



Case Study

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Study on the Application of Full-process Mechanization in Green and Efficient Production of High-quality Rice: A Case Study of Mashan Agricultural Service Center in Shangyu District

Xinfeng Ren¹, Yaqin Ren^{1,2} ¹ Shaoxing Shangyu Weilue Ecological Agriculture Development Co., Ltd., Shaoxing 312352, Zhejiang, China² Zhejiang Agronomist College, Hangzhou, 310021, Zhejiang, China Corresponding authors: 2898418581@qq.comGenomics and Applied Biology, 2026, Vol.17, No.3 doi: [10.5376/gab.2026.17.0011](https://doi.org/10.5376/gab.2026.17.0011)

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Abstract This study explored the application of full-process mechanization in the green and efficient production of high-quality rice by taking Mashan Agricultural Service Center in Shangyu District, Zhejiang Province, as a practical case. Against the background of rapid agricultural modernization and increasing demand for green agricultural development in China, the study examined how regional agricultural service centers integrate mechanized seedling cultivation, machine transplanting, field management, plant protection, harvesting, drying, storage, and rice processing into a coordinated agricultural production system. Based on field materials, project documents, and operational cases, the study analyzed the service model, equipment configuration, production organization, and operational effects of the Mashan center. The results showed that full-process mechanization significantly improved rice production efficiency, reduced labor dependence, lowered grain losses during harvesting and postharvest stages, and enhanced the stability and quality consistency of high-quality rice production. In particular, centralized seedling cultivation, emergency mechanized harvesting during typhoon periods, and expanded grain drying capacity played important roles in strengthening regional food security and disaster-response capacity. The study also found that agricultural service centers can effectively bridge the gap between small-scale farmers and modern agricultural technology through socialized agricultural services. At the same time, several challenges remain, including high machinery investment costs, shortages of skilled technicians, uneven mechanization levels among farmers, and increasing climate-related risks. Therefore, future development should focus on improving regional agricultural service networks, strengthening agricultural talent training, promoting practical intelligent agricultural machinery, enhancing digital management, and extending the high-quality rice industry chain. The findings of this study provide practical references for promoting sustainable rice production and agricultural modernization in major rice-producing regions of China.

Keywords Full-process mechanization; High-quality rice; Agricultural service center; Green agricultural production; Rice mechanization

1 Introduction

Rice is not only a staple crop in China, but also a strategic crop closely tied to national food security, rural livelihoods, and regional agricultural modernization. A recent review of Chinese rice production showed that total rice output rose steadily from 2001 to 2021, and that the rise was driven largely by improvements in yield per unit area rather than by expansion of planted land. That long-term trend is encouraging, but it also means that future gains must come less from acreage growth and more from better organization, better varieties, and better management, especially in ecologically and economically advanced provinces where land and labor are both costly. Tang et al. (2022) further noted that rice production in China increasingly depends on coordinated improvements in varieties, field management, and agricultural resource use, rather than on one single input alone.

Yet the everyday reality of rice farming is still shaped by production bottlenecks. Recent studies on rice production efficiency in China indicate that mechanization and custom machine services already have measurable influences on technical efficiency, although the effects remain uneven across production stages and farm scales. The problem is not simply whether machinery exists, but whether farmers can access appropriate machinery and