One size fits all? Experimental evidence on the digital delivery of personalized extension advice for food security in sub-Saharan Africa

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Introduction

Throughout Sub-Saharan Africa, efforts by governments and development agencies to spur agricultural intensification have been meet with continued low levels of adoption of improved inputs. One explanation for the lack of adoption is the simplified blanket advice on fertilizer application rates which has failed to achieve potential yield gains for crop production in much of Sub-Saharan Africa. However, Decision Support Tools (DST) now makes it possible to deliver personalized extension services to farmers at a much lower cost. We assess the impact of personalized extension services delivered using a specific DST: RiceAdvice. RiceAdvice is an Android-based application (or app) that was developed by AfricaRice to provide personalized recommendations on nutrient management (type, quantity, and timing of fertilizer) in rice production. This study, along with Tjernström et al. (2020), are the first RCTs to assess the economic impact of DSTs on agricultural production.

Methodology

Study area

The study was conducted in Kano state because it is the major rice producing region in Nigeria (Fig. 2). We randomly selected five from the eight major irrigated rice production LGAs.

Experimental design and sampling

Two treatments and control were considered (Fig. 3):
- In the first treatment group (T1), households were offered personalized advice delivered by the extension agent using the RiceAdvice app.
- In the second treatment group (T2), households were offered personalized advice using the app along with a 100% subsidy (grant) for the quantity of fertilizer recommended by the app.
- In the control group (C), households received blanket advice provided by the extension agent.

In total, 35 villages were selected and within village we randomly selected 20 households from a census of all rice farming households. Thus, 700 households were sampled.

Figure 3: Experimental design

Data analysis

We calculate impacts using OLS along with analysis of covariance (ANCOVA) estimation. The ANCOVA estimator has more power than the typical difference-in-difference estimator, especially when there are multiple rounds of data treatment (McKenzie, 2012).

Table 1: Treatment effects on rice yield (t/ha)

Table 2: Treatment effects on profit (US$/ha)

Table 3: Treatment effects fertilizer (kg/ha)

Results

Regardless of the estimation strategy (Table 1):
- T1 increases yield by about 250 kg/ha, or 7% over control households.
- T2 increases yields by about 730 kg/ha, which represents a 20% gain over yields for control households.

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Conclusion

We find little evidence that personalized advice on nutrient management has an effect on the quantity of fertilizer (Table 3).

Personalized advice increases yields without increasing the overall quantity of fertilizer used. We conclude that the scaling of personalized extension services could improve productivity and livelihoods in Sub-Saharan Africa without necessarily increasing the total amount of fertilizer in use.

References