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Demonstration plots, seed trial packs, bidirectional learning, and modern input sales: Evidence from a field experiment in Tanzania

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INTRODUCTION

- Greater integration of **legumes** in cropping systems, increased use of **modern inputs**, and more **tailoring of extension recommendations** to local contexts are essential for **sustainable agricultural intensification**
- In addition, **bidirectional learning (BDL)** in which information providers and farmers iteratively refine extension recommendations is **critical for improving extension recommendations**
- In the context of **weak government extension systems**, NGO lead farmer extension models, such as the one implemented by **Farm Input Promotions-Africa (FIPS)** through its **Village-Based Agricultural Advisors (VBAAs)**, may play a key role

The FIPS approach:
- Demonstration plots (DPs)
- Distribution of trial packs (TPs) - free small packs of inputs highlighted on the DP given to farmers to use on their own farms

Previously, all VBAAs did both a maize DP and TPs → **little is known about the value added by the TPs**

FIPS theory of change: DP+TPs stimulates farmer demand for the showcased inputs → VBAAs can then sell farmers these inputs in future years

This study:
- RCT with VBAAs randomly assigned to do either a **bean DP only OR a bean DP+TPs**
- DP/TPs showcase **improved bean varieties & Apron Star (brand new seed treatment)**

HYPOTHESES & METHODS

Hypotheses:
Relative to VBAAs doing only a bean DP, we hypothesize that VBAAs doing bean DP+TPs will be more likely to:
1. **Sell bean seed or Apron Star** (due to a greater increase in farmer demand)
2. **Engage with farmers in ways that contribute to bidirectional learning**
(due to greater opportunities for farmer feedback when TPs are involved)

VBAAs involved:
- Original plan: All N=230 active VBAAs in 7 districts in the southern highlands of Tanzania (major bean production area)
- Due to implementation challenges: Analysis focuses on N=179 VBAAs who were interviewed on both the baseline and endline surveys and whose DP/TP inputs received could be verified (or the subset of N=120 who received the correct DP/TP inputs based on their random assignment)

Methods
- **Outcome variables**:
  - Input sales: dummies for input sales (bean seed & seed treatment, overall and by type), unfilled orders, and combined input sales and/or unfilled orders
  - Proxies for bidirectional learning: See Table 1
- **Regressions:**
  - OLS using endline survey data only
  - Difference-in-differences using baseline/endline survey data
  - Ordered probits for bidirectional learning-related outcomes (Likert scale responses)

TABLE 1. Proxies for bidirectional learning

How much do you consider feedback from farmers when you make recommendations on bean inputs or crop management practices? (1=not at all, 2=very little, 3=somewhat, 4=quite a bit, and 5=a great deal)

You often get together with other farmers to discuss farming practices or inputs.	1=strongly disagree 2=disagree 3=neutral 4=agree 5=strongly agree
You like to experiment with new farming practices or inputs.	
You encourage others to experiment with new farming practices or inputs.	
You are frequently taught new things by other farmers about farming practices or inputs.	
You often consider changing your own farming practices or the inputs you use because of things you have learned from other farmers.	
You often consider changing the recommendations you make to others on farming practices or inputs because of things you have learned from other farmers.	
You feel empowered to alter the recommendations you make to other farmers on farming practices or inputs based on things you learn from other farmers.	
You try to tailor the recommendations you make to other farmers on farming practices or inputs based on the needs of each farmer.	

KEY FINDINGS

1. Compared to doing DPs only, **adding TPs does not significantly change VBAA likelihoods of input sales, orders received, or bidirectional learning** between VBAAs and farmers… at least in the short-run and when only implemented for one year.
2. Unfilled orders: Over one third of VBAAs received requests for bean seed and/or seed treatments that they were unable to fulfill. The top reasons cited by VBAAs for being unable to fill the orders :
   - **Lack of access to financing**
   - **The input requested by farmers was unavailable**
3. Bidirectional learning:
   - More than 55% of VBAAs consider farmers' feedback at least "quite a bit" when making recommendations on bean inputs or crop management practices; 19-20% consider it only a little bit or not at all
   - The vast majority (83-93%) of VBAAs agreed or strongly agreed with the statements related to discussing farming practices or inputs with other farmers, experimenting with farming practices or inputs, and tailoring recommendations to the needs of each farmer, but far fewer (55-65%) agreed or strongly agreed with the statements related to: (i) learning from other farmers; (ii) considering changing their own practices or the recommendations they make (including feeling empowered to do so) based on things learned from other farmers

CONCLUSIONS & POLICY IMPLICATIONS

- Adding bean TPs to a DP **does not increase VBAA input sales/unfilled orders or promote bidirectional learning**
- There appears to be some **unmet demand for improved bean varieties and seed treatments**. Although not attributable to the DPs or TPs, this **warrants further study**.
- Key constraints leading to unfilled orders include **lack of financing and unavailability of inputs** → policy implications:
  - **Improve VBAA access to credit/financing** to purchase inputs
  - **Improve input availability** (develop supply chains)
- VBAAs consider farmer feedback but **may need encouragement/training on how to use that feedback to fine tune their recommendations** on input use and management practices

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