



EVIDENCE-BASED AGRICULTURE TRANSFORMATION AND SUSTAINABLE FOOD SECURITY

Lessons from Randomized Evaluations

Thematic Focus

Maximizing food security through innovation and practice.

1. Agriculture technology adoption

- ✓ Effects of ICT on agricultural outcomes
- ✓ Technological innovations and best practices (fertilizer adoption)

2. Climate smart agriculture

- ✓ Climate adaptation in agriculture

3. Food systems and management

- ✓ Credit for sustainable food security

Methodology

- ❑ This evidence synthesis includes a review of 53 randomized controlled trials by IPA and J-PAL, where this evidence was sourced from published and working papers from both institutions.
- ❑ Showcases tested solutions that address gaps on agricultural productivity and food security, thus speaking to a matter of national and international interest.
- ❑ Studies included were conducted in Africa (Kenya, Ghana, Mali, Malawi, Zambia, Ethiopia, Mozambique etc) and Southern Asia (India, Bangladesh)

Key lessons



ICT tools provide a cost-effective way to promote social learning amongst farmers



Use of fertilizer can increase agricultural yields and profitability for farmers when used correctly, coupled with timely information on its benefits & application



Access to credit facilities can increase agricultural output and consumption, decrease off-farm labor, and increase local wages, thus enabling consistency in food production

Key lessons



Providing risk insurance and widening its access to farmers can increase the likelihood of farmers investing in high-risk crops with higher yields in their farms.



Promoting weather tolerant crops can increase a farmers confidence in agricultural investment Vs output.



Agriculture technology adoption

Why has agricultural
technology adoption and
diffusion in LMIC countries
lagged behind and how can
technology adoption and
diffusion be accelerated?



Evidence on - Effects of ICT on agricultural outcomes

Traditional agricultural extension aims to ensure farmers receive and act upon timely information to improve their agricultural yields, these efforts are often costly and time-consuming.

- ICT platforms can be utilized for social learning and promote information sharing to and among farmers thus influencing their farming practices and decisions.

“Sending SMS messages with agricultural advice to smallholder farmers increased yields by 11.5% relative to a control group with no messages.”

(Casaburi, Kremer et.al 2019: Harnessing ICT to Increase Agricultural Production: Evidence From Kenya)

- A review of 41 randomized evaluations by J-PAL on the adoption of technology on agriculture emphasized that the **content, frequency, and channel by which information is disseminated plays an important role in boosting farmers' adoption of technologies and improving agricultural outcomes.** (Abdul Latif Jameel Poverty Action Lab (J-PAL) Sept 2022)
- Providing performance-based incentives to farmers can significantly influence technology adoption especially among peer farmers. (Ariel BenYishay, Mushfiq Mobarak : Promoting Sustainable Farming Practices in Malawi)

Evidence on - Technological innovations and best practices

Research has shown that inputs such as fertilizer and hybrid seeds increase yields thus translating to highly profitable investments. In response, many countries heavily subsidize the cost of fertilizer.

- ❖ Research from Kenya, Mozambique and Mali suggest that **fertilizer use can be very profitable and boost agricultural productivity when used correctly**. (E.Duflo, M.Kremer, J. Robinson. 2011: "Nudging Farmers to Use Fertilizer")
- ❖ Barriers to correct usage of fertilizer still exist according to field experiments in Kenya and Bangladesh which point to **gaps in the technological innovation and information** gaps on the adaptation and benefits of fertilizer use. (M.Islam and S. Beg-2019 Can Rules-of-Thumb Improve Fertilizer Management?)
- ❖ **Agricultural extension services complimented by ICT** can play a key role in helping farmers make informed choices on the best farming practices like fertilizer adoption. Further, the **information can be tailored to the farmers' context** and timed to coincide with the relevant part of the growing season. (Abdul Latif Jameel Poverty Action Lab (J-PAL) Sept 2023)



Climate smart agriculture

What best practices and sustainable measures can we adopt to enhance sustainable food security?



Evidence on - Climate adaptation for increased productivity

The threat of extreme weather affects farmers' decision to invest in more profitable crops that are more sensitive to weather, thus trapping farmers in a cycle of low productivity.

- ❖ Randomized evaluations in Ethiopia, Ghana, India and Malawi tested the take up of weather risk insurance products while measuring its effects on agricultural productivity found that **weather insurance can protect farmers against losses due to extreme weather and influence their farm investments decisions**. Farmers who bought insurance shifted production toward crops that were more sensitive to weather but more profitable. (Abdul Latif Jameel Poverty Action Lab (J-PAL). 2016. "Protecting farmers from weather-based risk.")
- ❖ **Combining a well-designed product offering credit and weather risk insurance has the potential to meet farmers' demand. In addition, strong information, marketing, and promotion is needed to create a demand for insurance products and ensure subsequent take-up.** (Ahmed, Shukri et.al 2014. "Ethiopian Project on Interlinking Insurance with Credit for Agriculture.")

Evidence on - Enhancing food security through improved seed technology adoption

High-yielding crop varieties offer the promise of increased productivity, but adoption of these technologies has often been slow, particularly in sub-Saharan Africa.

- ❖ Evidence from India studying the adoption of flood-tolerant rice seed varieties in 134 villages indicate that **knowledge plays an important role in seed technology adoption among farmers** (D.Manzoor, A.Janvry, K.Emerick et al. 2013. “Flood-tolerant Rice Reduces Yield Variability and Raises Expected Yield)
- ❖ **Agro-dealers can significantly influence adoption** as they not only provide/stock the improved seed varieties, they also inform/educate potential customers about the new seed technology compared to conventional extension approaches.



Food systems and management

What production, marketing and supply-chain management techniques can provide the Kenyan population with access to “sufficient, safe, and nutritious food at all times?”



Evidence on - Credit for sustainable food security

Small-scale farmers in Africa often have little cash at hand typically due to lack of enough produce to sell at the end of a planting season, but they also have difficulty accessing credit to invest in their farms.

- ❖ Evaluation of the **rural credit system** in Burkina Faso found it to be an effective way of boosting agricultural and non-agricultural investment for farmers in places with weak financial markets. The farmers significantly **increased consumption and savings as well as investment in agricultural inputs** and education.

(C.Delavallade, S.Godlonton: The Impact of Inventory Credit on Food Security and Rural Livelihoods in Burkina Faso)



Evidence on - Credit for sustainable food security



- In Kenya, an evaluation of asset collateralized loans (water tanks) on a sample of 1800 dairy farmers observed improved milk production specifically in households without access to piped water, implying that **using assets as collateral to expand access to credit and agricultural technologies**, which have the potential to contribute to economic growth **could improve farmers productivity and other economic outcomes.**

CONCLUSION

1

The agriculture sector is quite dynamic and therefore needs constant innovations and approaches to counter new challenges and inform the improvement of the systems.

3

Identifying the drivers of low adoption of technologies and providing a wide range of approaches tailored to the farmers' needs is essential in increasing usage of inputs and the productivity of small-scale farms.

2

Agricultural research remains key to finding innovative solutions that can guarantee sustainable productivity.

4

Maximum effect can be achieved from complementary interventions that are cost-effective and are implemented over time to influence farmer behaviors towards the best practices.

Thank you!

