INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
IFPRI

POLICY NOTE DECEMBER 2025

Lessons from the Digital Agricultural Advisory Services (DAAS) Project in Ethiopia

Wheat Use Case

Gashaw T. Abate, Brian McNamara, Juan Bonilla, Daniel T. Asrat, and David J. Spielman

Introduction

Agricultural extension services are a cornerstone of rural development and a vital instrument for policymakers to directly shape economic, social, and environmental outcomes in rural areas. These services aim to enhance farm productivity by promoting the adoption of agricultural technologies, inputs, and management practices. Through outreach, training, knowledge sharing, and learning, extension activities help bridge the gap between research and practice, potentially supporting more resilient and productive farming systems (Davis 2008; Jack 2013).

Conventional extension programs are often based on a training-and-visit model in which a lead or model farmer plays a key role in sharing and promoting new information. These programs have contributed to gains in agricultural productivity, but they also face limitations. Top-heavy organizational structures with many supervisory and field-level staff tend to incur high operational costs and limit efficiency in service delivery. These financial and logistical burdens hinder the system's ability to collect and use data effectively, adapt to farmers' evolving needs, or ensure a consistent level of service quality. Furthermore, the model is largely supply-driven, emphasizing priority crops and standardized technologies without sufficiently accounting for farmers' diverse needs and specific demands, or linking them to broader market opportunities.

Innovations in information and communication technologies (ICTs) have enabled new channels for delivering extension services, particularly in low- and middle-income countries. Mobile tools can enhance access to timely information, improve coordination across input and output markets, strengthen communication within farming communities, and streamline the delivery of public services (Aker and Mbiti 2010). Videos, voice recordings, chatbots, and other media can be used to provide engaging, consistent, and context-specific messages to extension recipients (Abate et al. 2023). When used independently or alongside conventional extension services, ICT-enabled approaches have the potential to improve knowledge transfer and agricultural outcomes.

Collectively, ICT-based approaches to extension aim to create more responsive, farmer-centered systems that foster stronger connections to value chains (for example, Nakasone et al. 2014; Aker et al. 2016; Spielman et al. 2021). This brief presents findings from field trials that employed ICT-powered or -driven extension in Ethiopia's wheat sector under the Digital Agricultural Advisory Services (DAAS) project. The results are primarily taken from the midline report of a process and impact evaluation implemented by the American Institute for Research (AIR).[1] The brief also summarizes findings from several studies and A/B tests conducted under the DAAS project, covering topics such as gender, crop storage, farmer and DA registries, wheat rust management, site-specific fertilizer recommendations, and climate-smart agriculture.

Opportunities for digital agricultural extension

The DAAS project leverages digital innovations to strengthen Ethiopia's extension system by delivering tailored advice to smallholder producers. DAAS uses a range of digital delivery methods to reach farmers with actionable information. Since it began in 2019, the project has reached more than 2 million farmers, including nearly 600,000 women, to provide different combinations of ICT-based services. This brief highlights the wheat-focused component of a project that used video-mediated extension services and mobile phone–based interactive voice response (IVR) systems to provide farmers with intervention information.

Extension in Ethiopia

Ethiopia's largely public extension system boasts the highest ratio of extension agents to farmers in Africa, reflecting the country's strong institutional commitment to rural advisory services (Berhane et al. 2018). However, the extension infrastructure faces several challenges. Development agents (DAs), who serve as frontline extension workers, are often overburdened by a wide variety of daily and seasonal tasks, and farmer training centers are frequently underfunded and poorly equipped. Furthermore, linkages between research institutions and extension services remain weak, limiting the flow of up-to-date, evidence-based technologies and practices to the field. Critically, extension services often do not adequately reach women, who represent an estimated 29 to 45 percent of Ethiopia's agricultural labor force (Buehren et al. 2019), underscoring the need for more inclusive approaches.

The Ethiopian wheat sector

Wheat production is central to food security, gross domestic product, and many rural livelihoods in Ethiopia. Wheat is the second most important staple crop in the country (after maize): it is grown by 5 million smallholders and accounts for 15 percent of caloric intake. Tadesse and colleagues (2022) estimate that Ethiopia has a 44–55 percent yield gap, which is the difference between what is biophysically possible under optimal conditions and what is observed in farmers' fields.[2] In Ethiopia, the wheat yield gap is largely attributed to the low use of recommended inputs, improved varieties, and agronomic practices, as well as evolving pest, disease, and climatic threats. High input prices make it difficult for many farmers to afford sufficient fertilizer, herbicide, and new wheat varieties, while the absence of irrigation leaves wheat fields vulnerable to volatile weather patterns and adverse weather events. In this context, efforts to improve the delivery of production and market information through Ethiopia's extension system are expected to enable productivity growth, more efficient use of inputs and other resources, and greater resilience to shocks for Ethiopian wheat farmers.

