

Survey and Recommendations for Land Use of Agricultural Machinery Service Organization Facilities in Guizhou Province

Xingyuan QI, Chunbo LIU*, Zhifei JIN, Yingfen WANG, Shuyun LIN

Guizhou Mountain Agricultural Machinery Research Institute, Guiyang 550001, China

Abstract With the advancement of agricultural modernization, agricultural machinery service organizations, as an important part of the rural operating entities, show an increasing trend year by year, and need new facilities land in the process of development and growth. Based on the written survey of 597 agricultural machinery service organizations in Guizhou Province, the demand and demand gap of various facilities land use in agricultural machinery service organizations were analyzed and compared. In addition, based on the field survey and policy background, the main practices and experiences of agricultural machinery service organizations in Guizhou Province in the approval and use of facility land were sorted out, and the problems and causes of large gap in facility agricultural land, lack of standards and difficulty in policy implementation were analyzed. Finally, it recommended that the site selection of agricultural machinery service organization facilities needs to be standardized, the land demand needs to be coordinated, the land scale needs to be scientifically demonstrated, and financial support should be sought to promote Guizhou agricultural machinery service organization to become bigger, better and stronger.

Key words Agricultural machinery service organization, Facility land use, Current situation survey, Agricultural mechanization, Guizhou Province

0 Introduction

With the development of modern agriculture, the crop types and cultivation methods of new agricultural operating entities in production are increasingly diversified, and the organization and scale of production also raise new requirements for the supporting facility land for their development^[1]. In recent years, with the continuous change of prominent problems and related hot spots reflected in practice, the relevant ministries and commissions of the state have also refined and improved the policy documents of facility agricultural land, which has improved the operability of facility agricultural land management and provides policy support and guarantee for the development of facility agriculture^[2]. Generally, agricultural facility land is optimized in the following fields: (i) it is not necessary to implement the balance of occupation and compensation, mainly because facility agriculture belongs to the internal adjustment of agriculture and can use general cultivated land; (ii) the scale of land use is managed differently, because the country has a vast area and different regions have great differences, which is measured by the provinces as a whole; (iii) land for production facilities and land for auxiliary production are no longer distinguished; (iv) registration management is implemented to simplify approval procedures^[3–6]. However, in the actual operation process, there are still some problems such as non-standard supervision, imperfect registration management, and other business activities in violation of regulations^[7–9].

As an important part of rural operating entities, agricultural machinery service organizations are increasing year by year with the advancement of agricultural modernization. According to statistics, in 2021, there were 193 400 agricultural machinery service

organizations in China, including 76 000 agricultural machinery professional cooperatives and 39.475 7 million agricultural machinery households with 46.785 8 million people^[10]. The land for facilities of agricultural machinery service organizations is mainly used for grain drying, storage of agricultural materials, storage of large-scale agricultural machinery, *etc.*^[11], while the land for warehouses and maintenance workshops of agricultural machinery is an important factor restricting the development of agricultural machinery service organizations^[12–13]. In recent years, Guizhou Province has vigorously supported the development of agricultural machinery service organizations and actively promoted the full coverage of agricultural machinery socialization service organizations in agriculture-related townships, which also faces a series of problems in the approval and use of agricultural facilities land. Through investigation and analysis, we analyzed the problems and put forward pertinent recommendations for the land use of agricultural machinery service organizations.

1 Land use for facilities of agricultural machinery service organizations in Guizhou Province

1.1 General situations Through written investigation, we surveyed land use situation of agricultural machinery service organization facilities in Guizhou Province. According to the survey results, 573 agricultural machinery service organizations participated in the survey, and the total area of existing facility agricultural land was 2 205 095 m², of which the area of factory breeding and seedling raising sites was 1 332 610 m², accounting for 60%, and the area of hanger land was 260 252 m², accounting for 12%; the area of agricultural machinery maintenance workshop (including spare parts warehouse) is 85 569 m², accounting for 4%; the area of drying place is 108 108 m², accounting for 5%; the area of pri-

mary processing place of agricultural products is 178 071 m², accounting for 8%; the area of cold storage or warehouse is 148 365 m², accounting for 7%; the area of other facilities is 92 118 m², accounting for 4%. Seedling-raising land accounts for the largest proportion of all facility land, followed by hangar land. In terms of cities (prefectures), the number of agricultural machinery service organizations and land use are shown in Table 1. Zunyi City and Tongren City have the largest number of facilities, accounting for 38% of the total; in terms of facility land area, Zunyi City, Qianxinan Prefecture and Tongren City have more facilities, accounting for 66% of the total.

