

Qianjiang 661 is discussed in this paper from that system-based perspective. A methodological caution is necessary at the outset: compared with nationally prominent rapeseed cultivars that are frequently discussed in indexed papers, the publicly visible, variety-specific documentation for Qianjiang 661 is still limited, especially in English. For that reason, this article does not manufacture numeric superiority claims that cannot be traced. Instead, it uses a review approach that combines broader literature on rice-rapeseed rotation with the case sources specified for this manuscript—especially enterprise demonstration information from Longyou Wuguxiang Seed Industry Co., Ltd. and Zhejiang-oriented demonstration descriptions—to assess the plausible application performance and promotion value of the cultivar under real production conditions. The objective is not to oversell the variety, but to place it accurately within the agronomic and strategic logic of rice-rapeseed rotation in eastern China.

2 Development and Significance of Rice-Rapeseed Rotation Systems

2.1 Current development of rice-rapeseed rotation in china

In China, the agronomic importance of rice-based double-cropping systems rests on geography as much as on policy. The middle and lower Yangtze region combines a warm climate, sufficient moisture, paddy-based farming traditions, and a long enough frost-free season to support rice in summer and rapeseed in winter. This makes the rice-rapeseed sequence especially valuable in provinces such as Hubei, Hunan, Jiangxi, Anhui, Jiangsu, and Zhejiang, where winter fallow represents not only a missed production opportunity but also a missed opportunity for strengthening regional oilseed supply. At the national level, China remains one of the world's leading producers of rapeseed and rapeseed oil, and rapeseed continues to hold a special place in the domestic edible-oil structure even as soybeans dominate the import landscape.

The system has become even more significant because current agricultural strategy increasingly values intensification that works through better system design. The key question is no longer how to increase output through a single crop in isolation, but how to redesign the annual cropping calendar so that land, labor, and seasonal climate are used more effectively. This is exactly the kind of problem addressed in the broader literature on sustainable intensification and crop diversification. Diverse crop sequences often improve ecological functioning, maintain productivity, and reduce some of the vulnerabilities associated with simplified systems. In Chinese rice regions, rapeseed is especially attractive in this role because it occupies the winter gap between rice seasons while contributing to domestic oilseed output (Pretty, 2008; Gurr et al., 2016; Pretty, 2018).

At the same time, the system is under pressure. Delayed rice harvest can narrow the sowing window for rapeseed. Paddy soils may remain wet when field turnover should already be underway. Labor shortages make late, labor-intensive field operations more expensive and less reliable. These changes are pushing rotation systems toward varieties and management packages that are less sensitive to operational delay and more compatible with mechanized production. In that sense, the development of rice-rapeseed rotation in China is not only a question of area, but of technical fit and operational robustness.

2.2 Advantages of rice-rapeseed rotation for farmland utilization

The first and most obvious advantage of rice-rapeseed rotation is that it raises annual land-use efficiency. A field that would otherwise remain idle after rice harvest can continue to produce value during the winter season. This is important in a country where cultivated land is finite and where stable output increasingly depends on making better use of existing farmland rather than adding new land. FAO data show both the global importance of efficient cropland use and the continuing pressure on agricultural land systems; in this context, cropping intensity matters as much as land area itself.

The second advantage is system complementarity. Rice and rapeseed differ in growth season, canopy structure, residue type, nutrient demand pattern, and pest-pathogen spectrum. This does not eliminate production problems, but it can help reduce the ecological rigidity associated with repeated single-crop use of the same land. More generally, crop diversification is often associated with improved ecological intensification because it can strengthen ecosystem services, improve resilience, and distribute production risk across seasons (Lin, 2011; Bommarco et al., 2013; Gurr et al., 2016). In practice, a winter rapeseed crop also means that paddy fields are not