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Impacts of Natural Resource Management Technologies on Agricultural Yield, Income, and Poverty: The System of Rice Intensification in Timor Leste

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Abstract

Natural resource management (NRM) technologies, such as the system of rice intensification (SRI), have been proposed to tackle agricultural challenges such as decreasing productivity growth and environmental degradation. Yet, the benefits of NRM technologies for farmers are often debated. Impacts seem to be context-specific, which is especially relevant in the small farm sector with its large degree of agroecological and socioeconomic heterogeneity. This was not always considered in previous research. We analyse the impacts of SRI adoption on rice yield and household income among smallholder farmers in Timor Leste. Heterogeneity is accounted for in an endogenous switching regression framework. Comparing mean yield and income levels, we find no significant differences between SRI adopters and non-adopters. This is due to negative selection bias; SRI seems to be adopted more on plots and by farmers with less than average yields. Controlling for this bias reveals significant yield and income gains. Poor and non-poor households benefit from SRI adoption; small and specialised farms benefit more than larger farms. The results also suggest that SRI may not be beneficial when compared to conventional rice grown under favourable conditions and with best management practices. This reveals that the impacts are very context-specific, depending on micro-level agroecological and socioeconomic conditions. Such heterogeneity in impacts can also be expected for other NRM technologies, which often depend on the farmers' capacity to adapt general principles to local conditions. We find that successful adoption is crucially based on good information flows and effective extension services. Innovative technology transfer models, such as farmer-to-farmer extension as well as participatory learning and knowledge sharing, may support more widespread and successful adoption of NRM technologies.

Keywords: Endogenous switching regression, impact assessment, system of rice intensification, Timor Leste