The Role of Soybean Mechanization in Agricultural Supply-Side Structural Reform

Donghui Zhang, Qingchun Yang, Zhen Geng, Jinxia Wang, Penglei Wang

Zhoukou Academy of Agricultural Sciences, Zhoukou 466001, China.

Abstract: In order to explore the role of mechanized soybean cultivation technology in the structural reform of agricultural supply side, this paper analyzes the impact of mechanized planting technology on the soybean industry through comprehensive literature review and empirical research, and provides theoretical support and practical guidance for the structural reform of agricultural supply side. The results show that the mechanized cultivation technology of soybean can improve the efficiency of agricultural production and realize the high-quality, green and standardized supply of agricultural products. In addition, soybean mechanized planting technology can also reduce the labor intensity of agricultural practitioners, improve their income level, and promote rural economic development. The research results have certain theoretical and practical significance for promoting the structural reform of China's agricultural supply side, and also provide reference for the agricultural development of other countries and regions.

Keywords: Study on Mechanization of Soybean; Structural Reform of Agricultural Supply Side and Its Role

Introduction

Agricultural supply-side structural reform is an important part of agricultural development in many countries, including China [1]. It aims to improve the overall efficiency and sustainability of agricultural production by optimizing resource allocation, promoting technological innovation, and improving the quality and safety of agricultural products [2]. The reform focused on addressing long-standing problems in agriculture, such as overproduction, low quality and over-reliance on chemical inputs [3]. The aim of this reform is to transform traditional agricultural production methods and improve the quality, efficiency and sustainability of agricultural products. [4]

In recent years, the agricultural sector has undergone significant changes due to supply-side structural reform [5]. Soybeans, as one of the main crops for food and feed production, should play a crucial role in this reform. [6] Mechanized planting technology refers to the use of various mechanical equipment in the soybean planting process, such as precise planting, seeding, fertilization, harvesting, etc. [7]. This technology can significantly improve agricultural productivity and reduce labor intensity, while also promoting the standardization and greening of agricultural production [8]. In addition, soybean mechanized planting technology contributes to the increase of farmers' income and the development of rural economy, and is an important tool to achieve the goal of agricultural supply-side structural reform [9]. Mechanized soybean planting technology has received increasing attention from researchers and policymakers due to its potential to address challenges facing the agricultural sector [10].

1. Impact of soybean mechanization on soybean production

The mechanization of soybean farming includes a wide range of agricultural machinery and equipment, including tractors, planters, harvesters and sprayers. These technologies are designed to automate various tasks involved in soybean farming, such as land preparation, planting, fertilization, pest control, harvesting and processing. As can be seen from Figure 1 and Figure 2, in recent years, with the continuous progress of agricultural technology, the total power of agricultural machinery and the number of agricultural tractors in the country have shown a steady increase, indicating that the level of agricultural mechanization has achieved significant development and has become an important part of modern agriculture.
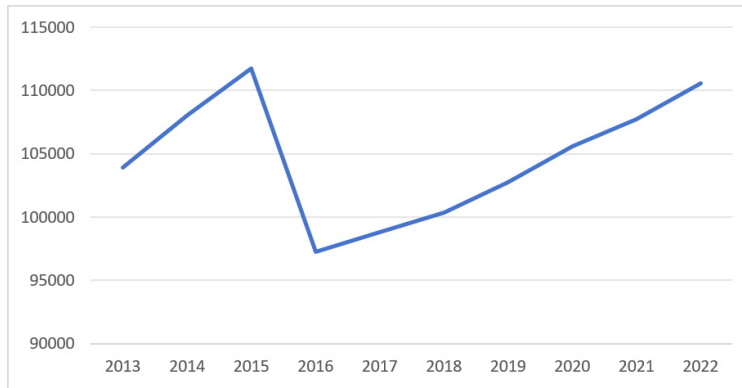
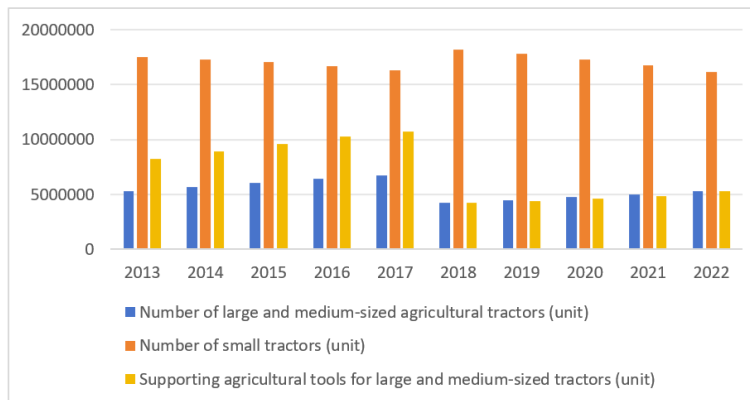Figure 1 Total power of agricultural machinery (10000 kilowatts)