The DAAS wheat case

One of the core interventions of the DAAS project is specifically designed to improve wheat production practices and ultimately increase smallholder farmers' incomes through ICT-enabled extension services. To this end, Digital Green and its partners developed a suite of solutions to share agricultural advice with smallholder farmers, which are currently being used across key wheat-producing *woredas* in the Amhara, Oromia, Central, South, and South West Ethiopia regions. These solutions center around three core ICT tools:

Video screenings and discussion. Digital Green developed a series of 12-to-15-minute videos whose language, music, and actors were customized to fit local contexts and different farmer audiences. The videos were designed to be both climate- and gender-sensitive by incorporating information tailored to the specific needs of women farmers and addressing key climate risks. The DAs mediated group screenings of these videos and participatory discussions on the content. These sessions focused on topics such as land preparation, varietal selection, planting, weeding, crop protection, fertilizer use, and harvesting.

Interactive voice recordings. Wheat-focused audio messages were developed to complement the video screenings and mediation. These short messages were delivered to farmers' phones to provide timely reminders about the detailed guidance covered in the videos.

Telegram-based chatbot. A menu-based chatbot tool was developed through the Telegram app to provide DAs and farmers with access to agricultural advisory content. By integrating data from the farmer and DA registries,[3] the chatbot delivers tailored, location-specific information. The chatbot component was introduced in the project's fourth year to provide DAs with interactive advisory services through mobile messaging. This primarily consisted of information on climate-smart agricultural (CSA) practices such as agroclimatic advice tailored to local weather patterns and planting seasons, as well as site-specific fertilizer recommendations to improve fertilizer use and soil health. The chatbot was developed in coordination with the Alliance of Bioversity International and CIAT.[4] DAs utilized this tool to customize the advice they gave to farmers.

Evaluation approach

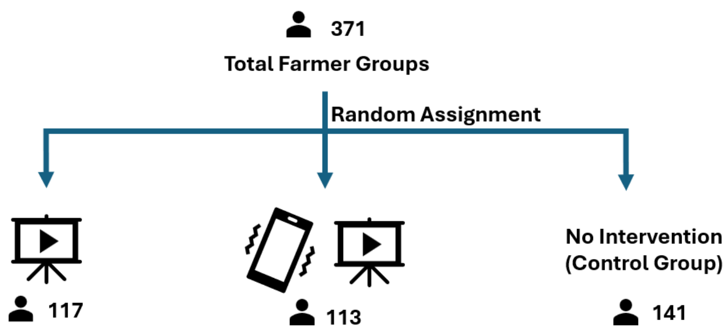
AIR conducted an impact and process evaluation of the core set of interventions: video screening, video-mediated extension provision, and IVR. The impact evaluation investigated the program's effects on intermediate impacts such as knowledge about key practices. These knowledge areas include eight nonnegotiable points for wheat production:

1. In the land preparation phase, plowing should be done 3–5 times
2. Seeds should be sown at a rate of 101–120 kg (in kg/ha)
3. The distance between rows should be 20 cm
4. Seeds should be planted at a depth of 3–4 cm
5. DAP/NPS[5] fertilizer rate is 100 kg/ha
6. One-third of the urea should be applied during the first round of fertilizer application

7. Two-thirds of the urea should be applied during the second round of fertilizer application
8. Urea should be applied 5–7 cm from the plant

The evaluation also examined the adoption of improved practices, spending on inputs, labor time, and longer-term outcomes such as agricultural productivity and income. The process evaluation considered the fidelity of program implementation, alignment with the theory of change, and the program's ability to translate content into targeted messages.

Figure 1. Random assignment across intervention and control groups



Source: Authors' illustration based on study midline report.

The evaluation used mixed methods to combine an experimental and qualitative approach. Farmer groups[6] were randomly assigned to three groups: (1) video + IVR, (2) video only, or (3) control. The study tracked the same farmers over time, collecting follow-up data 12 months after the beginning of implementation.[7] As shown in Figure 1, data were collected in 2022 from 2,599 farmers in 371 farmer groups (141 control, 117 video only, 113 video + IVR).[8] Farmers were eligible to participate in the study if they planted wheat in the last *Meher* (rainy) season. This random assignment allowed the researchers to attribute any differences in outcomes identified in the survey to the intervention alone. The primary outcomes of interest are listed in Table 1.

