

This issue is particularly relevant in the Mashan case because the center serves both nearby villages and a broader multi-township agricultural region. As the service radius expands, the center inevitably encounters greater variation in field conditions and farmer demands. A single standardized service package may therefore not suit all users equally well. Some households may only purchase harvesting services, while others may accept partial or full-process trusteeship services. Some farmers prioritize quality-oriented branded production, whereas others focus mainly on reducing immediate production costs.

These differences indicate that full-process mechanization still has organizational and social boundaries. Even when machinery services are available, farmer adoption depends on factors such as trust, land conditions, production goals, and the suitability of service arrangements. Therefore, agricultural service centers must function not only as technical providers, but also as coordinators capable of matching different farmers with appropriate service combinations.

6.4 Significant impacts of extreme weather on rice production

The Mashan emergency harvesting case clearly demonstrates that extreme weather remains a major challenge even in relatively well-equipped agricultural regions. Rice production in China is increasingly exposed to climatic uncertainty, including heat stress, heavy rainfall, typhoon events, and humid harvesting conditions. Recent climate-related studies suggest that extreme climate events may become more frequent and more severe in future rice production systems, particularly under warming scenarios that intensify heat stress and increase production instability (Jiang et al., 2025).

For agricultural service centers, extreme weather creates several interconnected challenges. It shortens operational windows, increases pressure on machinery scheduling, raises demand for emergency drying and temporary storage, and may generate sudden service demand beyond ordinary operational capacity. Mashan's ability to organize emergency harvesting and large-scale drying during the "double rush" period was impressive, but the case also reveals how quickly even well-organized systems can be placed under stress during abnormal climatic conditions.

This challenge is unlikely to disappear in the future. Modern agricultural service centers will increasingly be evaluated not only by their efficiency during normal seasons, but also by their resilience during periods of climatic disruption. Full-process mechanization improves regional response capacity, but resilience itself must now become an explicit goal in the design of agricultural modernization systems.

7 Optimization Suggestions and Development Directions

7.1 Improving the regional agricultural machinery service system

The Mashan case suggests that the future development of agricultural mechanization depends not simply on increasing the number of machines, but on strengthening the regional agricultural service system itself. Zhejiang Province's 2024 policy already reflects this direction by emphasizing layered service networks, comprehensive functional coverage, and the establishment of a five-kilometer agricultural service circle. For service centers such as Mashan, the practical implication is the establishment of clearer service zoning, including a nearby core area for highly intensive "nanny-style" services, a broader operational area for scheduled cross-township services, and an emergency-response layer designed for extreme weather and urgent harvesting tasks.

Recent research also supports stronger integration of agricultural service systems. Studies on agricultural socialized services show that service efficiency is highest when mechanized operations improve production continuity, operational coordination, and machinery utilization across different stages of farming (Cai et al., 2024; Liao et al., 2025). Instead of expanding services randomly, agricultural service centers should strengthen the links among seedling cultivation, transplanting, plant protection, harvesting, drying, transportation, and storage so that farmers can rely on one coordinated operational chain rather than fragmented service providers.

For Mashan, this may involve establishing more stable long-term service agreements with nearby villages, improving seasonal booking systems, and strengthening coordination among grain ordering, drying demand, and