

How to Enhance Transport Sustainability in Agriculture Operations

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Abstract

The study highlights that transport activities represent a significant share of total energy consumption in agriculture, with their impact varying widely depending on distance, crop type, and logistics organization. For example, transport accounts for 3–15% of total energy use in rice cultivation and can reach 20–70% during maize silage harvesting, mainly due to the large volumes of material moved.

Field tests were conducted in winter 2024, using different tractors and load configurations over 20–25 km routes. Results show that tractors operating without load have relatively high fuel consumption compared to industrial trucks, while optimal tractor-trailer combinations significantly reduce fuel use per ton transported. The study provides empirical consumption coefficients and analytical formulas to estimate diesel demand for both towed equipment (trailers, slurry tanks) and mounted implements.

Applying these models to maize grain production demonstrates that logistics-related fuel consumption can reach 11.6% of total diesel use at a distance of 5 km, and up to nearly 46% at 20 km. The report concludes that logistics is a crucial factor in agricultural energy efficiency and that optimising transport operations or improving field allocation can lead to substantial fuel savings in horticultural activities.