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# Possible pathway and interactions for integrating mechanisation into sustainable rice production in Ghana

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**Abstract**

Environmentally sustainable small-scale rice production mechanisation is a feasible intervention to help enhance yields and reduce food insecurity challenges. In Ghana, agricultural production is a significant component of Ghanaian livelihood and is an important economic activity for most of the population. Therefore, mechanised rice production can provide financial gains for small-scale farmers and ensure a sustainable agricultural production value chain based on practical agroecological principles. This study evaluates machinery ownership models and proposes the stakeholder interactions needed for sustainable rice production. The study uses primary data from a field survey of 320 farmers within Asutsuare, a rice production hub in Southern Ghana, key informant interviews with major stakeholders and secondary data from various sources. Findings show that some machinery ownership models can provide the smallholder rice farmer with the machinery needed to mechanise their production effectively. Four main machinery ownership models have been proposed and evaluated. The cooperative-owned machinery model, with a sharing of the initial investment capital outlay for the machinery acquisition, and the ownership model, where the farmer owns and offers hiring services to other farmers, were the most economically viable models. In addition, the study identifies necessary stakeholder engagement and interaction pathways to ensure the availability of innovative and affordable machinery at scale for locally appropriate and sustainable mechanised rice production. In addition to the benefits of releasing effective and good quality farm labour, the mechanisation model promotes machinery ownership that socially integrates machinery usage into the community and promotes the social aspects of resilient farming systems.

**Keywords:** Agroecology, rice production, stakeholder interactions, sustainable mechanisation

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