Figure 2 National Agricultural Machinery Quantity Diagram

One of the main reasons for promoting soybean mechanization is to address the challenges faced by traditional manual labor-intensive agriculture. The use of advanced machinery and equipment in soybean planting can greatly improve labor productivity, reduce labor costs, and alleviate the problem of rural labor shortage.

Another reason for advancing soybean mechanization is to improve the efficiency and quality of soybean production. Mechanized planting technology allows soybeans to be precisely seeded and grown evenly, thereby increasing yield and quality. Mechanized harvesting and processing technologies further ensure efficient and standardized production.

In addition, soybean mechanization also contributes to the optimization of agricultural production structure. By promoting the transition from traditional farming methods to mechanized farming, it helps to improve the overall competitiveness of the agricultural sector and promote the sustainable development of soybean production.

2. Impact of soybean mechanization on agricultural productivity

Mechanized cultivation techniques offer several advantages in planting, fertilization, and pest control, resulting in increased crop yields and efficiency.

One of the significant benefits of soybean mechanization is increased agricultural productivity. By replacing human labor with machines, the time and labor required to grow soybeans can be significantly reduced, thus improving the timeliness and productivity of the entire production process.
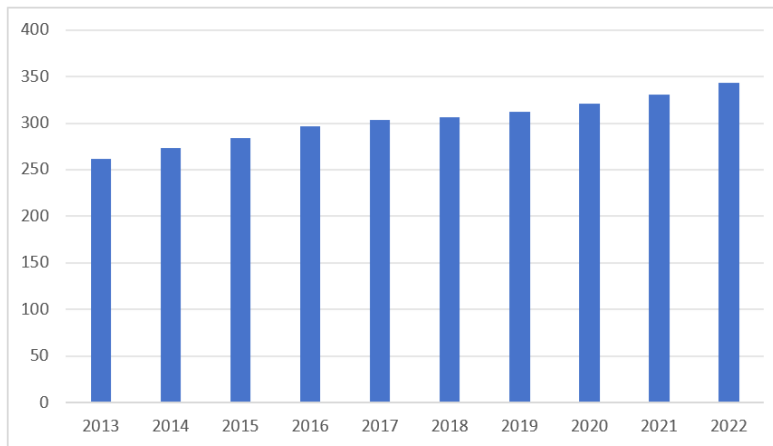
Figure 3 Total power of agricultural machinery in state-owned farms (billion watts)

By using modern machinery, precise and uniform sowing of soybeans can be achieved, ensuring optimal plant density, enabling more uniform plant growth and reducing competition between plants for nutrients and sunlight, resulting in higher crop yields. Mechanized fertilization technology enables accurate fertilizer application, ensuring that plants get the nutrients they need at the right time. This not only promotes the healthy growth of soybean plants, but also reduces fertilizer waste, resulting in more environmentally friendly and sustainable farming practices.
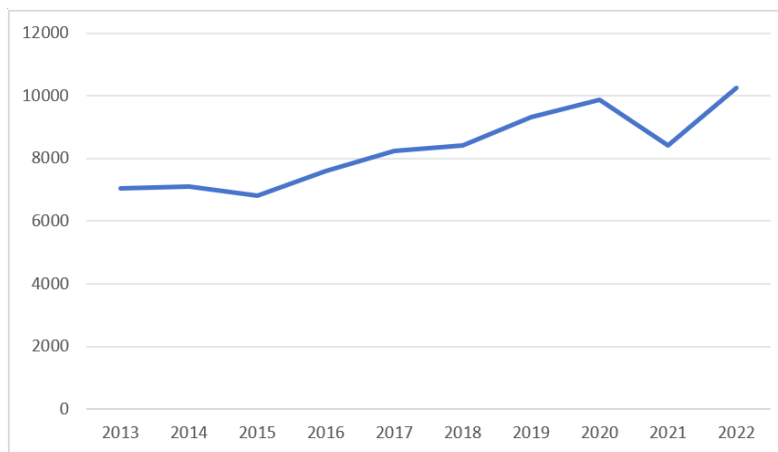

