



Ex-ante Welfare Impacts of Maize-Soybean Rotation Adoption in Eastern Zambia

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Abstract

In Zambia, maize is the most important food staple; as such smallholder production is characterized by high levels of soil depletion and land degradation. Lack of use of grain legumes in maize based systems has been attributed as one of the causes of accelerated soil fertility depletion. This paper estimates the welfare impacts of introducing legumes in the system in the form of maize-soybean rotation in eastern Zambia using data from on-farm trials and household survey data of over 800 households. The rotation regimes are analyzed under four different soybean nutrient management scenarios: (1) soybean without any external input; (2) soybean with inorganic fertilizer (NPK fertilizer); (3) soybean with inoculants; and (4) soybean with inorganic fertilizer and inoculants. The study applies the economic surplus framework to predict ex-ante impacts of maize-soybean rotation research on aggregate poverty. In the first stage, we use the survey data to assess the propensity of adopting the maize-soybean technology and to generate a technology adoption profile. The results show that several factors determine adoption, including total land cultivated education and gender of the household head. In the second stage, on-farm trial data are used to generate the benefits resulting from the rotation technology and in the final stage, the benefits are then allocated to the individual household's based on the survey data. Results from the economic surplus procedure show that the rotation regime that included inoculation only was the most profitable as it reduced cost by about 28% compared to maize mono-cropping. Analysis of the ex-ante welfare impacts shows that if all the non-adopters were to adopt maize-legume rotation, the incidence of poverty would reduce by 15 percentage points when compared to continuous maize. These results underscore the importance of including grain legumes in maize based systems.

Key words: Maize-legume rotation, economic surplus, poverty, Zambia

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