Table 1 Land for facilities of agricultural machinery service organizations in cities (prefectures) of Guizhou

Region	Quantity of organizations surveyed	Area of facility land//m ²
Guiyang City	78	78 307
Zunyi City	110	696 509
Liupanshui City	39	194 335
Anshun City	86	62 393
Bijie City	34	128 533
Tongren City	108	378 446
Qiongnan Prefecture	59	215 568
Qiannan Prefecture	16	60 073
Qianxinan Prefecture	43	390 931

1.2 Analysis of service types According to the statistics of agricultural machinery service organizations with land area greater than 0, there are 374 agricultural machinery service organizations with hanger land, which indicates that they had the ability to carry out agricultural machinery operation services, followed by 241 agricultural machinery service organizations with maintenance land that can carry out agricultural machinery maintenance services; there were 122 and 117 agricultural machinery service organizations with storage land and other land, respectively, while the agricultural machinery service organizations with seedling raising land, drying land and primary processing land have corresponding seedling raising, drying and primary processing service capabilities, and the proportion of agricultural machinery service organizations with the above three capabilities was 23%–27%.

1.3 Gap analysis In the survey, there were 297 agricultural machinery service organizations with new land demand, accounting for 52% of the total. According to the classification of demand area, there was a gap of 832 763 m² for seedling raising land, 201 237 m² for hangar land, 56 668 m² for maintenance land, 109 758 m² for drying land, 129 451 m² for primary processing land and 86 113 m² for storage land. Other land gap was 107 168 m², the total gap area was 1 523 158 m², of which the demand for seedling land and hanger land was the largest. The gap area of seedling-raising land was the largest, which is not only the larger area needed for seedling-raising itself, but also reflects that under the current opportunity of focusing on grain and oil industry in the

whole province, the extension service of agricultural machinery service organization and the deep binding of seedling-raising service and mechanized operation service were the development trend of agricultural machinery socialization service. However, the demand for hanger-land reflects that there were some difficulties in the storage of machines and tools in the current agricultural machinery service organizations. The gap area of grain drying land and other land even exceeded the existing area. (i) It shows that the demand for drying land and other land is urgent. (ii) It reflects that the demand for grain drying is growing vigorously. (iii) It reflects that the difficulty of land approval is different for different types of land.

According to the statistics of the number of agricultural machinery service organizations with gaps in demand for various types of land, there were 189 organizations needing land for seedling raising, 245 organizations needing land for hangars, 235 organizations needing land for maintenance, 164 organizations needing land for drying, 159 organizations needing land for primary processing, 148 organizations needing land for storage, and 147 organizations needing other land. In terms of quantity, the number of hanger land demand and maintenance land demand is the largest, accounting for 82% and 79% of the total number of demand organizations respectively, indicating that the most urgent problem to be solved is still the storage and maintenance of agricultural machinery. The number of organizations for seedling raising, drying, primary processing, storage and other land needs accounts for about half of the total.

2 Main practice and experience

2.1 Main practice In accordance with the *Notice of the Ministry of Natural Resources, Ministry of Agriculture and Rural Affairs on Issues Concerning the Management of Facility Agricultural Land* (Natural Resources Gui[2019] No.4), Guizhou Province has issued the *Notice of the Guizhou Provincial Department of Natural Resources and the Guizhou Provincial Department of Agriculture and Rural Affairs on Issues Concerning the Management of Facility Agricultural Land* (Guizhou Natural Resources Planning [2020] No.1), the cities, counties, and townships have implemented the land demand for agricultural machinery service organization facilities in accordance with the relevant requirements. (i) It clarified the regulatory functions and responsibilities, the county (city, district) people's government, the agricultural and rural departments and the natural resources department are responsible for the daily management of facility agricultural land, the township people's government is responsible for the site selection, review and registration and information reporting of facility agricultural land, the provincial and municipal agricultural and rural departments and natural resources departments are responsible for the county-level facility agricultural land registration and facility agriculture management supervision, spot checks, verification, pro-

vincial and municipal comprehensive administrative law enforcement departments at the county level illegal occupation of cultivated land for the construction of non-agricultural facilities.

(ii) Taking three-change reform as an opportunity to expand the development of agricultural machinery service organization. Three changes refer to turning resources into assets, funds into shares, and farmers into shareholders. For example, Liupanshui City and other places insisted on taking social service organizations as the pioneers of Three – Change Reform, seizing the opportunity of building the "National Rural Reform Pilot Area", and constantly improving the interest linkage mechanism of "bottom-guaranteed income + income dividend" through the Three – Change model, to build a three-change consortium of agricultural industrialization, in order to solve the problem of land use for agricultural machinery service organizations, it is necessary to fully revitalize rural land resources, promote the rational and orderly circulation of land, support and guide the "activation" of land resources into the expansion of cooperatives, and promote the moderate scale development of agricultural machinery service organizations.

