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Original Paper

A Study on the Countermeasures of Agricultural Mechanization Development

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Abstract

This paper analyzes the current situation of agricultural mechanization development in the process of rural revitalization.

Keywords

rural revitalization, agricultural mechanization

1. Introduction

In the context of rural revitalization, accelerating the improvement of the promotion, application, organization, management and supervision of high-tech agricultural machinery has become an important guide for the policy planning of agricultural mechanization supervisory departments in the majority of regions. 2022, the Ministry of Agriculture and Rural Affairs prepared the “14th Five-Year Plan” for the development of national agricultural mechanization, specifying that by 2050, the total power of agricultural machinery nationwide will be The total power of agricultural machinery in the country will be stabilized at around 11KW by 2050, the configuration structure of agricultural machinery will be rationalized, and the safety of agricultural machinery data and agricultural machinery safety production will be further strengthened. Changji is located in the northeastern region of Xinjiang Uygur Autonomous Region totaling 8215km^2, with a population of 372,900, of which 132,400 are in agriculture, located in the southern part of Tianshan, Junggar fringe basin, with rich water and forest resources, relatively concentrated earth resources, suitable for mechanized agriculture, Changji agriculture has become an important part of Xinjiang’s agricultural development. From 2002 to 2015, the total power of agricultural machinery in Changji grew rapidly, but slowly. By 2015 only 425000KW, there is still a large gap between it and other developed provinces and cities. Therefore, it is necessary to analyze the current development status of agricultural mechanization in Changji, and to identify the existing problems and discuss how we can further optimize the agricultural mechanization

in Changji to promote the development of agricultural mechanization in Changji and to promote the quality and efficiency of agricultural production in Changji.

2. Overview of the Study Area

Changji City is located in the northern foothills of the Tianshan Mountains, the interior of the Eurasian continent, the southern edge of the Junggar Basin, the city has 8 towns, 2 townships, 6 streets, the city's total area of 8000km^2. location advantage is obvious, east of the Hami region, west of Shihezi City, south and Turpan City, adjacent to the north and Tacheng, Altai region, from the east, west and north of the three sides of the ring Urumqi City, located in the Uchang Shi city group and the northern slope of the Tianshan Mountains economic belt The core area of the pioneering development, 38km from the center of Urumqi, is an important channel for Xinjiang to connect east and west, the second Eurasian Continental Bridge, the Wuqui Expressway and the North Xinjiang Railway pass through the city, and is an important part of building the core area of the Xinjiang Silk Road Economic Belt (Zhang, W. L. & Zhang, C., 2019). Modern agriculture is developing rapidly, with a land cultivation area of more than 600,000m^2 and arable land per capita of 10m^2. The regional branding of cotton, wheat, corn and other special agricultural and sideline products has been effective, and the "five industrial alliances" have been established, making it an important national production base for commercial grain, commercial cotton, sauce tomatoes, wine grapes and an advantageous area for modern agricultural development. At the end of 2018, the city's resident population was 383,600, including 190.500 men. The annual gross domestic product is 37233049 million yuan. The output value of the primary industry was 264.980 million yuan. Secondary industry output value 1792766 million yuan. The output value of the tertiary industry is 1,665,303,000,000 yuan. Among them, the total output value of agriculture, forestry, animal husbandry and fishery is 4526.36 million yuan, from which it can be seen that the total output value of agriculture, forestry, animal husbandry and fishery contributes a high proportion to the GDP of Changji City, and the development of agricultural mechanization is conducive to the increase in income of the first agriculture, forestry, animal husbandry and fishery, thus increasing the income of rural farmers and better realize the revitalization of the countryside.

3. Current Status of Development of Agricultural Mechanization in Changjiqi

3.1 Level of Agricultural Mechanization Equipment in Changji City

In 2015, the total capacity of agricultural machinery in Changi was 425,000 kw, with a total capacity of 3508 kw for large and medium tractors and a ratio of agricultural implements of 1:2.55, there were 7996 small tractors, with a corresponding ratio of agricultural support implements of 1:1.64, there were 6098 irrigation machines, 2.31 times more than in 2003, with a total power of 53.900 kw, harvesters The number of harvesters reached 183, and the active introduction of mobile threshing technology led to the peak of the development of agricultural machinery. From the perspective of agricultural machinery per hectare (Figure 1, Figure 2 and Figure 3), it is easy to find that although the power of

agricultural machinery per hectare in general fluctuates slightly each year in Changji, it generally shows an upward trend. In 2015, the power of agricultural machinery per hectare exceeded 5 KW, with the widespread use of agricultural machinery, some problems in the development of agricultural machinery have gradually come to the fore. The agricultural machinery production sector has been more supportive of development of large agricultural machinery, ignoring the promotion of small agricultural machinery research and development, but the actual production life of small and medium-sized machinery is not used less frequently. With the continuous development of agricultural modernization, in the development of agricultural machinery in Changji, to continuously optimize the proportion of agricultural machinery structure, in the development of large and medium-sized agricultural machinery at the same time also to increase the promotion of small agricultural machinery, to help push the development of agricultural machinery in Changji to a higher level and specialization (Wang, 2021).

