

Mechanization Meets Sustainable Intensification: Experimental Evidence from Rice Farming in Bangladesh

**Reuben Ngari¹, Abdul Malek², Kazushi Takahashi³, Yoko Kijima³, Yukichi Mano⁴,
and Yuko Nakano¹**

Rising rural wages and labor shortages threaten the sustainability of intensive rice farming in emerging economies. Agricultural mechanization aims to mitigate labor constraints, but solid evidence of its effectiveness in smallholder systems is still limited. We conduct a cluster-randomized trial with 897 farmers and 1,577 plots across 45 villages in Bangladesh to evaluate the impacts of training in the System of Rice Intensification (SRI) and its mechanized variant, referred to as the mechanized system of rice intensification (MSRI), which integrates mechanical transplanting. SRI training boosted the use of some recommended practices, increasing yields by 359 kg/ha, approximately 6% compared to control villages. In MSRI villages, mechanized transplanting adoption remained low (4%), but experience statistically significant higher adoption of fewer seedling transplants recommended under SRI. The findings reveal both the potential and limitations of labor-saving and labor-intensive innovations in smallholder rice systems. Scaling up mechanized technologies may need additional measures to address coordination failures, risk perceptions, and logistical bottlenecks.

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¹ University of Tsukuba, 1-1-1 Tennodai, Tsukuba, Ibaraki 305-8571, Japan

² Miyazaki International University, 1405 Kano-hei, Kiyotake, Miyazaki 889-1605, Japan

³ National Graduate Institute for Policy Studies, 7-22-1 Roppongi, Minato, Tokyo 106-8677, Japan

⁴ Hitotsubashi University, 2-1 Naka, Kunitachi, Tokyo 186-8601, Japan