Table 1. Intermediate and final outcomes of interest for the wheat use case evaluation

Intermediate outcomes
Agricultural practices
Knowledge of residue management, crop rotation, planting, fertilizer use, and weeding practices
Inputs
Use of herbicide, DAP/NPS, and urea fertilizer; intensity of use (kg/ha) Use of rust-resistant wheat varieties and certified seeds; intensity of planting (kg/ha) Spending on land management (Birr/ha) Labor (person days/ha)
Productivity outcomes
Wheat yield (Q/ha)
Social outcomes
Instrumental, intrinsic, and collective agency of women participants (pro-WEAI indicators)

Source: Authors, based on study midline report.

Note: DAP=Diammonium phosphate; NPS=nitrogen, phosphorus, and sulfur.

In addition to the quantitative analysis, a rapid qualitative assessment was conducted 12 months after the beginning of the intervention. The assessment covered selected woredas where early implementation allowed AIR to gather insights into program rollout. The qualitative data were used to assess farmer and DA engagement with ICT services and their experiences with the intervention. Selection and methods are outlined in Table 2.

Table 2. Qualitative design and sample

	Research method	Number of participants
Rapid qualitative assessments (Addis Ababa and Oromia)	3 key informant interviews (KIIs) with national stakeholders	1 from ATA 1 from Digital Green 1 from IFPRI
	1 KII with region officials	1 Extension Directorate Coordinators
	2 KIIs with woreda officials (Development Agent Extension Supervisor)	1 per 2 sampled woredas
	8 KIIs with development agents (DAs)	4 for each of the 2 sampled woredas (Limu Bilbilo and Ejersa Lefo)
	2 focus group discussions (FGDs) with farmers	1 for each of the 2 sampled woredas
Total	17 KIIs and 2 FGDs	
Process evaluation at midline (South West and Amhara)	2 KIIs with regional officials	1 for each sampled region 2 Extension Directorate Coordinators
	4 KIIs with woreda officials (DA Extension Supervisor)	1 for each of the 2 sampled woredas in each of the 2 regions
	8 KIIs with DAs	4 for each of the 1 sampled woredas in each of the 2 regions
	16 FGDs with farmers	4 FGDs with women farmers for each of the 1 sampled woredas in each of the 2 regions 4 FGDs with male farmers for each of the 1 sampled woredas in each of the 2 regions
Total	14 KIIs and 16 FGDs	

Source: Authors, based on study midline report.

Evaluation of complementary pilot interventions

The three key ICT services described above were used in the implementation of several complementary pilot interventions, which were also evaluated. These pilot interventions are outlined in Table 3; additional information can be found in the cited sources.

Table 3. Additional pilot studies complementing core wheat intervention

Title	Intervention	Modality(ies)	Total population who received intervention	Study population	Evaluation methods
Gender-intentional video mediation	Women-only video-mediated extension sessions were held	- Video screening and mediation	1,313 women farmers	- 319 women from women-only extension sessions	- Household survey

				- 216 women from mixed extension sessions - 341 women from households where men attended sessions	- Participant observation - Focus group discussion (FGD) - In-depth interviews
Purdue Improved Crop Storage (PICS) bag recommendations	Video-mediated sessions educated farmers on the advantage of using PICS bags for wheat storage, and farmers were also given information on supplier location and prices	- Video screening and mediation	3,389 farmers	- 339 farmers	- Household survey - Semi-structured interviews
Digital Farmer and Development Agent (DA) Registry	Digital platform and mobile app were introduced to create detailed farmer and DA profiles, which could be used to facilitate data collection and tailor advisory services to individual farmers	- Digital platform - Mobile application	60 DAs Over 13,800 farmers	- 126 registered farmers - 48 nonregistered farmers - 41 registered DAs - 19 nonregistered DAs - 16 other registry report users	- Semi-structured interviews
Wheat rust management early warning and recommendations	IVR messages were used to share location-specific information and recommendations from wheat rust surveillance early warning system to DAs	- IVRs - Digital platform - Mobile application	431 DAs used information to advise an estimated 142,230 farmers	- 46 DAs - 197 farmers	- Semi-structured interviews
Site-specific fertilizer recommendations	Site-specific fertilizer recommendations were delivered to farmers through a Telegram bot, with recommendations based on soil, agronomy, weather, and household data	- Telegram-based chatbot	Over 50,0000 farmers	- First phase: 300 wheat plots - 16 DAs - 228 farmers	- FGDs - Key informant interviews (KIIs) - Direct observation - Backend data analytics
Cross-cutting pilot videos on climate-smart agriculture (CSA)	Four videos about CSA practices focused on crop rotation, wheat seed selection, compost preparation, and wheat row planting	- Video screening and mediation	71 farmer development groups	- 8 farmer development groups (103 farmers) - 4 DAs - 2 other focal people	- FGDs - KIIs

Source: For gender-intentional video mediation, see IGNITE; Digital Green Ethiopia (2022). For PICS bag recommendations, see Digital Green (2021). For Digital Farmer and DA Registry, see Sebsibie et al. (2023). For wheat rust management early warning and recommendations, see Digital Green Ethiopia (2021). For site-specific fertilizer recommendations, see Digital Green Ethiopia and Alliance for Bioversity and CIAT (2023). For cross-cutting CSA pilot videos, see Digital Green Ethiopia (2023).