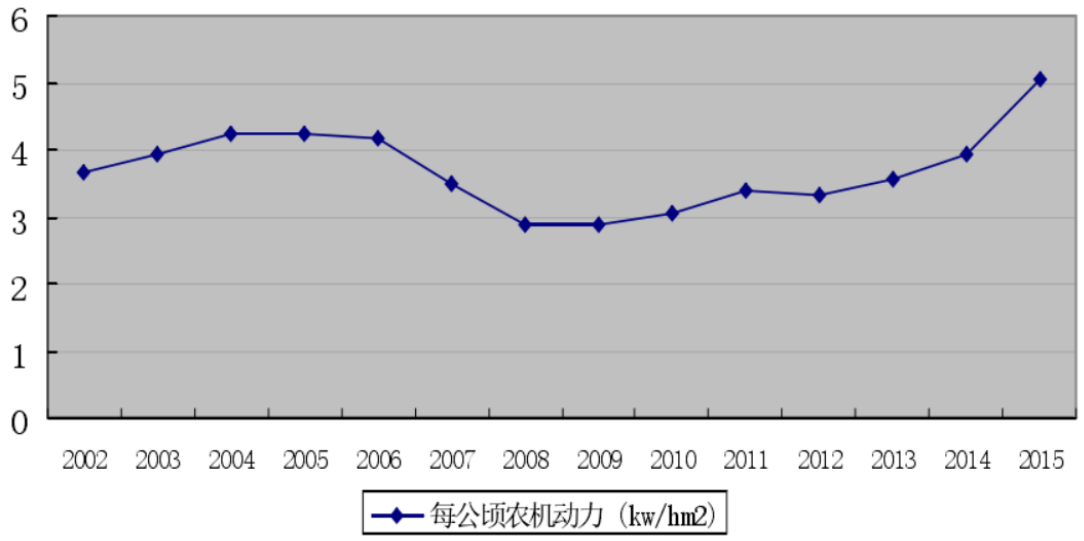

Figure 1. Change in Power per Hectare of Agricultural Machinery in Changji City, 2002-2015

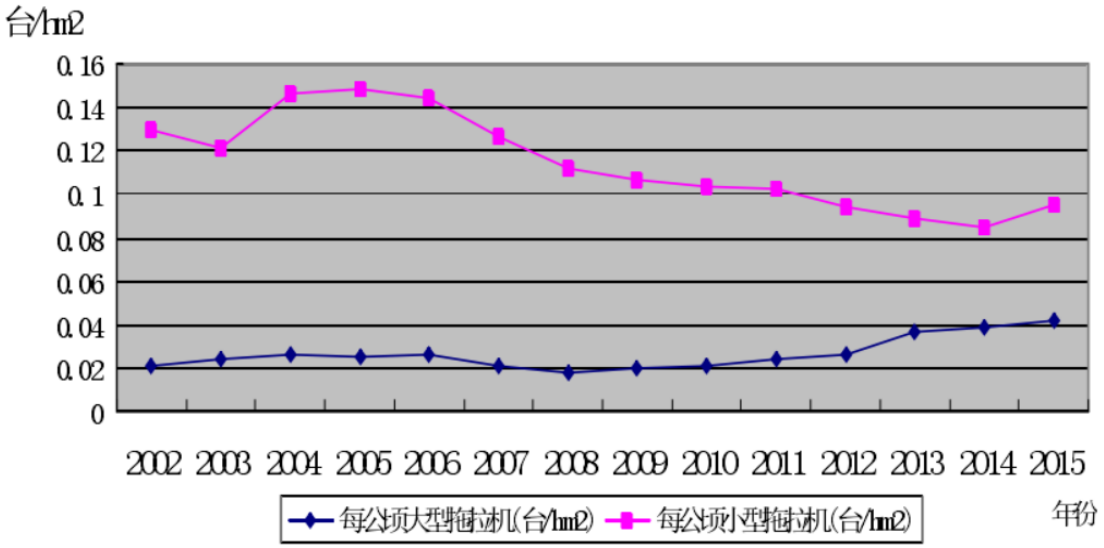

Figure 2. Change in the Number of Large and Medium Tractors and Small Tractors per Hectare in Changji, 2002-2015

Data from the Statistical Yearbook of Changji Hui Autonomous Prefecture and the Statistical Bulletin of National Economic and Social Development of Changji City, 2002-2015.

