POLICY NOTE 23 SEPTEMBER 2024

Digital Literacy Training to Promote Diffusion of Digital Agricultural Tools to Smallholder Farmers

Fatma Abdelaziz and Kibrom A. Abay

Highlights

- We report on a randomized controlled trial (RCT) aiming to evaluate the effectiveness of alternative digital literacy training and promotion strategies on increasing the diffusion of digital agricultural technologies to smallholder farmers in Egypt.
- We find that investing in digital literacy and educational interventions can significantly improve:
  - Awareness, adoption and utilization of digital tools;
  - Trust in digital agricultural tools among smallholder farmers

Introduction

Digital innovations hold significant potential to address multiple forms of market failures (e.g., Courtois and Subervie, 2015; Aker et al., 2016; Aker and Cariolle, 2023; Abate et al., 2023). However, their adoption remains low and heterogenous across Africa (e.g., Abate et al., 2023; Aker and Cariolle, 2023; Tabe-Ojong et al., 2024). Smallholder farmers face significant barriers in accessing essential information, limiting their ability to seize market opportunities and enhance profitability. While numerous digital tools have been developed for farmers in the region, most are still in pilot phases. The landscape of digital agricultural innovations in Egypt, the focus of this study, presents a similar outlook, whereby the Egyptian market has an array of innovative digital study, presents a similar outlook, whereby the Egyptian market has an array of innovative digital agricultural tools that offer different services to farmers (including digital advisory agricultural and market services) (e.g., Tabe-Ojong et al., 2024; Abdelaziz and Tarek, 2024). Several demand and supply-side factors contribute to the low adoption of these digital innovations and their disparities among smallholder farmers in Africa and Egypt. On the supply side, the most important challenges include inadequate public and private investment in complementary infrastructure, unsustainable business models, and a misalignment in the pace of innovation (Abate et al., 2023). The most important demand-side challenges include lack of digital literacy, insufficient context-specific needs assessments, digital divide, and accessibility, usability, and user trust. User confidence and trust in digital tools is another important but understudied topic (Molony, 2008; Aker et al., 2016; Abate et al., 2023). However, we lack empirically grounded evidence on alternative supply and demand-side interventions to enhance the adoption and scaling of digital innovations in various contexts, including Egypt.

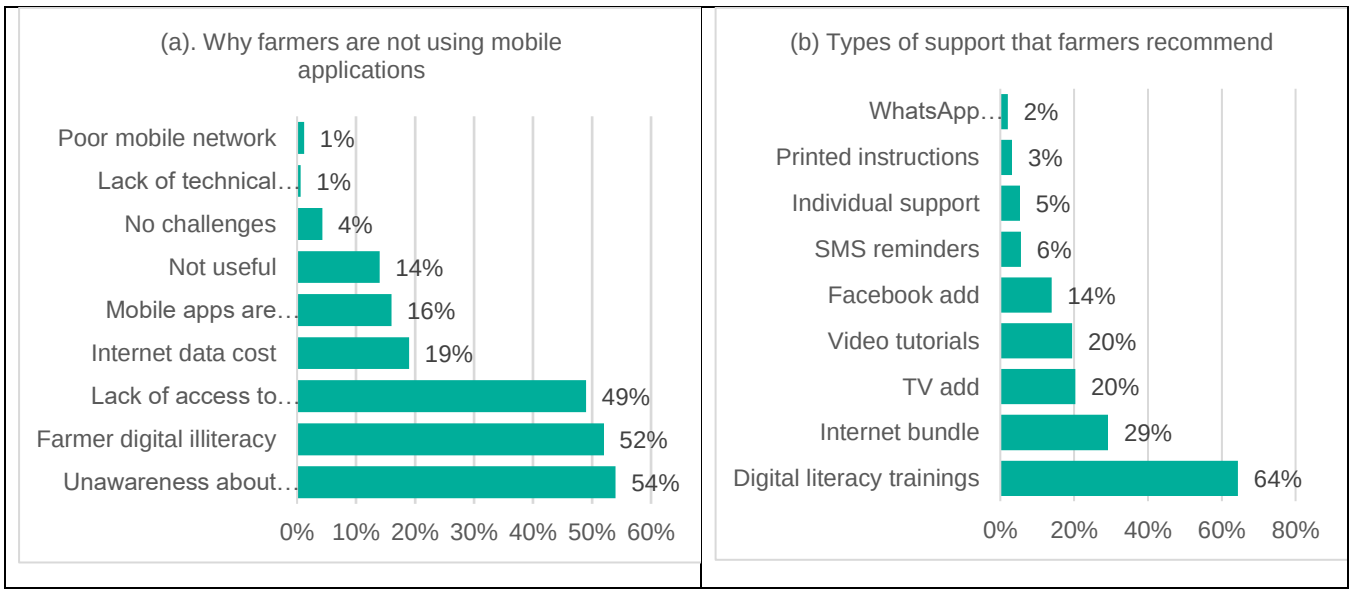
In this note we report on a randomized controlled trial (RCT) aiming to evaluate the effectiveness of alternative digital literacy training and promotion strategies on increasing the diffusion of digital agricultural technologies to smallholder farmers in Egypt. We focus on digital agricultural tools that can provide marketing and related advisory services to smallholder farmers. We introduced a randomized digital literacy training to smallholder farmers in Egypt using different variants of delivery and incentive mechanisms to trainers. The digital literacy training we introduced builds on the model of Training of Trainees (TOT) through which digital application developers train local trainees first and then these local trainees pass on and deliver this training to farmers. As a significant departure from existing practices, we designed the incentives for trainings to be a function of the number of farmers who pass the digital literacy test.

