



Figure 2 Combine harvesting in the rice fields served by Mashan Agricultural Service Center (Photoed by Xinfeng Ren)

The field photograph of combine harvesters operating in the paddy landscape makes the service-center logic visible. In good weather, mechanized harvesting improves labor efficiency. In bad weather, it becomes a risk-management tool. A center able to quickly mobilize harvesting capacity across several towns is not only improving efficiency, but also performing a quasi-public service by protecting grain from weather shocks. Zhejiang's 2024 policy on modern agricultural service centers also encouraged centers to build emergency response teams and integrate them into local agricultural disaster-response systems, and Mashan's emergency harvesting case fits that policy direction closely.

### 3.5 Mechanized grain drying and processing

For high-quality rice, harvest without drying is incomplete mechanization. Grain that is harvested on time but not dried promptly may still suffer quality and safety losses. Drying affects grain cracking, storage stability, whole-rice rate, appearance, and later processing performance. Recent studies on rice drying have shown that carefully controlled drying conditions can improve both drying efficiency and grain quality, while poor drying management can quickly weaken the advantages of timely harvesting (Li et al., 2024).

The Mashan case gives drying a central place in the production chain. According to the internal project materials, the center added eight dryers after expansion and raised batch drying capacity to 400 tons, while annual drying capacity increased from 10,000 tons to 18,000 tons. The center also expanded grain storage through a 750-ton indoor metal granary and built a 50-ton rice processing line (Figure 3). These facilities make it possible to move from field rescue to stable postharvest management, and then from postharvest management to value-added rice products.

This stage is especially important in regions with narrow harvest windows and unstable autumn weather. Centralized drying reduces dependence on household sun drying, which is weather-sensitive, land-intensive, and difficult to standardize. It also supports grain safety, reduces the risk of mildew and quality deterioration, and creates the condition for processing and branding. In quality-oriented rice systems, this is a major bridge between agricultural production and the consumer market. Mechanized drying is therefore not simply a postharvest convenience. It is an essential part of green and efficient production because it prevents avoidable loss of grain already produced with limited land, water, energy, and labor resources (Qu et al., 2021; Li et al., 2024).

## 4 Promotion Effects of Full-process Mechanization on High-quality Rice Production

### 4.1 Improvement of rice production efficiency

The most immediate effect of full-process mechanization is improved production efficiency, but the term "efficiency" deserves a broader reading. It certainly includes speed and labor saving. Yet in rice production it also includes the ability to complete operations within the proper agronomic window, to reduce coordination failures, and to maintain service continuity across production stages. Research on Chinese rice production has shown that mechanization and custom machine services are positively associated with production efficiency, while empirical work on grain production capacity more broadly has shown that mechanization can improve both output capacity and production efficiency (Shi et al., 2021; Liu and Li, 2023).