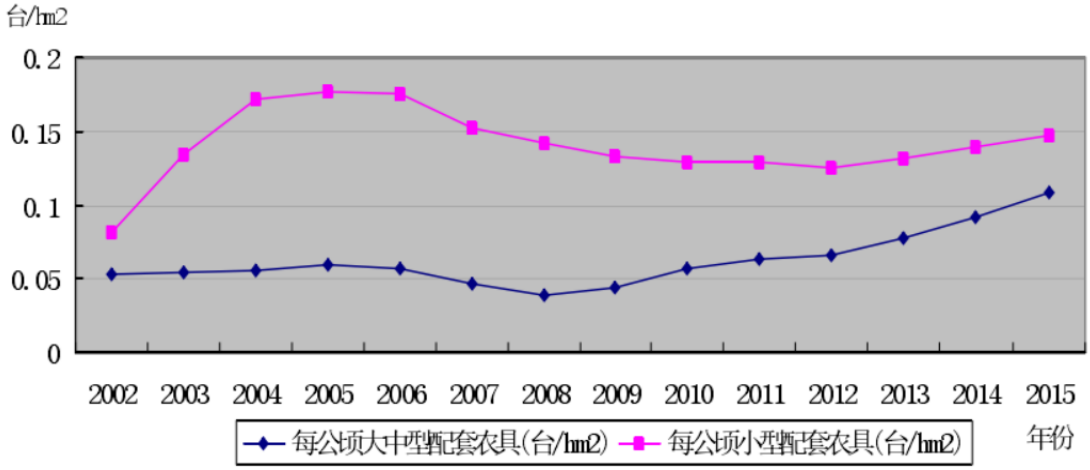

Figure 3. Change in the Number of Large, Medium and Small Supporting Implements per Hectare in Changji, 2002-2015

Data from "Statistical Yearbook of Changji Hui Autonomous Prefecture" 2002-2015.

3.2 Level of Agricultural Mechanization Operations

The level of agricultural machinery is an important indicator of the level of development of regional agricultural modernization. Agricultural machinery, mechanical sowing and harvesting machinery, development level and comprehensive agricultural mechanization in Changji City were studied from three aspects, and Changji City determined extensive and weight of 4:3:3 as shown in Figure 4, from 2002 to 2015, the level of agricultural machinery in Changji City has improved year by year, and the

level of agricultural machinery is in a relatively advanced state. The farmland in Changji is basically sown by machinery, and the level of sowing machinery has increased from 76.3% in 2002 to 98.3% in 2015, with an average annual growth rate of more than 1.96%. The proportion of mechanical harvesting also increased from 26% in 2002 to 59% in 2015 with an average annual growth rate of over 6.5%.The overall level of agricultural machinery in Changi reached 89% in 2015, an increase of 19% in the last decade. The line graph shows a steady growth trend in the level of machinery for mechanized agriculture, mechanized sowing, mechanized harvesting and integrated mechanization, which is developing well.