Context

The target population of our interventions include about 4,000 smallholder farmers located across two governorates in Egypt: Minya and Benisuef. These farmers are part of around 30 farmer organizations in Upper Egypt that are supported by the Agricultural Innovation Project (AIP) of the German Corporation for International Cooperation (GIZ). Of the 4,000 farmers, 3,332 are full-time farmers. Among them, 2,400 own smartphones, while the remaining 950 do not. Since the interventions we are implementing require smartphones, we were forced to exclude farmers that do not own smartphones.

For informing the design of our interventions, we launched a baseline survey and farmers were asked to report on their access to digital tools and associated infrastructures. We also elicited major constraints and challenges impacting farmers access to digital tools. As shown Figure 1, more than half of the sampled farmers cited that the main obstacle is lack of awareness about the different existing digital applications (54 percent) and another half (52 percent) reported that general digital literacy is a key challenge. Furthermore, lack of access to smartphones is reemphasized as a common challenge, with at least half of the farmers sampled (49 percent) identifying it as a key obstacle. Other issues included high internet costs (19%), the complexity of mobile apps (16%), and perceived lack of usefulness (14%). When farmers were asked to provide their recommendations on how best to address these barriers to adoption of digital tools, about two-third of the farmers (approximately 65 percent) identified digital literacy training as a solution (Figure 1).

Figure 1: Major challenges: why farmers are not using mobile applications.



Intervention and Experimental Design

The intervention in this project aims to promote the use of digital mobile apps among small-holder farmers in Minya and Benisuef through educational and promotional strategies. We are targeting 2,400 smartphone-owning farmers, focusing on two agricultural apps, Mahsoly and Cropsa, which provide marketing and advisory services to farmers. Three digital promotional

strategies have been developed and implemented in partnership with local farmer organizations:

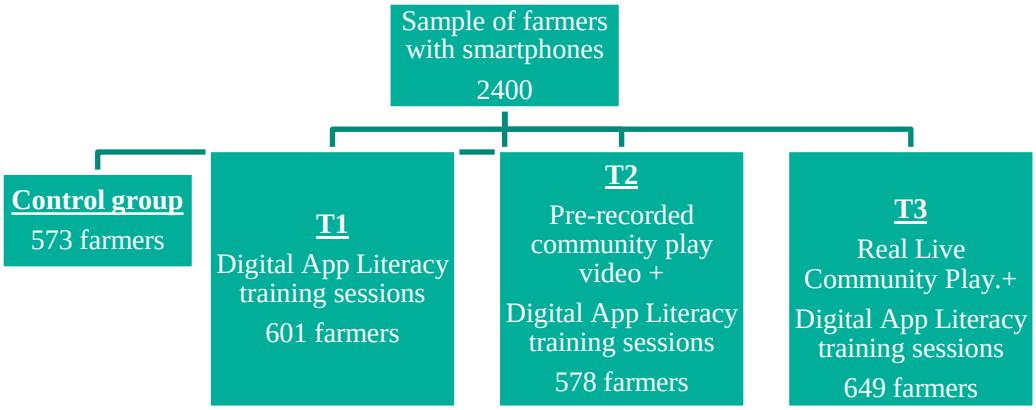
A. Digital Literacy Training via Training of Trainees (TOT) Sessions: This instruction-based training focuses on two successful agricultural apps in Egypt, Mahsoly and Cropsa, providing market advisory services. Thirty trainers from Minya and Benisuef will conduct sessions over two months, with their remuneration based on the number of farmers who pass a knowledge test.