Note: IVR=interactive voice response.

Insights into participant engagement with ICT tools

The evaluation found that both farmers and DAs viewed the video-mediated extension intervention positively, noting that the videos were useful, strengthened interactions between DAs and farmers, and increased training attendance. The intervention achieved strong participation: about 85 percent of farmers in treatment groups attended at least one video session. Some spillovers occurred, as 52 percent of farmers in the control group also reported viewing a video.

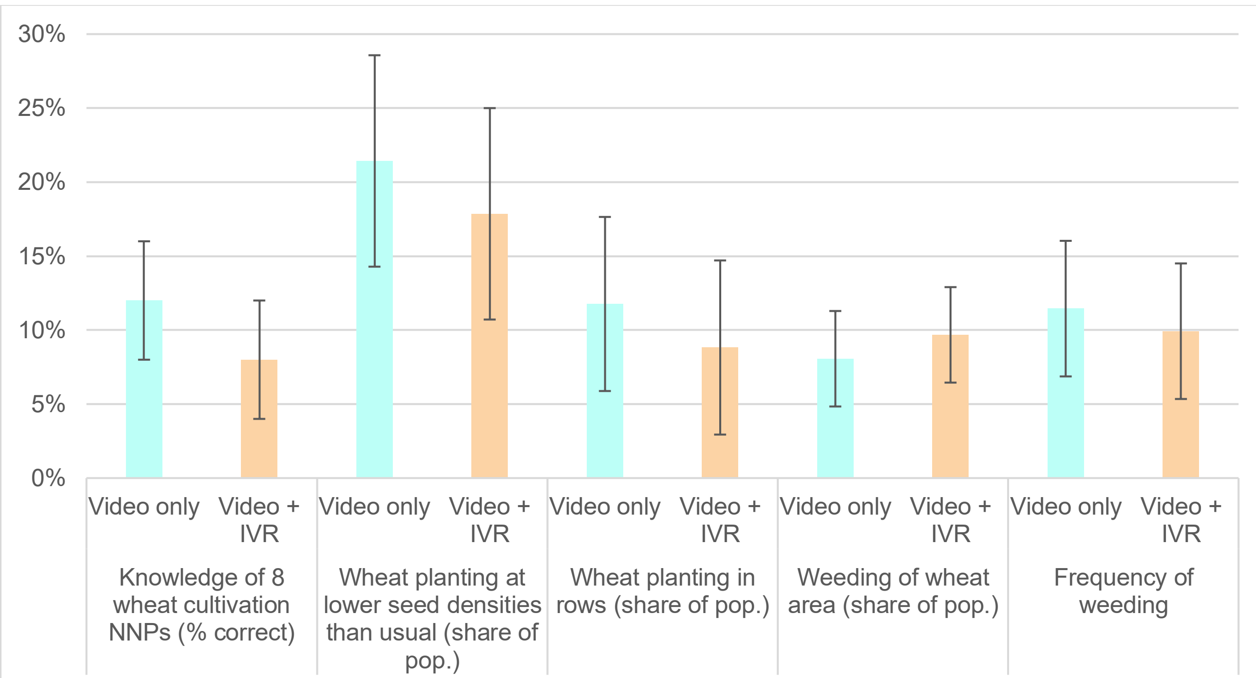
Engagement with the IVR system was limited. Only 23 percent of farmers in the video + IVR group reported receiving a message, and just one-third listened to the entire message. Monitoring data confirmed low uptake (39 percent received at least one message), which was attributed to farmers' mistrust of automated calls and concerns about possible phone charges.

The Telegram chatbot was mainly used to share information on recommended agricultural practices and site-specific fertilizer recommendations. The qualitative assessment found that 65 percent of DAs (22 percent women) effectively used the chatbot to access advisories, with 96 percent providing positive feedback. DAs strongly supported making it an official digital agriculture channel at the national level.

Program impacts on farmer behavior and wheat production

Results from the evaluation presented in Figure 2 show that video-mediated extension services significantly improved farmers' knowledge and adoption of recommended farming practices. After 12 months, farmers exposed to videos knew a larger share of the eight key nonnegotiable points for wheat cultivation on average, with correct responses higher by 12 percent in the video-only group and by 8 percent in the video + IVR group than in the control group.