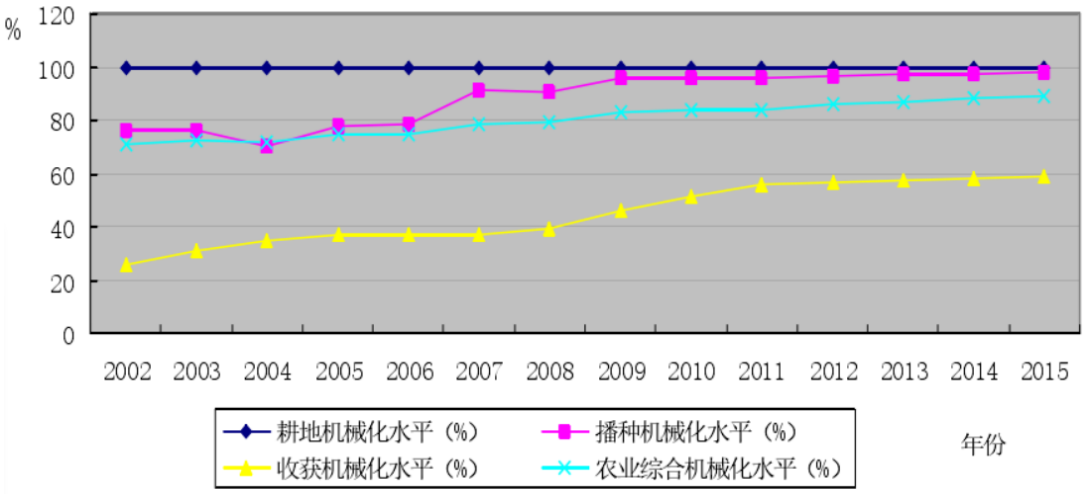

Figure 4. Level of Development of Agricultural Mechanization Operations in Changji City, 2002-2015

Data source: Statistical Yearbook of Changji Hui Autonomous Prefecture.

3.3 Financial Investment in Agricultural Machinery in Changji City

Agricultural machinery input funds have grown steadily in Changi. The total value of agricultural machinery fixed assets grew from 155 million yuan in 2002 to 425 million yuan in 2015, with a growth rate of over 174%. The government attaches great importance to the development of agricultural mechanization, and since 2004, the government has sought more than 2.5 billion yuan in various types of subsidies, which has largely promoted the development of agricultural mechanization in Changji. In addition, Changji has always attached great importance to training on the use of agricultural machinery, which has enhanced farmers' enthusiasm to use agricultural machinery, and farmers' investment funds in agricultural machinery have been increasing. The annual investment in agricultural machinery per farmer has increased from 92.3 yuan in 2002 to more than 1,100 yuan in 2015. More and more agricultural machinery has entered Changji City, providing material security and financial support for the development of agricultural machinery in Changji City.

4. Problems in the Development of Agricultural Mechanization in Changji City

4.1 Unreasonable Proportion of Agricultural Machine Structure

The total power of agricultural machinery in Changji is not low, but the overall level of development is not satisfactory, and the phenomenon of blind purchase of agricultural machinery by agricultural cooperatives and individual farmers still exists in some areas. The distribution structure of tractors and other "large" and "small" agricultural machinery is unbalanced, and the proportion of small agricultural machinery and agricultural tools in agricultural production is unreasonable. 2015, there were 3,508 large and medium-sized tractors and 7,996 small tractors in Changji city, with a ratio of 1:2.3, tractors, with a ratio of 1:2.3. the development of large and medium-sized tractors is still relatively slow compared to small tractors. However, as far as the efficiency of machinery is concerned, large and medium-sized agricultural machinery is highly efficient, low-cost and economically efficient, while small agricultural machinery is not only unable to meet the rapidly growing needs of agricultural production, but also difficult to adapt to large-scale agricultural modernization and strengthen the productivity and cost of small agricultural machinery production to meet the needs of modern agriculture. The slow development of large agricultural machinery and tools limits the improvement of the overall level of agricultural machinery in Changji City (Chen, 2022).

4.2 A single Approach to the Dissemination of Agricultural Mechanization Technologies

With the development of modern information technology, more and more agricultural practitioners are accustomed to using the Internet for learning and consultation. The new generation of young agricultural practitioners are more accustomed to using computer network technology to seek answers to doubts encountered in the use of agricultural machinery on the Internet. At the same time some highly educated farmers will choose online self-learning platforms such as Wanmen University, Love Course and MU for learning new agricultural machinery knowledge. These new learning and promotion modes bring opportunities and challenges to our promotion. Because at this stage, our agricultural machinery technology promotion and publicity methods are still too traditional to make good use of the Internet and new media platforms, resulting in some delays in the promotion of agricultural machinery and the rapid delivery of agricultural information.

4.3 Low Quality of Promotion Staff

Agricultural technology is not static, and with the renewal of equipment, agricultural mechanization technology is also progressing. Agricultural machinery promotion work is not a simple mechanical instruction to convey, the staff should go deep into the countryside, go into the farmers to understand what is the technology that farmers need most, what is the problem that farmers want to solve most, based on the actual practical solution to the problems of farmers on the use of agricultural machinery. At the same time, the quality of quality management personnel and scientific and cultural level is not high, science and technology extension staff echelon construction is backward, the lack of young agricultural machinery personnel who understand the technology, know how to operate, willing to work hard, agricultural technicians in young scientific and technological personnel accounted for a relatively

low. Most farmers have limited understanding of agricultural machinery, subject to lower cultural quality level, and low acceptance of advanced agricultural machinery and machinery, making it more difficult to transform the scientific and technological achievements of regional agricultural machinery into productivity (Wang, Xu, Hou, et al., 2016).