B. Digital Literacy Training with Pre-Recorded Community Play: This includes a pre-recorded video featuring a community play designed to educate farmers about digital agricultural tools in an entertaining way. The play humorously highlights common challenges farmers face with traders and market access and will be offered alongside the digital literacy TOT.

C. Digital Literacy Training with Live Community Play: This involves live performances in six communities in Minya and Benisuef to enhance outreach. Presented in a theater-style setup, the live play shares a similar script to the pre-recorded version. Following the play, farmers will be invited to a digital app literacy training session a week later.

A baseline phone survey was conducted prior to implementing the three digital promotion strategies. The 2,400 smartphone-owning farmers were randomly assigned to one of four groups: (i) Control Group: no intervention; (ii) T1 farmers: Attend digital app literacy training sessions; (iii) T2 farmers: Attend digital app literacy training sessions + pre-recorded community play video; and (iv) T3 farmers: Attend digital app literacy training sessions + live community play.

Figure 2: Study design

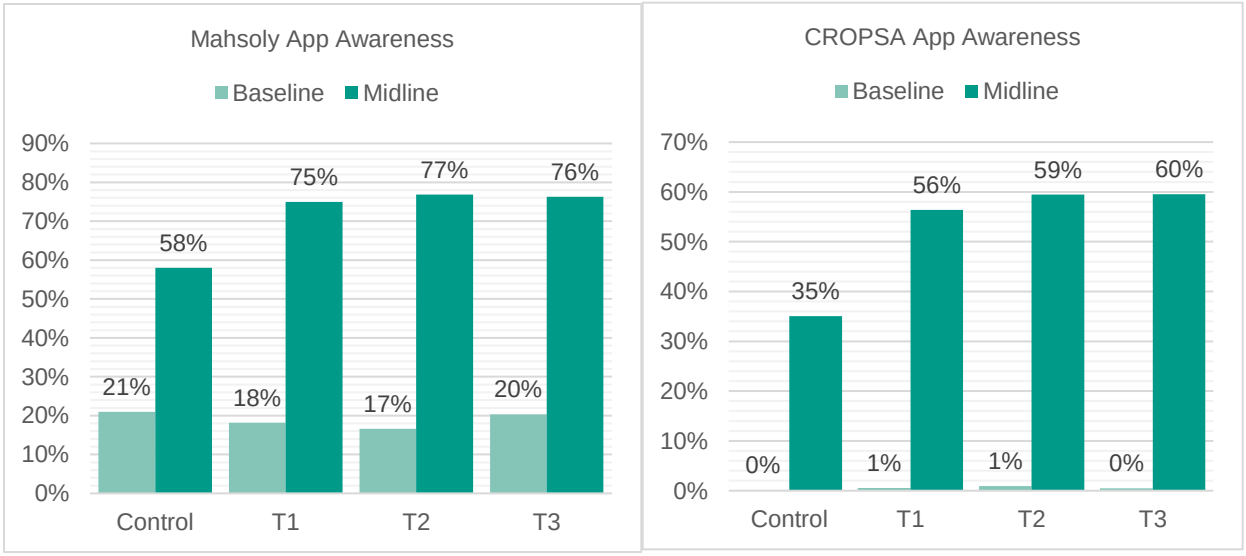


Impacts on Awareness and Uptake

To evaluate the impact of the interventions on farmers' awareness of digital agricultural tools, respondents were asked to report if they heard about different agricultural digital apps (such as Mahsoly, Cropsa, etc.) in the baseline (before they receive any digital literacy training), and in the midline (after they receive digital literacy training). Figure 3 reveals key findings: first, baseline awareness was similar across treatment and control groups. Second, awareness significantly increased in the midline, particularly among those who received digital literacy training. For instance, awareness of Mahsoly rose from 18% to 75% among farmers receiving just the training. First, in the baseline survey, awareness about the different mobile applications was

