Indifferent to difference? Understanding the unequal impacts of farming technologies among smallholders

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NL-CGIAR SEP: Ken Giller on Farming Systems Analysis for Inclusive and Resilient Agriculture

Background

Research on the impacts of agricultural technology interventions is dominated by comparisons of adopters and non-adopters. By contrast, in this literature study, we critically review how technology evaluation studies assess differentiated impacts in smallholder farming communities. We searched systematically for studies which present agricultural technology impacts disaggregated for poor and relatively better-off users (adopters).

Our objective was to identify and understand differentiated impacts of agricultural technology interventions.

Systematic literature search

Out of 5294 search results, 85 studies met our criteria:
(1) there is a distinct intervention event involving agricultural technology, (2) impacts are assessed for poorer and better-off technology users, (3) the study was executed in a developing country (UNDP classification), (4) the study is peer-reviewed.

Results

1. The number of studies that assessed impact differentiation was startlingly small: we were able to identify only 85, among which only 24 presented empirical findings.
2. These studies confirm an expected trend: absolute benefits are larger for the better-off, and large relative benefits among the poor are mostly due to meagre baseline performance (Figure 1).
3. Households are primarily considered as independent entities, rather than as connected with others directly or indirectly, via markets or common resource pools.
4. Explanations for impact differentiation (Figure 2) are mainly sought in existing distributions of structural household characteristics.

Conclusions

It is important to consider the following in technology development and impact evaluation:

1. recognize the poorer among the poor,
2. acknowledge and investigate unequal impacts,
3. explicitly aim to avoid negative consequences, and
4. include interventions to mitigate negative consequences where they occur.

DOI https://doi.org/10.1007/s13593-022-00768-6

We offer a structured overview of factors associated with differentiated impacts at the level of the field, the farm and household, the farming system and over time, to guide future development-oriented research (Figure 3).

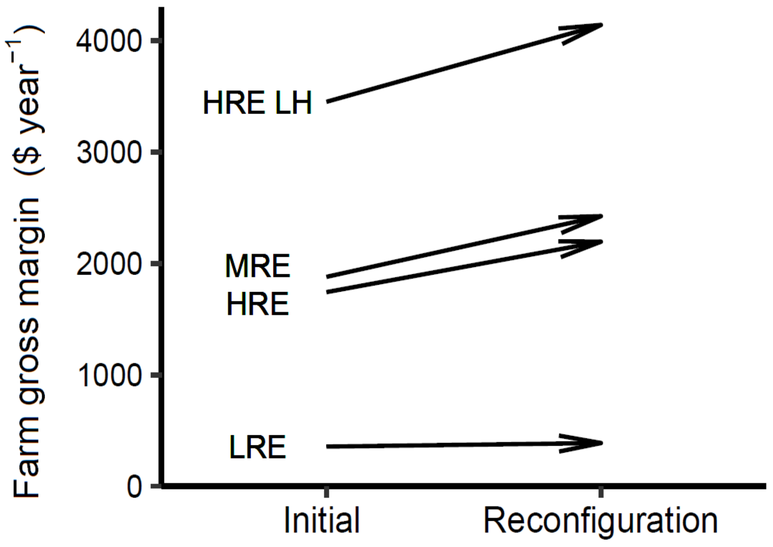

Figure 1. Change in farm gross margin for different farm types as a result of targeted interventions in Koutiala, Mali, based on ex ante analysis. Farm types are based on resource endowment, HRE_LH: "High Resource Endowed Farms with large herds", HRE: "High Resource Endowed farms", MRE: "Medium Resource Endowed farms", LRE: "Low resource Endowed farms". Figure derived from data presented in Falconnier et al. (2017, doi).