4.4 Lack of Attention to Outreach

For farmers in a single agricultural production mode, influenced by the traditional agricultural production ideology and economic conditions, most farmers are still accustomed to traditional farming methods, using more human resources for production and planting, with little awareness of the application of agricultural mechanization technology and no interest in agricultural mechanization technology. This situation exists not as an individual case but as a common phenomenon among farmers. Secondly, agricultural technicians in the process of promoting the relevant agricultural machinery technology is not comprehensive enough, too much attention to the increase or decrease in the number of agricultural machinery, while ignoring the use of farmers' demands, farmers do not master the best use of the method makes agricultural machinery in the agricultural production process is not effective enough (Wang & Zhao, 2014). Farmers do not use agricultural machinery and equipment to achieve the expected benefits of increased production and income, which frustrates the enthusiasm of farmers to use agricultural machinery and equipment, which in turn affects and hinders the promotion and use of agricultural machinery.

5. Suggestions for Countermeasures for the Development of Agricultural Mechanization in Changji City

5.1 Enhance Technical Training to Improve the Quality of Personnel

Rural revitalization, talent is the key. Development of agricultural machinery technology one, strengthen the professional quality of basic technical extension personnel , the professional quality of agricultural machinery personnel in Changji City is generally low and cannot meet the pace of development of agricultural mechanization in Changji City at this stage. Therefore, it is necessary to strengthen the treatment and scientific and cultural quality of basic technical extension personnel (Wang, 2022). Second, strengthen the specialized technical education and training. Along with the efforts to improve the basic cultural quality of farmers, farmers should be further trained to use agricultural machinery and equipment in order to increase their willingness to accept agricultural machinery. This requires local governments to strengthen agricultural machinery technology and provide professional training for rural laborers. On the one hand, it can improve farmers' ability to utilize and maintain various agricultural mechanization; on the other hand, it can also improve employment competitiveness and farmers' wage income (Pan, Li, Tang, & Zhang, 2022). Third, it improves the scientific and cultural quality of farmers. Further strengthen farmers' vocational education, improve the basic cultural quality of farmers, build new fields and develop new agricultural machinery and equipment. First, completely abolish the separation of the rural and urban education systems,

respect the deadlines, respond to the state policy, gradually increase the number of years of compulsory education and improve its basic cultural quality. Second, stop the imposition of tariffs on rural public education to facilitate its proper implementation (Luo, 2021).

5.2 Establishment of an Agricultural Mechanization Technology Extension Base

The establishment of agricultural technology promotion demonstration bases has an important demonstration and guiding role in the promotion of agricultural mechanization (Ma, 2021). Changji City should establish corresponding demonstration bases for the use of agricultural machinery according to the realities of local agricultural production in accordance with local conditions. At the same time, actively introduce social capital and agricultural machinery enterprises into the countryside to jointly publicize and promote the use and role of agricultural equipment. The local government can also join hands with enterprises to carry out field classes to promote machinery at the same time, through the teaching of relevant agricultural technology knowledge to make people feel the technical changes brought about by the use of agricultural machinery to agricultural production. Enterprises can also send education to the countryside through this mode to better understand the needs of farmers, to help enterprises to develop products needed by the market. The construction of the agricultural mechanization base makes the government, enterprises and farmers three different subjects effectively integrated, promoting enterprises to increase income while driving the local agricultural mechanization level to improve. Changji City should give full play to its comparative advantages according to its own agricultural base and characteristics, and focus on the production and development of special agricultural machinery (Sun, 2021).

5.3 Improving the Operating Environment for Agricultural Machinery in Changji City

Agricultural infrastructure has a great impact on agricultural machinery. Only by improving land shaping, increasing the number of agricultural technical service stations and improving the environment for agricultural machinery operations can we better serve agricultural production. Especially, the agricultural infrastructure is more important in the semi-mountainous areas of Changji City. The government should organize appropriate technical staff to plan and establish reasonable regulations for the use of agricultural machinery according to the specific area of land and arable land in Changji city. Farmers should actively work on agricultural infrastructure and open up arable land to create conditions for better operation of agricultural machinery.

