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Impacts of biofortified bean adoption on productivity, income, and nutritional outcome: The case of Zimbabwe

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Abstract

Enhancing agricultural productivity by adopting proven technologies presents a credible pathway to economic development and micronutrient deficiency reduction. Adopting improved biofortified beans has the potential to contribute to economic development and micronutrient reduction. Few studies provide evidence of the linkage between adopting iron beans, income, and nutritional outcomes. The study assessed the impact of iron bean adoption on bean yield, agricultural income and disability life-adjusted years saved. The study uses nationally representative cross-sectional data collected from 1517 respondents across seven provinces in Zimbabwe. First, we use the triple hurdle that integrates awareness, planting, and area allocation decisions to estimate the determinants of biofortified bean variety adoption. Secondly, we estimate the effect of adopting iron beans on yield and income using endogenous switching regression, which addresses the endogeneity challenges. Lastly, we estimated the disability life years saved due to the adoption of biofortified beans. The results indicated that 56 % of the respondents know biofortified beans, and 28 % planted iron beans in 2022. The descriptive has shown that adopters of iron beans are older, have larger family sizes, smaller farm sizes, and are more likely to irrigate their bean plots. Adopters use more bean seeds and are less likely to use herbicides. The econometric results indicated that land owned, the household head's age, education level, and bicycle ownership determine awareness of iron beans. The determinants of planting iron bean variety are household size, education of the household head and owning a mobile phone. The source of seed, fertiliser application and irrigation of the bean plot influenced the area under iron beans. The adoption of iron beans did not increase the bean yield of the adopters; however, it had a positive and significant effect on agricultural incomes. The reduction of the total disease burden through adopting iron beans was 1.3 %. Overall increasing access to seed of iron beans would make households earn more incomes, and consumption of iron beans would contribute to the reduction of disease. It is essential to understand the mechanism through which the adoption of iron beans leads to increased incomes since there were no yield differences.

Keywords: Biofortified beans, nutritional outcomes, technology adoption, Zimbabwe

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