural machinery are dispersed agricultural machinery specialists, and mastery of the use of agricultural machinery technology level is not the same, with the continuous development of agricultural machinery, decentralized agricultural services operating quality and operating efficiency of the shortcomings of the uneven gradually appeared, and more and more unable to meet the modern agricultural production of high quality, standardized operational requirements. Therefore, the Government can encourage and support agricultural machinery professionals to join or establish agricultural machinery service cooperatives, and improve the quality and skills of existing agricultural machinery operators through the provision of guidance, training and practice in the use of specialized agricultural machinery skills, and train a group of skilled agricultural machinery professionals, leading to an overall improvement in the quality of the agricultural machinery workforce.

Fourthly, promote the deep integration of agronomy and agricultural machinery operations to jointly form synergies for agricultural production. The integration of agronomy and agricultural machinery is the best way to promote both for agricultural production. Relevant management departments can be based on the growth characteristics of local crops and the specific operating standards of agricultural machinery, guiding farmers to adopt planting or cultivation methods in line with the follow-up operation of agricultural machinery, so that the existing agronomic technology and agricultural machinery for effective cooperation. In addition to this, a system of communication links has been established between relevant departments, such as agricultural machinery

extension stations and agricultural extension stations.

Fifthly, we will continue to improve policies on agricultural machinery insurance, agricultural machinery purchase subsidies and agricultural machinery technological innovation, and enhance the precision and directionality of the relevant policy systems. First of all, Fujian Province, the mountainous and hilly terrain, large-scale agricultural machinery is difficult to play the full effect of the future suitable for mountainous new small and medium-sized agricultural machinery is the main force of agricultural machinery production in Fujian Province, so the government's insurance of agricultural machinery, the purchase of agricultural machinery subsidies should be tilted to small and medium-sized agricultural machinery, which is conducive to improving the weak link of agricultural machinery in mountainous operations in Fujian Province. Furthermore, the government can also set up or improve the agricultural science and technology innovation special funds, new technology research and development incentives and other related policies to stimulate the research and development of new agricultural technology and output, for the stable and healthy development of agricultural machinery to provide policy support and protection.

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