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Title: Crop yield on multi-cropped plots: Aligning measurement with goals

The practice of planting multiple crops on a single plot has been associated with improved soil quality, dietary diversity, and greater resilience to biotic and abiotic stresses. These outcomes align with SDG 2 seeking food security, improved nutrition and sustainable agriculture, and in theory are consistent with the longstanding focus on raising the productivity of small-scale farmers that underlies billions of aid and investment dollars.

In practice, however, productivity measures that reflect the value of all crop outputs or the cost of all inputs on a given plot remain rare, and simple crop yield (the ratio of harvest quantity to area cultivated with a single crop) is more commonly reported. Yet for intercropped plots, even measuring yield can be challenging. In a survey of the literature on crop yield in low-income settings, we find that scholars specify how they measure area cultivated for intercropped crops in fewer than 10% of cases, and in those cases all authors allocated the entire land area cultivated to each intercropped crop, necessarily under estimating yield for any single crop.

Using the 2014/15 Tanzanian National Panel Survey, we consider four alternative methods of allocating land area on intercropped plots. We focus on rice and maize, crops that differ in the likelihood of intercropping, and ask whether the choice of method affects which crop is found to be more productive, and whether the statistically significant correlates of crop yield differ with different methods and farmer sub-populations.

We find that 64% of cultivated plots in Tanzania are intercropped and that average yields do vary with different area methods, with this pattern more pronounced for maize. The choice among methods also influences which of these two crops is found to be more calorie-productive per hectare, and the extent to which fertilizer is expected to be profitable.

Given SDG 2 and donor goals associated with intercropping, the prevalence of intercropping among those most at risk of not reaching those goals, and the practice of using yield to assess progress and direct further investment, we argue for the value in examining the consequences of intercropping measurement decisions.