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Impacts of Integrated Soil Fertility Management on Yield and Household Income: The Case of Tamale (Ghana) and Kakamega (Kenya)

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Abstract

Integrated soil fertility management (ISFM) has been widely promoted by research and philanthropic organisations as well as governments to increase crop yields and improve livelihoods of smallholder farmers in Africa. Therefore, it is surprising that there is still scant information on its impact on crop yields and household income.

Taking the case of maize farmers in Tamale (northern Ghana) and Kakamega (western Kenya) we estimate a yield and income model using inverse-probability-weighted regression adjustment, which is considered a powerful estimator for observational data as it is more robust to misspecification. Farm household data has been collected between July 2014 and February 2015 from 285 farmers in Tamale and 300 in Kakamega.

The analyses reveal that ISFM adoption leads to an increase in maize yields by up to 27 % in Tamale and 16 % in Kakamega. Increasing the number of ISFM components, however, does not improve yields. Despite the positive effect on yields, adoption of ISFM does not increase total household incomes at both locations, which might be due to increased cost of production, family labour reallocation, and the low share of maize income in total household income. Cost of production for ISFM adopters are much higher because they apply more chemical fertiliser and use improved varieties.

Our results suggest that ISFM is not a particularly attractive choice from the farmers' point of view when considering just private costs and benefits. At national and global levels, however, this might change, because ISFM produces positive environmental externalities such as carbon sequestration and the reduction of nutrient mining through building-up of soil organic matter. Some implications for future research are also discussed.

Keywords: Impact assessment, inverse-probability-weighted regression adjustment, maize yield, sub-Saharan Africa, total household income