Figure 4 Soy planting area (thousand hectares)

In addition, mechanization has greatly improved the efficiency of pest control in soybean cultivation. Using advanced spraying equipment and technology, it is easier to apply insecticides evenly and efficiently, reducing the risk of pests and crop damage. This not only reduces the use of pesticides, but also improves the quality and safety of soybean products, enabling environmentally friendly and sustainable soybean production.

In addition, mechanized harvesting and processing technologies help increase agricultural productivity. Using modern harvesting machinery, soybeans can be harvested more efficiently, reducing the time and labor required for manual harvesting. This not only improves total production, but also minimizes post-harvest losses and ensures timely delivery of soybeans to market.

Overall, as can be seen from Figures 3 and 4, the adoption of soybean mechanization in agricultural production has significantly increased productivity, thereby increasing yields and enhancing the competitiveness of the soybean industry. It will also help achieve the goals of agricultural supply-side structural reform, such as optimizing the production structure and promoting high-quality, green and standardized agricultural products.

3. Impact of soybean mechanization on farmers' income

Soybean mechanization is not only conducive to improving agricultural productivity, but also has a profound impact on farmers' income. By reducing labor intensity, increasing efficiency, and increasing yields, soybean mechanization offers farmers the opportunity to increase income and improve quality of life.
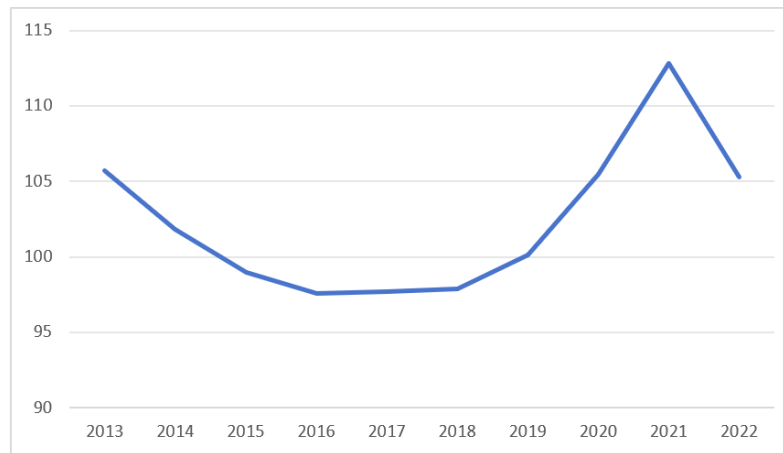

Figure 5 Soybean Production Price Index (Last Year=100)

First of all, the adoption of mechanized planting technology reduces the labor intensity and physical consumption required for soybean planting. This frees farmers from heavy manual labor and enables them to engage in other income-generating activities such as part-time work or entrepreneurship. The reduced labor burden also enables older farmers to continue farming for longer, ensuring their income stability and retirement security.

Second, the efficiency gains and increased yields from soybean mechanization help boost farmers' incomes. Using advanced machinery, farmers can complete agricultural operations faster and more efficiently, saving time and costs. The increased yield through mechanized planting techniques not only increases the sales volume of soybeans, but also improves the quality of the products and occupies a higher price in the market.

In addition, the spread of soybean mechanization helps farmers integrate into the market. Mechanized farming allows farmers to produce standardized, high-quality soybeans that meet market demand. This enables them to establish stable and long-term partnerships with buyers and processors, ensuring a more stable and higher source of income.

In summary, combined with Figure 5, we can conclude that soybean mechanization plays an important role in raising farmers' income. By reducing labor intensity, increasing efficiency and increasing yields, it offers farmers the opportunity to increase their incomes and improve their livelihoods. The promotion of soybean mechanization, coupled with appropriate policy support, can contribute to the overall development of rural areas, stimulate rural consumption, and promote sustainable development of the agricultural sector.

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About the author: Zhang Donghui, born in March 1977, male, Han nationality, native of Zhoukou, Henan Province, associate researcher, master candidate.

Research direction: Soybean breeding, cultivation, demonstration and extension.