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The Impact of Using Fresh Seeds on Land Productivity and Efficiency: Evidence from Smallholders' Agriculture in Ethiopia

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Abstract

Numerous studies analysed the impact of new improved varieties on land productivity and efficiency. Nevertheless, the impact of using fresh seeds of old varieties has rarely been studied. In this paper, we study the impact of fresh seeds on both land productivity and efficiency. Given the slow varietal turnover rate in many developing countries, quantifying the benefits of using fresh seeds helps to shed light on how to design strategies of attaining higher productivity in an efficient way without introducing new improved varieties. We contribute to the literature in thee ways. First, to the best of our knowledge, we provide the first rigorous empirical evidence on fresh seeds use. Second, we estimate land productivity and efficiency together in the same econometric model enabling us to understand the joint impact on productivity and efficiency attributed to the use of fresh seeds that has not been studied before. Third, unlike previous studies on efficiency that assumed identical seed types, we use a more detailed classification of seed types that might arise because of recycling behaviour of farmers. We base our empirical analysis using comprehensive panel household survey data collected from maize producing households in rural Ethiopia by the International Maize and Wheat Improvement Center (CIMMYT) and the Ethiopian Institute of Agricultural Research (EIAR). To minimise selection bias from seed choice, we estimate random effects production functions using endogenous switching regression treatment effects model. Our findings show that fresh seeds not only increase land productivity but also improve efficiency suggesting complementary benefits of using fresh seeds. The implication is that evaluating the performance of agricultural technologies by examining only on either land productivity or efficiency is likely to underestimate the benefits that accrue to farmers. Despite the productivity and efficiency gains of fresh seeds, we find that the farmers were nearly 40 % inefficient. Along with promoting fresh seeds, the government may need to design other complementary strategies that improve efficiency.

Keywords: Africa, efficiency, Ethiopia, fresh seeds, land productivity, maize, seed recycling

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