

PERFORMANCE EVALUATION OF A NEWLY IMPORTED SMALL COMBINE HARVESTER

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Rice (*Oryza sativa* L.) is a staple food in Sri Lanka, and efficient harvesting is vital for enhancing productivity. Most farmers use mechanical harvesting, but small and medium-scale farmers face high costs, field limits, and complexity with large harvesters. Browns Agriculture introduced WEIMA WM4LZ-1.0B, a small combine harvester to address this issue. This study aimed to assess its performance and economic efficiency relative to a commonly used large harvester. Field trials were conducted in the Western and North Central Province of Sri Lanka during the 2024 Yala season. Key performance metrics evaluated included operating speed, effective field capacity (EFC), theoretical field capacity (TFC), field efficiency (FE), fuel consumption, grain quality, and header losses. An economic analysis was conducted, including fixed and variable costs, along with the break-even point. Data analysis utilized an independent t-test. Results indicated that the small harvester operated at a speed of 2.1 km h⁻¹, EFC of 0.113 ha h⁻¹, and TFC of 0.192 ha h⁻¹. In contrast, the larger harvester recorded a higher speed of 2.69 km h⁻¹, EFC of 0.301 ha h⁻¹, and TFC of 0.553 ha h⁻¹. While field efficiency (58.87% for small and 54.4% for large) and grain quality were not significantly different, the small harvester exhibited lower fuel consumption (13.59 L ha⁻¹ vs. 30.72 L ha⁻¹) and reduced header losses than the large one (1.58% vs. 3.1%). There was no breakdown occurring during the operation. The economic analysis revealed lower operational costs for the small harvester (32,846 LKR ha⁻¹) than the large harvester (38,687 LKR ha⁻¹), with a break-even point of 15.64 ha yr⁻¹. According to the results, the small combine harvester could be recommended for medium to large-scale rice farmers as a reliable solution.

Keywords: Break-even point, Field capacity, Field efficiency, Operational cost, Paddy harvesting