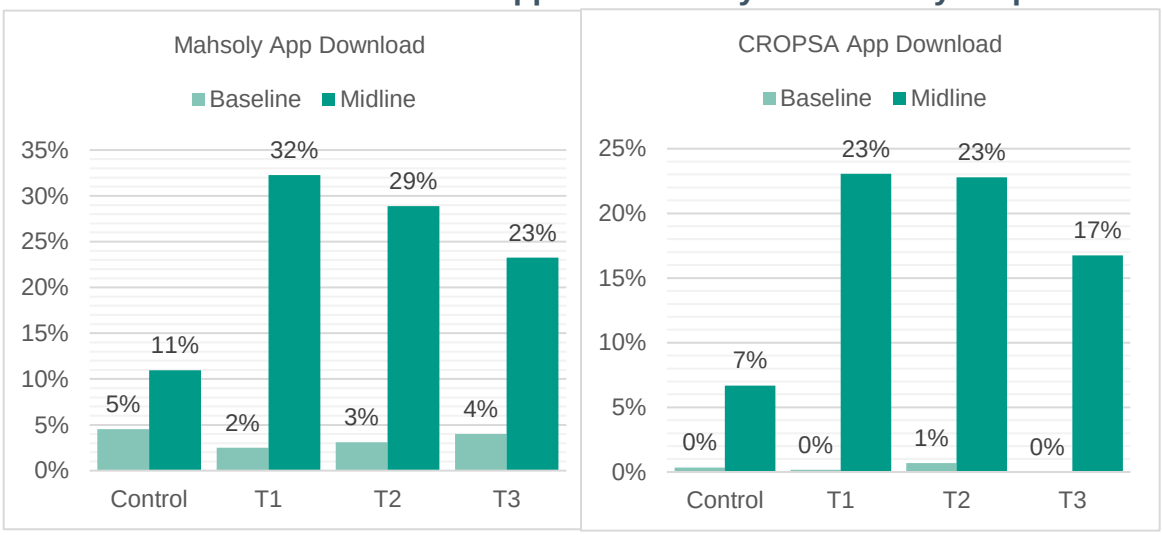
statistically comparable across treatment and control groups. Second, awareness about the different mobile applications significantly increased in the midline, more so, for those farmers exposed to the digital literacy training. For example, for those farmers receiving only the digital literacy training awareness about Mahsoly increased from 18 percent to 75 percent. Third, in the absence of any intervention, it is evident that farmers in the control group still did experience an increase in digital app awareness, for Mahsoly app (from 21 percent to 58 percent) and similarly for Cropsa app (from 0 percent to 35 percent). We can think of two important explanations for this. First, both control and treatment groups had prior exposure to these mobile apps from the baseline interview. Second, although interventions were carefully designed and attendance closely monitored to minimize spillover effects, information sharing among farmers in the same community could still occur. Nevertheless, awareness of the mobile apps increased significantly more in the treatment groups than the control group.

Figure 3: mobile application have you heard of in your network?



We also ask respondents to report if they downloaded any of the different agricultural digital apps, to assess the impact of the different interventions on uptake. Figure 4 shows that the control group reported a slight increase in downloads, while the treatment group reported significantly higher increases, ranging from 17 to 30 percentage points increase.

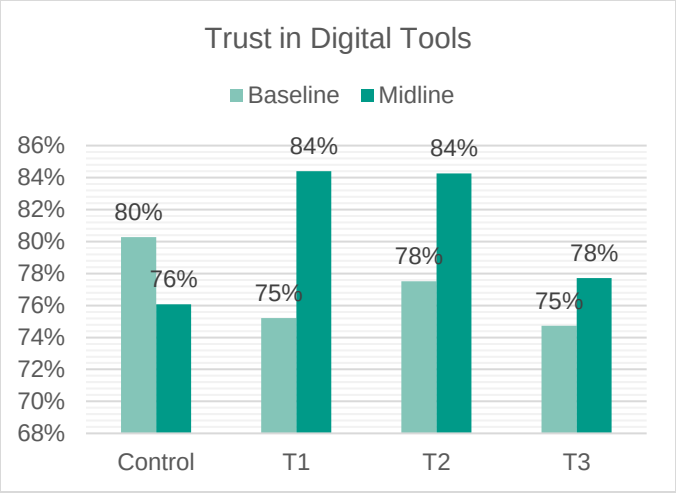
Figure 4: Which of the above mobile applications do you have on your phone?



Impacts on Trust in Digital Tools

A key barrier to farmers' adoption of digital technologies is lack of trust and confidence in digital tools. Farmers tend to prefer traditional marketing methods involving local traders and in-person advisory services (e.g., Aker, 2016). However, the digital literacy training workshops organized through farmer organizations significantly helped bridge these trust gaps, allowing farmers to better understand and appreciate the relevance of digital tools for their operations. When respondents were asked to report if they trust sharing and receiving farm information through the different agricultural digital apps. Figure 5 shows that the control group farmers witnessed a decrease in trust over time, whereas treatment group farmers witnessed significant increases in trust in digital tools when compared to baseline (ranging from a minimum of 3 percent to a maximum of 9 percentage points increase).

Figure 5: Do you trust sharing / receiving farm information through agricultural digital apps?



