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Category	: International Rice Research Conference
Select Theme	: Sustainable and equitable farming systems
Endorsement email	:
Keyword 1	: Mechanization
Keyword 2	: Energy efficiency
Keyword 3	: Precision Agriculture
Title of Entry	: Increasing economic and energy efficiency and reducing greenhouse gas emissions in rice production by applying laser-controlled land leveling
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: Precision land leveling to minimize the unevenness of the rice field can contribute significantly to increasing the yield and input use efficiency of water, energy, and agronomic inputs and to reducing postharvest losses and the environmental footprint of rice production. One of the precision technologies widely developed in modern agriculture and more recently for smallholder rice production is laser-controlled land leveling (LLL) which can level the fields with high precision, reaching an altitude unevenness of as little as 1-2 cm or slopes of the fields lower than 0.02%. This research conducted a Life-Cycle Assessment to analyse the

impacts of LLL based on balances of energy and greenhouse gas emissions (GHGE), and cost-benefits. The application of this technology for rice production in one season resulted in energy use savings of 526 kWh ha⁻¹ and a reduction of GHGE by 53 kgCO₂-eq ha⁻¹. From more efficient input use, a one-time LLL application within a five-year cropping cycle can generate a total net profit of 17.3 MWh ha⁻¹ from energy saving and a cumulative reduction of GHGE in five years by 9.3 Mg CO₂-eq ha⁻¹. In addition, LLL can obtain a net profit ranging from 36 to 62 \$US ha⁻¹ in one season of rice production. This research, thus, demonstrates the sustainable benefits of LLL in terms of increasing productivity and reducing the environmental footprint of rice production.

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