Figure 2. Difference in knowledge and behavior relative to the control group at midline (%)

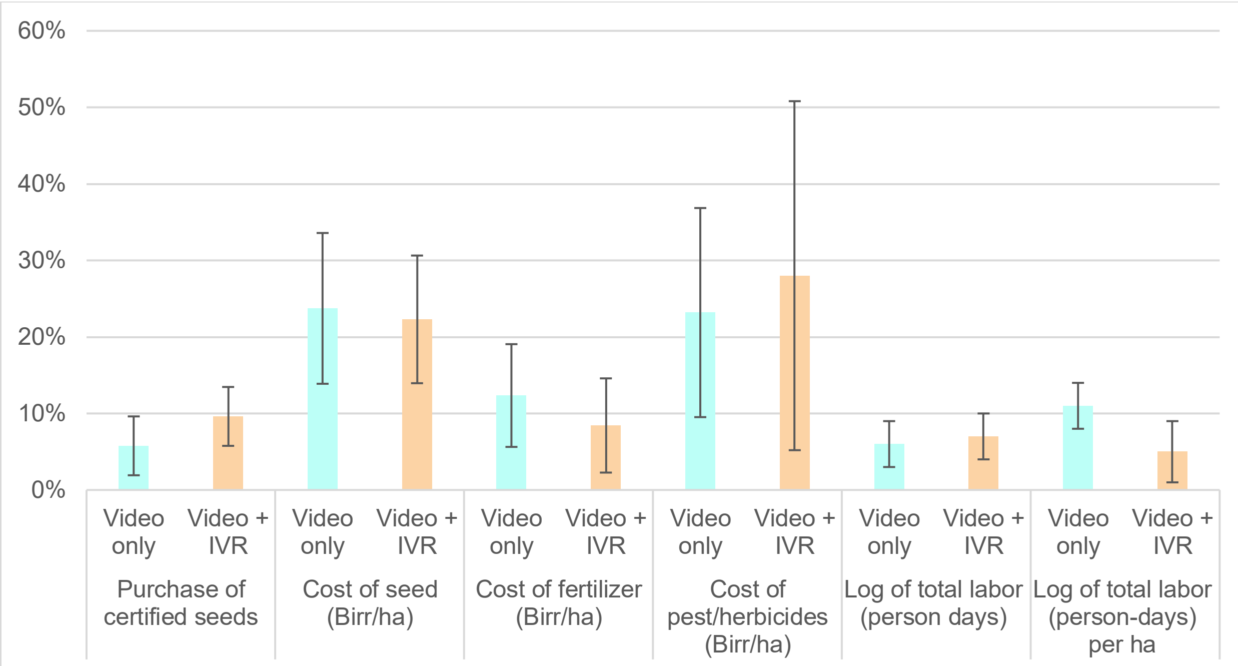


Source: Authors' illustration based on study midline report.

Note: Differences between the Video-only and Video + IVR groups were not statistically significant. Whiskers represent standard errors. Each regression controls for kebele fixed effects. Standard errors clustered at the farmer group level. NNPs = nonnegotiable points.

Video-mediated extension also encouraged better farm management and input use. Farmers in video groups were 21 percent more likely to plant seeds at a lower density, 12 percent more likely to practice row planting, and 8 percent more likely to adopt improved weeding practices, with an 11 percent increase in weeding frequency. Figure 3 shows that farmers in treatment groups invested more resources in wheat production. They were 6–10 percent more likely to buy certified seed, spent more per hectare on inputs, and deployed 6–7 percent more labor hours on wheat production than the control group. No significant impacts on yields were observed within the short assessment period.[9]

Figure 3. Difference in investment and labor relative to the control group at midline (%)



Source: Authors' illustration based on study midline report.

Note: Differences between the Video-only and Video + IVR groups were not statistically significant. Whiskers represent standard errors. Each regression controls for kebele fixed effects. Standard errors clustered at the farmer group level.

The video-mediated extension interventions also influenced women's farming activities and decision-making. Women who participated in women-only (IGNITE) or mixed training groups gained greater knowledge of best practices, were more likely to adopt them, and reported increased decision-making power compared to nonparticipants. Women farmers in either group were 4 percentage points (pp) more likely to engage in farm tasks and join farmer groups, while those in treatment households were 3–4 pp more likely to act on their own values when making farming decisions. Women noted feeling more comfortable in women-only groups, which also drew higher participation of women in extension activities.

Findings from additional pilot studies

The Purdue Improved Crop Storage bag use case

Farmers adopted and benefited from the use of Purdue Improved Crop Storage (PICS) bags, although the video-mediated extension sessions apparently had a limited influence on this behavior. More than 6,000 farmers purchased PICS bags from the three DAs who were interviewed by the project, suggesting that information also spread through peers and DAs. Among those who received information, 46 percent reported buying and using the bags, with IVR reminders significantly associated with adoption, although other factors may have played a role. DAs were the most preferred source of information, followed by video, but their outreach was constrained by transport challenges and the low priority given to PICS promotion at the woreda level.