In summary, our findings indicate that investing in digital infrastructure alongside educational interventions to enhance farmers' digital literacy can significantly improve (i) awareness and adoption, (ii) utilization and relevance, and (iii) trust in digital agricultural tools among small-holder farmers in Egypt. The results show promising improvements in the uptake and utility of these tools due to the digital literacy training offered. Furthermore, there has been a notable shift in farmers' beliefs and trust towards these tools, suggesting strong potential for future adoption. The endline survey will provide conclusive evidence on the medium- and long-term impacts on the marketing and production behaviors of beneficiary farmers.

ABOUT THE AUTHORS

Fatma M. Abdelaziz is a Senior Research Associate in the Development Strategies and Governance Unit based in Cairo, Egypt. **Kibrom A. Abay** is a Senior Research Fellow in the Development Strategies and Governance Unit, based in Washington, DC

ACKNOWLEDGMENTS

We thank Abdallah Tarek for his excellent research assistance, which involved field support, data quality monitoring and data cleaning. We gratefully acknowledge the financial support of the United States Agency for International Development (USAID), which made this study possible through the project Evaluating Impact and Building Capacity (EIBC) implemented by IFPRI. The information provided in this note is not official U.S. government information and does not represent the views or positions of the United States Agency for International Development or the U.S. Government. This work also benefited from the support of the CGIAR research initiative on Fragility to Resilience in Central and West Asia and North Africa (F2R-CWANA). This research experiment was preregistered at the American Economics Association's RCT registry (AEARCTR-0012723). We received constructive feedback and guidance from Erwin Bulte and colleagues at the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) Egypt office, especially Hassan Elbadawy, Yasmeen Fahmy and Myriam Fernando.

REFERENCES

Abate, Gashaw T., Kibrom A. Abay, Jordan Chamberlin, Yumna Kassim, David J. Spielman, and Martin Paul Jr Tabe-Ojong. "Digital tools and agricultural market transformation in Africa: Why are they not at scale yet, and what will it take to get there?." *Food Policy* 116 (2023): 102439.

Abdelaziz, Fatma, Abdallah, Tarek, 2024. Digital Tools for Smallholders in Egypt: The Launch of a New Price Monitoring Tool – Mahsoly. MENA Working Paper.

Aker, Jenny C.; Ghosh, Ishita; Burrell, Jenna (2016): The promise (and pitfalls) of ICT for agriculture initiatives. In *Agricultural Economics* 47 (S1), pp. 35–48. DOI: 10.1111/agec.12301.

Aker, Jenny C.& Cariolle, Joël (2023): Digitizing Development. *Palgrave Studies in Agricultural Economics and Food Policy*. Palgrave Macmillan, pages 57-90, https://ideas.repec.org/h/pal/psachp/978-3-031-41885-3_4.html

Courtois, Pierre, Subervie, Julie (2015): Farmer Bargaining Power and Market Information Ser- vices. In *American Journal of Agricultural Economics* 97 (3), pp. 953–977. DOI: 10.1093/ajae/aau051.

Fu, X., & Akter, S. (2016). The Impact of Mobile Phone Technology on Agricultural Extension Services Delivery: Evidence from India. *The Journal of Development Studies*, 52(11), 1561–1576. https://doi.org/10.1080/00220388.2016.1146700.

Molony, T. (2008). Running out of credit: The limitations of mobile telephony in a Tanzanian agricultural marketing system. *The Journal of Modern African Studies*, *46*(4), 637-658.

Tabe-Ojong, Martin, Yousra Salama, Kibrom A. Abay, Fatma Abdelaziz, Claudia Zaccari, Akmal Akramkhanov, Gianpiero Menza, and Oyture Anarbekov, 2024. Harnessing digital innovations for climate action and market access: Opportunities and constraints in the CWANA region. *Global Food Security* 41 (2024): 100763.

The Egypt Strategy Support Program (EGSSP) is managed by the International Food Policy Research Institute (IFPRI) and is financially supported by The United States Agency for International Development (USAID). This publication has been prepared as an output of Evaluating Impact and Building Capacity project (EIBC) and has not been independently peer reviewed. Any opinions expressed here belong to the author(s) and are not necessarily representative of or endorsed by IFPRI.

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

A world free of hunger and malnutrition

IFPRI is a CGIAR Research Center

1201 Eye Street, NW, Washington, DC 20005 USA | T. +1-202-862-5600 | F. +1-202-862-5606 | Email: ifpri@cgiar.org | www.ifpri.org | www.ifpri.info

© 2024 International Food Policy Research Institute (IFPRI). This publication is licensed for use under a Creative Commons Attribution 4.0 International License (CC BY 4.0). To view this license, visit https://creativecommons.org/licenses/by/4.0.