5.4 Improving the Extension Guarantee Mechanism

At present, China has increased its support for agricultural mechanization production in policy, and the Government has continued to strengthen subsidies for the purchase of agricultural machinery and implement tax reduction policies for agricultural machinery and equipment-related production enterprises. At present, agricultural machinery purchase subsidies include provincial financial purchase subsidies, central financial purchase subsidies, subsidies for the purchase of machinery for the development of facilities for agriculture and other levels of subsidies, three-dimensional, all-round to meet the needs of farmers in agricultural production (Xue & Han, 2021). To formulate effective

countermeasures suitable for the development of agricultural mechanization in Changji City, to open green sales channels to reward agricultural machinery products that are urgently needed by farmers, have good market response and have good performance in use (Chen, 2021). Carry out the work of exchanging agricultural machinery for new ones to encourage farmers to replace advanced agricultural mechanization equipment in a timely manner. Multi-departmental joint production actual research in the countryside, combined with the actual agricultural and rural work in Changji City, the establishment of a complete agricultural mechanization production and use guarantee system, so as to lay a solid foundation for the large-scale use and promotion of agricultural mechanization in Changji City, and promote the further optimization of the city's agricultural equipment structure.

6. Conclusion

After entering the 21st century in the context of rural revitalization strategy and transformation of agricultural technology and equipment industry, the development of agricultural machinery in Changji has ushered in opportunities and challenges. Agricultural mechanization in Changji still needs continuous improvement and refinement. In this paper, the operation level and equipment level of agricultural machinery in Changji and the operation level of agricultural machinery are elaborated in three aspects: unreasonable structure of agricultural machinery and equipment, agriculture is the basic environment of the countryside, agricultural machinery, agricultural machinery workers from the base level is generally not a high level of agricultural machinery and technical equipment behind. According to the specific situation of agricultural machinery development in Changji City, countermeasures and suggestions are put forward: strengthen education and training of agricultural machinery, agricultural machinery industry development in Changji City, update the level of science and technology of agricultural machinery, Changji City to improve agricultural machinery in the working environment, strengthen the agricultural machinery industry and policy support, improve the service system. The aim is to promote the development of agricultural machinery in order to better increase the income of farmers, which is a priority to promote rural revitalization.

References

Chen, Chuaning. (2022). Analysis of agricultural mechanization development under the background of rural revitalization strategy. *Southern Agricultural Machinery*, *53*(11), 150-152+160.

Chen, H. X. (2021). Innovative development ideas of agricultural mechanization in special industries in Dingxi City. *Agricultural machinery*, *2021*(11), 69-71.

Luo, Y. (2021). The current situation and suggestions for the development of agricultural mechanization in Loudi City. *Agricultural development and equipment*, *2021*(09), 92-93+230.

Ma, S. G. (2021). The use of agricultural mechanization in the development of modern agriculture. *Agricultural counselor*, *2021*(18), 93-94.

Pan, J. X., Li, L. J., Tang, S., & Zhang, T. (2022). Current situation of agricultural mechanization development in Guangxi and suggestions for countermeasures. *Tropical Agricultural Science*, *42*(01), 84-90.

Sun, L. T. (2021). The current situation of agricultural mechanization development and countermeasure suggestions. *Farmers' Counselor*, *2021*(18), 95-96.

Wang, J. (2022). Discussion on the development of agricultural mechanization under the background of rural revitalization strategy. *Contemporary Agricultural Machinery*, *2022*(03), 48-49.

Wang, J. Q. (2021). Agricultural machinery technology promotion problems and countermeasures discussion. *Southern Agricultural Machinery*, *52*(01), 64-65+84.

Wang, X. B., Xu, D., Hou, L. L., et al. (2016). Research on mechanization of maize production and mechanical labor substitution effect-Based on provincial panel data analysis. *Agricultural Technology Economics*, *2016*(6), 4-12.

Wang, X. L., & Zhao, K. (2014). Research on the impact of agricultural mechanization level on agricultural economic growth in Heilongjiang Province. *Agricultural Technology Economics Economy*, *2014*(6), 9-14.

Xue, X. Y., & Han, Y. J. (2021). Review of agricultural machinery operation services. *Journal of China Agricultural University*, *26*(10), 185-197.

Zhang, W. L., & Zhang, C. (2019). Exploring the path of "urban-rural" rural revitalization in Northwest China--Xinjiang Changji City as an example. China Society of Urban Planning, Chongqing Municipal People's Government. Vibrant City and Countryside for Better Living - Proceedings of the 2019 China Urban Planning Annual Conference (18 Rural Planning) China Society of Urban Planning, Chongqing Municipal People's Government: China Society of Urban Planning, 2019, 9.