Access and availability remain key barriers to PICS adoption. Only 25 percent of farmers could purchase PICS bags locally, while 27 percent did not know where to obtain them. Despite these challenges, 86 percent of users reported securing better wheat prices compared to selling immediately after harvest, with an additional 54[10] Ethiopian Birr earned for every month of storage.

Digital Farmer Registry

Results indicate that DAs benefited from using the Digital Farmer Registry, though limited technical capacity and the time required for setup posed challenges. Nearly all DAs adopted the platform, collectively registering more than 13,800 farm households. Approximately 63 percent of all DAs in the sample used the app regularly in their work with farmers. Most DAs reported that the registry improved communication with supervisors and farmers, enhanced technical knowledge, and expanded networking opportunities. A large majority agreed that it reduced workload (82 percent), helped them focus on extension activities (93 percent), improved data generation and sharing (94 percent), and facilitated timely reporting (90 percent). However, some experienced technical difficulties and expressed a need for further training.

Results also indicate that the Digital Farmer Registry may have improved data accuracy in DA record-keeping. Comparisons between registry data in pilot *kebeles* and traditional records in non-pilot kebeles showed discrepancies with farmer survey data on input demand, field details, and advisory services. These deviations were smaller in pilot areas, suggesting that the digital platform contributed to more accurate data recording.

Wheat rust management recommendations

Approximately 52 percent of farmers who received information and recommendations on wheat rust management reported a better understanding of the issues and mitigation measures. Fifty percent took some action to reduce grain loss, saving an estimated 2,084 kg of wheat on average. Despite this success, 90 percent of respondents noted that they would prefer to receive information on wheat stem rust management from DAs in the future rather than via IVR or SMS messages. They also showed a strong preference for receiving information on preventive measures instead of early warning messages, though both were seen as useful. DAs also received IVR/SMS messages related to wheat stem rust, which they found useful, timely, and reliable. These DAs passed on the information from these messages to 330 farmers on average.

Climate-smart agriculture pilot videos

The assessment found that many farmers were already aware of the implications of climate change on their productive practices, due to recent experiences with adverse weather events associated with climate change. The videos communicated strategies and rationale for four CSA strategies, and farmers demonstrated strong comprehension of this content. Farmers demonstrated a willingness to adopt all strategies presented and did so in some cases. However, the study revealed that limited access to technology and input costs were significant barriers to adoption.

Site-specific fertilizer recommendations

Backend data show that 65 percent of DAs (269 total, 24 percent women) interacted with the bot at least once, and 44 percent (189 total, 23 percent women) generated advisories more than once. The remaining DAs did not engage with it, mainly due to technical or access-related issues, such as malfunctioning phones or tablets, SIM card errors, or a lack of smartphones. DAs who interacted with the bot used it for 4.8 days on average (5.1 for men and 4.5 for women). DAs reported that the Telegram chatbot was user-friendly and that the information it provided was relevant and useful.

Most DAs used information from the Telegram bot during video dissemination sessions and door-to-door visits, sharing specific advisories with farmers based on their kebele location. Farmers generally trusted the information and found it useful. However, few were able to follow the recommendations due to high fertilizer prices and poor timing, with the advice often coming after they had already made fertilizer decisions for the season. DAs did not collect data on adoption, as few farmers implemented the recommendations.

Lessons from the DAAS wheat use case

The DAAS wheat case provides valuable insights related to the use of ICT tools, as well as the complementary interventions introduced by this project. While this analysis was only able to identify limited evidence of improvements to productivity, income, and agricultural practices, the underlying strategies were attractive to extension providers and recipients. The methods used are also easy to incorporate into existing extension systems.

Overall, early DAAS results are positive, showing increased knowledge, adoption, and some productivity gains. Qualitative feedback highlights DAAS's value in addressing DA shortages and training needs, and improving the efficiency of DAs, with stakeholders supporting video and IVR use. The results suggest the video-mediated sessions are more effective at disseminating information and catalyzing behavior change than the IVR component. In particular, farmers expressed a preference for the videos and interactions with DAs over IVR. They often did not answer calls delivered by IVR or listen to the full message, further indicating that this modality has limited appeal for the target audience. However, in the case of the wheat stem rust management system, farmers noted that the IVR messages provided helpful reminders to consider preventive actions. DAs also found the messages helpful and more timely than traditional means of receiving information. It is important to note that these messages can reach farmers far more easily than other modalities, since they are sent directly to individuals through their phones. These results may suggest that IVR is best suited as a tool to reinforce messages delivered through other means, especially time-sensitive messages, or as a tool for DAs and other professionals, who can then pass on the relevant information to farmers.

