

Development Trend of Agricultural Mechanization Automation in China

Jinming XU^{1*}

¹ Digital Efficiency Institute of Science and Technology Research, Guangzhou, 510630, China

* *Jinming Xu is the corresponding author, E-mail: axu9905@gmail.com*

Abstract: At present, China's rural population still accounts for 63,76% of the total population, agriculture is an important industrial sector of the national economy, with the development of society, the mechanization of agricultural production automation will become an inevitable trend of China's agricultural development, before the rural areas rely on people as a labor force for the production of agricultural products is not only inefficient but also a waste of a lot of resources. This is not in line with the minimum resources to obtain the maximum economic benefits of the development requirements.

Keywords: Agriculture, Mechanization and Automation, Mass Production, Development Trend.

DOI: <https://doi.org/10.5281/zenodo.8383712>

1. Background of the Study

(i) The level of automation of agricultural mechanization in agriculturally developed countries. The United States is the world's superpower, and its agriculture is among the most developed and technologically advanced. American agricultural mechanization has gone through a long historical period. But if from the beginning of mass production and the use of tractors to the basic realization of agricultural mechanization is experienced 30 years of time. The United States of America's agricultural products from planting to harvesting all aspects of the comprehensive mechanization automation, scientific and effective management has greatly improved the productivity of agricultural labor and the effective utilization of resources, power, although the agricultural labor is greatly reduced, agricultural land is shrinking, but because of its labor productivity continues to improve, agricultural production is a significant increase.

(ii) The level of automation of agricultural mechanization in China. China is a large agricultural country in the world, with the rural population accounting for more than 50% of the country's population. Since China's agricultural production have been people and animal power as the main labor force for agricultural production, in addition to China's land policy caused by China's agricultural production into a small-scale decentralization, which is very unfavorable to the realization of agricultural mechanization. In recent years, the development of China's agricultural mechanization is still relatively fast, agricultural mechanization to support the ability of agricultural development has also significantly improved, accelerating the transformation of the mode of agricultural growth and the process of agricultural modernization, and promote the

improvement of agricultural labor productivity and comprehensive agricultural production capacity. But we should also be clear that the level of agricultural mechanization in our country is far behind the United States and Japan, these developed countries, our country in the production of agricultural products is still to consume huge resources at the expense of obtaining a meager economic benefits, which is not worth the loss.

(iii) Reasons for the mechanization of agriculture in China: The post-80s and post-90s are gradually becoming the main force of farmers in China. They are the generation that grows up in the booming period of new China, and also the first generation after the implementation of the one-child policy in China. Most of them have received good education and have their own ideas and personalities, and they can't accept their father's way of farming which is facing the yellow soil and back to the sky. They have a strong demand for reducing labor intensity and favor light and simplified agricultural machinery.

2. Trends in the Automation of Agricultural Mechanization

Modern agricultural production is divided into three parts. The planting of agricultural products, the growth and maintenance of agricultural products, and the harvesting of agricultural products. If all three stages of mechanization and automation and scientific and effective management, then the reduction of labor intensity of agricultural production and the increase in agricultural productivity will be a matter of water to the end. The new generation of farmers to reduce the labor intensity of the requirements of the new generation has been met, they are well educated generation, their wisdom will lead China's agriculture to a

new era.

(i) planting of agricultural products: in the planting stage of agricultural products, we should be for different soil quality and landforms to design a corresponding combination of soil turning and planting as one of the agricultural machinery. Although now for the planting of soil turning machinery and sowing machinery has appeared but as far as I know these agricultural machinery can only work in the land flat area. But China's vast land, rural land is also a variety of terrain, such as mountains and hills these areas of agricultural land accounted for a large portion of our arable land, these areas are still relying on manpower and animal power for production, which directly results in these areas of labor intensity has not been reduced productivity has not been improved, which has caused a great waste of China's agricultural resources. In addition, the farmers in these areas are generally poorer, if they are allowed to buy soil turning and harvesting machinery, this will cause great economic difficulties for them. Therefore, agricultural machinery should be developed in the direction of lightweight integration and automation.

(ii) Growth and conservation stage of agricultural products: Nowadays, farmers in most areas of China still depend on the sky for food, and a few water-rich areas have a serious waste of agricultural water. These conditions are related to the fact that our agricultural irrigation system has not been mechanized and automated. We can scientifically and effectively control and manage the irrigation system according to the soil quality of different regions and the different crops planted. We can lay special irrigation and drainage pipes in the farmland, for example, we can implement drip irrigation in the farmland, so as to ensure that the normal soil moisture in the farmland under the circumstances of great water saving. We have a part of the scientific personnel to survey the land condition regularly, and these scientific personnel will reflect the land condition to the farmers in time, and the farmers will control the drought and flood of the farmland through the irrigation system and the drainage system, which will not result in the primitive mode of cultivation that depends on the weather. Or in the conservation phase, after scientific analysis, new machinery is used to apply the right amount of fertilizer to the farmland, so that it does not cause economic losses to the farmers, and fertilizers do not enter the environment and pollute the environment due to overuse.

(iii) harvesting of agricultural products: at the present stage of China's agricultural mechanization, in the harvesting of agricultural products in the machinery still presents the shortcomings of bulky, labor-intensive and single mode of action. Wheat harvester, for example, the wheat harvester is large and bulky, which for the United States of America's intensive agricultural production and there is no big problem, but the current implementation of China's rural areas of the joint contract, the unity and separation of the two-tier system of management, although the land as the means of production of the collective

ownership of the nature of the collective has not changed, but to the farmers as a unit of contracting, the land of public and private use of the reality of the decision of the production of the Organizational form is individual small-scale production, individual small-scale production caused by farmers and farmers harvest time is different, a variety of agricultural products planting present mosaic distribution, in addition to the narrow length of the plot of land is too short to the work of the wheat harvester caused great inconvenience, resulting in the air operation of the time is sometimes greater than the time of the work of the same kind of resources are repeatedly wasted phenomenon.

The same resource is wasted over and over again. This has resulted in a 90% utilization rate of resources in the United States and a 50% utilization rate of machinery in our country.

3. Conclusion

To sum up due to China's agricultural production belongs to individual small-scale production, this mode of production in the short term will not change, so the development trend of China's agricultural mechanization should have its own characteristics. It should be light and simplified automation, individual farmers can operate. In addition, due to the generally low standard of living of farmers in China, the purchasing power is poor, agricultural machinery should also have a variety of functions, such as turning and planting, land maintenance and fertilization and harvesting and other functions.

Acknowledgments

The authors thank the editor and anonymous reviewers for their helpful comments and valuable suggestions.

Funding

Not applicable.

Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Author Contributions

Not applicable.

About the Authors

At the request of the author, it will not be disclosed.

References

- [1] Feng Qigao, Mao Hanping. Development Status and Countermeasures of Agricultural Mechanization in China[J] Agricultural Mechanization Research, 2010(2):245-248.
- [2] Xiong Bo. Overview of the development of agricultural mechanization in the United States[J]Contemporary Agricultural Machinery,2010-06-15:52-54.