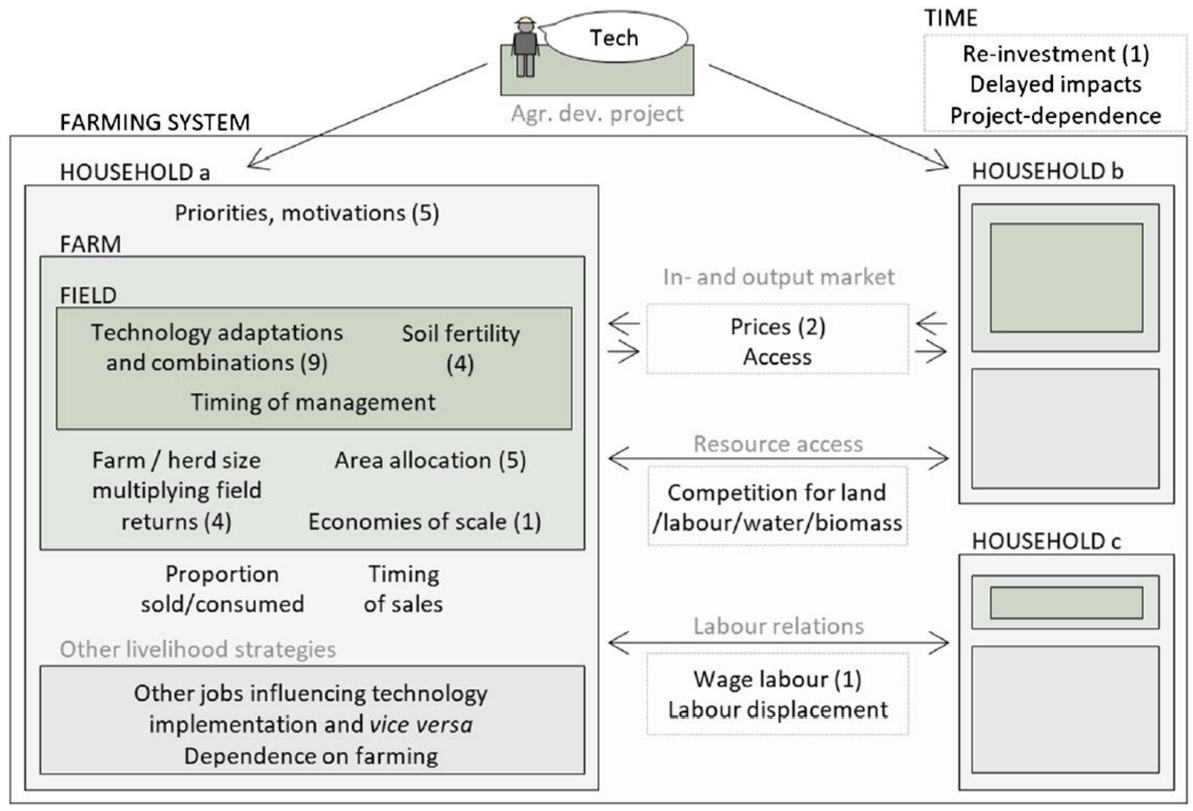

Figure 2. Schematic representation of a farming system where a technology is introduced, with indication of factors driving differentiated technology impacts. Within the farming system are rural households whose livelihoods are derived from their own farm (consisting of fields) and other livelihood strategies. Households can interact with each other directly (employment and resource exchange) or indirectly (via markets). Per hierarchical level, the factors displayed are the ones associated with differentiated technology impacts among the households. Values show how many papers provided empirical evidence of that association. For example, nine empirical studies showed that different technology adaptations and combinations by the poor and better-off led to impact differentiation among them. Factors without a value were suggested by authors of the systematically identified empirical and model studies as possible explanations.

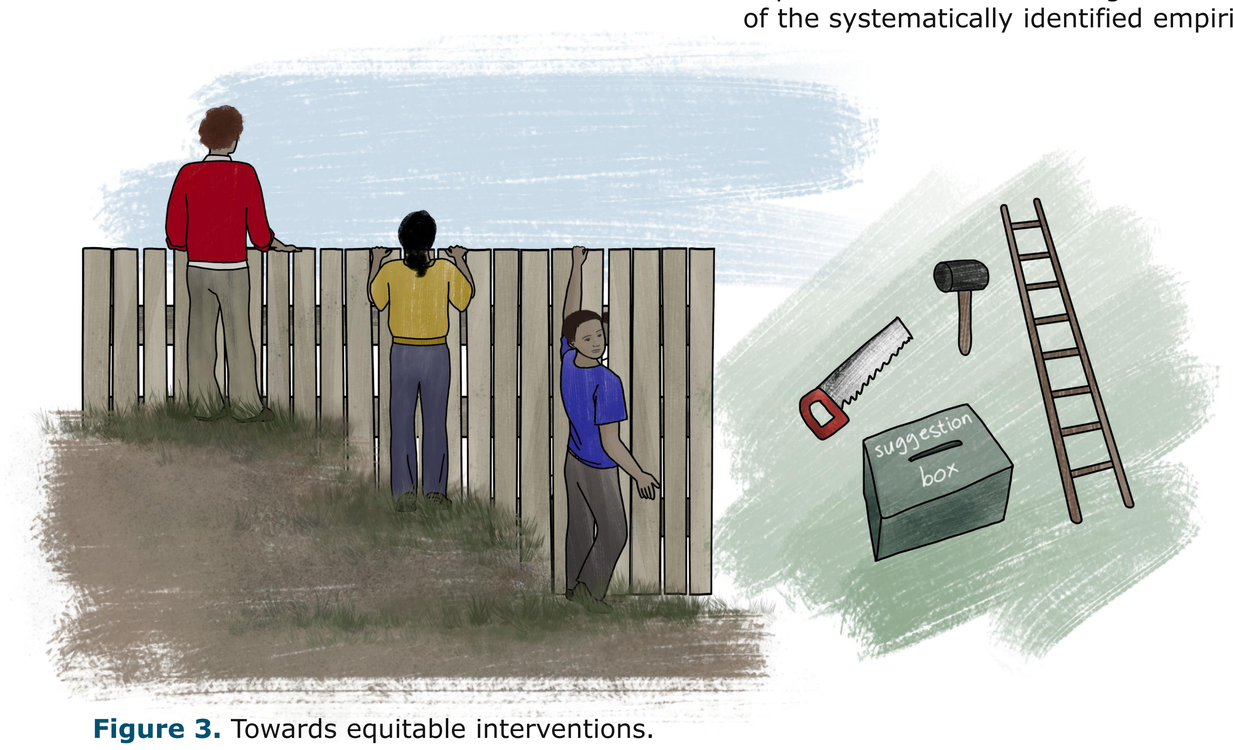

Figure 3. Towards equitable interventions.