2.2 Main experience

2.2.1 Making full use of the idle land. The experience includes taking renting or borrowing the old sites of village committees, old schools in rural areas, dilapidated factory buildings, and the idle sites of the original township supply and marketing cooperatives as the land for facilities, such as Yuping Agricultural Machinery Supply Farmers' Cooperative, *etc.*; renting the waste construction sites as the land for facilities, such as Songtao Jufeng Agricultural Machinery Specialized Cooperative, *etc.*; revitalizing the idle factories as the land for facilities, such as Yinjiang Agricultural Machinery Supply Cooperative.

2.2.2 Using the construction land. The experience includes renting village collective sites or facilities as facility land, such as Shiqian Minggui Agricultural Machinery Specialized Cooperative, Sinanhe Mufu Agricultural Machinery Specialized Cooperative, *etc.* Dushan Village Joint Stock Economic Cooperative in Xiuwen County, by convening villagers' representatives to convene villagers' congresses, determined land use within the scope permitted by law, clearly uses land (barren hills) that does not belong to good farmland and good soil, rationally plans and determines the land area of cooperatives in accordance with the development direction of cooperatives and the number of current machinery models, and determined the land area of cooperatives, which was reported to the township government for approval before implementation, and no land was occupied.

2.2.3 Using non-agricultural private plots as land for facilities. For example, Yanghe County Nongwang Specialized Cooperative and Leqiao Village Agricultural Machinery Specialized Cooperative in Benzhuang Town, Shiqian County, and Bijiang Zhuming Agricultural Machinery Specialized Cooperative.

3 Problems

3.1 Approval of facility land by policies and regulations The *Notice of the Ministry of Natural Resources, the Ministry of Agriculture and Rural Affairs, and the National Forestry and Grassland Administration on Issues Concerning the Strict Control of Cultivated Land Use* (Natural Resources^[2021] No. 166) clearly stipulates that "permanent capital farmland shall not be converted into forest land, grassland, orchard land and other agricultural land and agricultural facility construction land"; strictly control the use of general cultivated land for the construction of agricultural facilities such as new rural roads, livestock and poultry breeding facilities, aquaculture facilities and planting facilities that destroy the cultivated layer, and if it is really necessary to use, it shall be approved and meet the relevant standards". The introduction of this policy has affected the agricultural machinery service organization to a certain extent on the agricultural land for new facilities.

3.2 Gap in the land for facilities of agricultural machinery service organizations In recent years, with the continuous improvement in agricultural mechanization in Guizhou Province, in addition to the implementation of agricultural machinery projects and demonstration sites, and the continuous improvement in agricultural machinery equipment, there is a gap in the existing agricultural machinery storage land of agricultural machinery cooperatives, large agricultural machinery households, agricultural machinery service companies and other service organizations. For example, the land for storing agricultural machinery and tools of Dadi Agricultural Machinery Farmers' Specialized Cooperative in Xixiu District of Anshun City were built on the homestead around their own houses, the site for storing machines and tools of Yincheng Agricultural Machinery Specialized Cooperative in Xixiu District of Anshun City was an open-air site, and the land for some newly built service organization facilities was also very difficult.

3.3 Lack of construction standards for facility agricultural land The land for facilities of agricultural machinery service organizations is mainly used for hangar shed, machine repair, processing and storage of agricultural products, but the incomplete planning and unclear standards of land for facilities are the problems existing in the current implementation of land for facilities at the grass-roots level, such as how to calculate and determine the land area, and the supporting standards of various ancillary facilities are urgent problems to be solved.

3.4 Difficulties in implementing policies for agricultural machinery service organizations At present, most of the facility agricultural land still comes from general cultivated land, but it will face two major problems. (i) The capital farmland and forest land protection policy is strict, and it is difficult to approve the use of capital farmland or forest land. (ii) The use of cultivated land indicators needs to be linked to the increase or decrease of farmland, and agricultural machinery service organizations need to be approved for a long time, and it is difficult to obtain land in a

short time. For example, Chunhai Agricultural Machinery Service Farmers Cooperative and Yuanze Agricultural Machinery Service Farmers Cooperative in Xiuwen County, Guiyang City, submitted an application for facility land to the county, because the two cooperatives are located in the county, the land, forestry, urban construction and other departments will not approve it for planning and other reasons, and it is very difficult to apply for land.