Gender analysis showed that video-mediated extension reached both men and women effectively, though women-only groups encouraged higher participation and led to greater comfort among women farmers, suggesting they may be preferable to mixed groups.

The farmer registry was successfully implemented, which reduced DA workload, improved data management, and enhanced service delivery. However, technical capacity, training, and data accuracy remain key considerations for scaling. Reliable digital data can be critical for managing agricultural risk and informing policy responses.

The CSA video pilot underscored structural barriers to adoption: farmers were aware of and willing to adopt climate-smart practices, but high input costs and limited access to technologies posed constraints. Complementary measures, such as agricultural credit, are needed to maximize digital extension impacts.

The wheat stem rust management pilot was effective in improving farmers' understanding and encouraging action to reduce grain loss. The reported savings of more than 2 tons of wheat per farmer underscore the potential of such advisory efforts to enhance productivity and resilience. However, the strong preference for receiving information directly from DAs, rather than through digital channels, highlights the continued importance of human intermediaries in agricultural extension. The results also show that DAs play a key role in amplifying the reach of digital advisories, successfully relaying timely and reliable information to hundreds of farmers in their communities.

Finally, DAs provided positive feedback on site-specific fertilizer recommendations based on integrated soil, agronomic, and weather data, although farmers were unable to follow these recommendations. Recommendations were evaluated under controlled conditions, and they have since been scaled to more than 70,000 farmers via Telegram.

Conclusion

The DAAS wheat case demonstrates the potential of ICT-powered extension to broaden the reach and delivery of cost-effective, consistent, and accessible agricultural advisory services. With more than 2 million farmers reached in just five years—including over half a million through video messages alone—this suite of ICT-powered extension approaches has proven both scalable and adaptable to existing systems. Limitations include a lack of farmer engagement with IVR messages, challenges with data collection and management, and limited overall impacts on behaviors and yields. To maximize their impact, digital extension programs should incorporate strong collaboration with partners to improve data collection and message tailoring, and program implementers should engage with DAs to monitor uptake, support peer-to-peer sharing, and encourage practical demonstrations.

For policymakers, the findings provide clear guidance: while video-mediated strategies and IVR can extend the reach of extension services and ensure clarity of messaging, their long-term effectiveness depends on addressing structural barriers such as high input costs. Coupling digital tools with agricultural credit or similar support could enhance adoption and outcomes. Finally, alongside quantitative impacts, future initiatives should also account for farmer satisfaction with both the modality and user experience to ensure enduring relevance and success.

ABOUT THE AUTHORS

Gashaw T. Abate is a Research Fellow at IFPRI, Brian McNamara is a Program Manager at IFPRI, Juan Bonilla is a Managing Economist at AIR, Daniel T. Asrat is Deputy Country Director for Ethiopia at Digital Green, and David J. Spielman is a Senior Research Fellow and Director of the Innovation Policy and Scaling Unit at IFPRI

ACKNOWLEDGMENTS

Funding for this work was provided by the Gates Foundation and the Foreign, Commonwealth & Development Office. The authors are grateful for their financial support and would also like to thank the study participants (farmers, development agents, and subject matter specialists) for their willingness and time.

REFERENCES

Abate, G., T. Barnard, S. Makhija, and D.J. Spielman. 2023. “Accelerating Technical Change through ICT: Evidence from a Video-Mediated Extension Experiment in Ethiopia.” World Development 161.

Aker, J.C., I. Ghosh, and J. Burrell. 2016. “The Promise (and Pitfalls) of ICT for Agriculture Initiatives. Agricultural Economics 47 (S1): 35–48.

Aker, J.C., and I.M. Mbiti. 2010. “Mobile Phones and Economic Development in Africa.” Journal of Economic Perspectives 24 (3): 207–232.

Ayalew, H., J. Chamberlin, and C. Newman. 2022. “Site-Specific Agronomic Information and Technology Adoption: A Field Experiment from Ethiopia.” Journal of Development Economics 156: 102788.

Berhane, G., C. Ragasa, G.T. Abate, and T.W. Assefa. 2018. “The State of Agricultural Extension Services in Ethiopia and their Contribution to Agricultural Productivity.” Strategy Support Working Paper 118. Addis Ababa, Ethiopia: IFPRI. https://www.ifpri.org/publication/state-agricultural-extension-services-ethiopia-and-their-contribution-agricultural

Buehren, N., M. Goldstein, E. Molina, and J. Vaillant. 2019. “The Impact of Strengthening Agricultural Extension Services on Women Farmers: Evidence from Ethiopia.” Agricultural Economics 50 (4): 407–419.