4 Policy recommendations

In the actual work, it is necessary to carefully implement the land for agricultural machinery service organization facilities, make up for the gap in facility land, reasonably and legally arrange the land for agricultural machinery service organization facilities, ensure the good operation of agricultural machinery service organizations, and strengthen the operation and management capabilities of agricultural machinery service organizations.

4.1 Regulating the land selection In accordance with the provisions of *The Notice of the Ministry of Natural Resources, the Ministry of Agriculture and Rural Affairs, and the National Forestry and Grassland Administration on Issues Concerning the Strict Control of Cultivated Land Use* (Natural Resources [2021] No. 166), it is strictly forbidden to increase new land for agricultural machinery service organizations to occupy capital farmland, and to guide agricultural machinery service organizations to select unused land or construction land such as barren hills and slopes as far as possible in site selection during the project period, to make full use of idle yards and land, to build facilities for storing agricultural machinery, maintenance machinery, breeding and seedling raising, and to improve land utilization and avoid unnecessary losses.

4.2 Overall consideration of reasonable land use demand

When the people's governments at the county level organize the preparation of the overall plan of the annual "balance in and out" of cultivated land, they should ensure that under the premise of "farmland for agricultural use, farmland using for agriculture", the rational land use needs of agricultural machinery service organizations should be considered as a whole, and the rational land use of agricultural machinery service organizations should be tilted in land management, so as to effectively ensure that agricultural materials and machinery have storage sites, and there are facilities such as drying, sorting and packaging, and fresh storage that are directly related to production.

4.3 Accurately grasping the land use and scale of facility agriculture Before the registration of facility agricultural land for agricultural machinery service organizations, villages and towns must be guided to scientifically demonstrate the necessity and rationality of facility construction content, construction standards and construction scale, and adhere to the principle of saving and

intensive land use to guide the identification of facility agricultural land.

4.4 Striving for financial support funds It is recommended to encourage financial funds at all levels to support agricultural machinery service organizations, for hangars, machine repair, breeding and seedling raising, agricultural product processing and storage and other facilities land projects, fill the gap in facility land, and continuously improve the level of agricultural machinery and equipment of agricultural machinery service organizations and socialized service capabilities, and promote the healthy development of agricultural mechanization.

References

- [1] WANG XY, NING AF. Research on facility land of new agricultural operating entities under rural revitalization[J]. *Agricultural Economy*, 2021 (8): 87–89. (in Chinese).
- [2] PU CQ. Chongqing facility agriculture land management issues and proposes[J]. *South China Agriculture*, 2021, 15(25): 75–80. (in Chinese).
- [3] SU Q, ZOU H. Study on the current situation and countermeasures of facility agricultural land development in Hubei Province[J]. *Journal of Smart Agriculture*, 2021, 1(6): 12–14. (in Chinese).
- [4] XU XF, HU YG, WANG H. Analysis of current situation of facility agricultural land[J]. *Land and Resources Information*, 2011(1): 54–56, 39. (in Chinese).
- [5] ZHAO JQ, ZHU XX, ZHAO ZY. Policies on the facilities agriculture land management in Zhejiang Province[J]. *Shanghai Land & Resources*, 2020, 41(4): 56–59. (in Chinese).
- [6] JIANG Y. An empirical study on the impact of agricultural facility land on agricultural total factor productivity[D]. Chengdu: Southwest Jiaotong University, 2019. (in Chinese).
- [7] JIANG LJ. Study on the management and control mechanism of facility agricultural land in major grain producing area[D]. Zhengzhou: Zhengzhou University, 2022. (in Chinese).
- [8] JIN XL. Dilemma and process reconstruction of facility agricultural land record management in Bazhou District of Bazhong City[D]. Beijing: China University of Geosciences, 2020. (in Chinese).
- [9] YANG C. Thoughts on the examination and approval of facility agricultural land[J]. *South China Agriculture*, 2015, 9(12): 186–187. (in Chinese).
- [10] Department of Agricultural Mechanization Management, Ministry of Agriculture and Rural Affairs, 2021 National Statistical Communiqué on the Development of Agricultural Mechanization[J]. *Agricultural Science & Technology and Equipment*, 2023(1): 3. (in Chinese).
- [11] ZHANG DX, YANG JM, LI K. Agricultural machinery cooperative construction and land circulation[J]. *Shandong Agricultural Mechanization*, 2021(6): 36–37. (in Chinese).
- [12] ZHANG JH. Discussion about three problems to be solved in the development and construction of agricultural machinery specialized cooperative [J]. *Nong Min Zhi Fu Zhi You*, 2018(22): 175. (in Chinese).
- [13] LI KF. Support measures for farmers' professional cooperatives[J]. *China Farmers' Cooperatives*, 2018(4): 53–56. (in Chinese).