Davis, K.E. 2008. “Extension in Sub-Saharan Africa: Overview and Assessment of Past and Current Models, and Future Prospects.” Journal of International Agricultural and Extension Education 15 (3): 15–28.

Digital Green Ethiopia. 2021. Learnings from “Wheat Rust Management Use-case.” Addis Ababa, Ethiopia: Digital Green. Project Report.

Digital Green Ethiopia. 2022. Exploring Intra-Household Decision-Making and Best Practice Adoption Outcomes of Women-Targeted Digital Extension. Phase 1 Brief Report. Addis Ababa, Ethiopia: Digital Green. https://digitalgreen.org/wp-content/uploads/2022/04/IGNITE_DG_Qual_Report.pdf.

Digital Green Ethiopia. 2023. Learning from Climate Smart Agriculture (CSA) Practices Pilot Gassera and Agarfa Woredas. Addis Ababa, Ethiopia: Digital Green. Project Report.

Digital Green Ethiopia and Alliance for Bioversity and CIAT. 2023. Site-Specific Fertilizer Recommendations for Wheat in Ethiopia: An Assessment Report on Advisory Dissemination and Feedback Collection. Addis Ababa, Ethiopia: Digital Green. https://digitalgreen.org/wp-content/uploads/2023/12/Telegram-Bot-Assisted-SSFR-Assessment-Report_-Digital-Green-and-Alliance-of-Biodiversity-and-CIAT-1.pdf

Jack, B.K. 2013. “Market Inefficiencies and the Adoption of Agricultural Technologies.” CEGA White Papers. Berkeley. https://escholarship.org/content/qt6m25r19c/qt6m25r19c.pdf

Nakasone, E., M. Torero, and B. Minten. 2014. “The Power of Information: The ICT Revolution in Agricultural Development.” Annu. Review of Resource Economics 6 (1): 533–550.

Sebsibie, S., D.M. Ketema, and G.T. Abate. 2023. “Digital Farmer Registry and Tailored Extension and Advisory Services in Ethiopia: A Process Evaluation.” IFPRI Project Note. Washington, DC: International Food Policy Research Institute (IFPRI). https://doi.org/10.2499/p15738coll2.136603

Snyder, K.A., S. Miththapala, R. Sommer, and J. Braslow. 2017. “The Yield Gap: Closing the Gap by Widening the Approach.” Experimental Agriculture 53 (3): 445-459.F

Spielman, D., E. Lecoutere, S. Makhija, and B. Van Campenhout. 2021. “Information and Communications Technology (ICT) and Agricultural Extension in Developing Countries.” Annual Review of Resource Economics 13 (1): 177–201.

Sumberg, J. 2012. “Mind the (Yield) Gap(s).” Food Security 4 (4): 509-518.

Tadesse, W., H. Zegeye, T. Debele, D. Kassa, W. Shiferaw, T. Solomon, T. Negash, N. Geleta, Z. Bishaw, and S. Assefa. 2022. “Wheat Production and Breeding in Ethiopia: Retrospect and Prospects.” Crop Breeding, Genetics and Genomics 4 (3).

ENDNOTES

[1] An endline study was also conducted by AIR three months into the project, although the sample size was smaller due to the security situation in the Amhara study districts. AIR is currently implementing a longer-term endline study as part of its assessment of a Telegram bot intervention introduced toward the end of the DAAS project. This research brief will be updated once the results from the ongoing study become available.

[2] Although yield gaps may not be the best way to characterize constraints to production or potential gains from improvement (Gati et al. 2023; Snyder et al. 2016; Sumberg 2012), they are instructive in shaping roadmaps for future investment.

[3] Described below in the evaluation of complementary pilot interventions.

[4] For more on site-specific recommendations for nutrient management in the Ethiopian context, see Ayalew et al. (2022).

[5] DAP=Diammonium phosphate; NPS=nitrogen, phosphorus, and sulfur.

[6] There were seven farmers per group, on average.

[7] Another round of data collection occurred 36 months after the beginning of implementation, but those results are not presented here.

[8] Trial Registration and IRB Approval: Abate, G. et al. 2019. "A cluster randomized trial of video-mediated agricultural extension services in Ethiopia." AEA RCT Registry. https://doi.org/10.1257/rct.3724-2.0

[9] Other null findings about knowledge, practices, inputs, and productivity are not included in this brief.

[10] In the last year of the study (2024), the average exchange rate was 1,000 Ethiopian Birr to US$13.82 (https://www.exchange-rates.org/exchange-rate-history/etb-usd-2024).

Funding for this work was provided by the Gates Foundation and the Foreign, Commonwealth & Development Office. This publication has not been independently peer reviewed. Any opinions expressed here belong to the authors 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