Improving agricultural information and extension services to increase small-scale farmer productivity

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Agricultural extension services can be improved by leveraging tools like information and communication technologies, trainer incentives, or social learning to support small-scale farmers' decisions to invest in new, profitable practices. Extension programs that target both male and female members of the household or bundle advisory services with other offerings focused on alleviating gender-based barriers can also improve women's agricultural outcomes.

A farmer harvests seaweed in Bali. Photo: Eo naya | Shutterstock.com

Summary

Farmers need many types of information to assess the suitability of new technologies and make optimal farming decisions. This is especially important given that agricultural technologies may have different levels of risk depending on local plot characteristics and input choices, making it difficult for farmers to predict production outcomes on their own plots without reliable information [10]. However, access to information about the proper use and benefits of new practices is often cited as a binding constraint for small-scale farmers in many low-income settings, leading to lower realized yields and profits.

Agricultural extension is the most common model used to transmit information to farmers in low- and middle-income countries, and it is often one of national agriculture ministries' primary programs. These traditional extension systems often use top-down approaches, like training and visit, and bottom-up approaches, like farmer field schools or peer farmer learning, to encourage the adoption of new technologies. However, many extension systems face challenges with staff capacity and accountability to reach all farmers reliably. Furthermore, extensionists' recommendations may not sufficiently consider farmer profit incentives for technology adoption, focusing instead on yield maximization based on experimental evidence from test plots that do not smoothly translate to real farm settings.

A review of 41 randomized evaluations shows 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. For example, farmer social networks can help drive the diffusion of new technologies by lending credibility to extension programs and encouraging information to pass from neighbor to neighbor, while information and communication technologies (ICTs) are effective in tailoring information to farmers' needs and enabling the comprehension of complex technologies. Many of these programs increased farmer knowledge and adoption of new practices, though impacts on yields and profits was less consistent. Evidence also suggests that women farmers face unique barriers in accessing agricultural information. Specifically, women are less likely to be targeted by formal extension programs in part because they are often marginalized, have less agricultural decision-making power within their own household, and can be less connected to community social networks. In such cases, ensuring that extension programs target both members of the household as well as bundling information services with other services focused on alleviating gender-based barriers can improve the adoption of inputs as well as agricultural decision-making power.

Supporting evidence

In the context of a new technology or practice, extension services can serve an important role in helping farmers make informed decisions about technology adoption. Eight studies show that providing farmers with information about the benefits and proper use of new practices can effectively increase farmer knowledge, technology adoption, and, in some cases, yields [5], [8], [13], [17], [20], [22], [23], [42], . In Sierra Leone, a randomized evaluation of the rollout of a new improved rice seed variety, NERICA, found that yields only increased for farmers who received extension services alongside free seed kits [42]. Those who received seeds alone did not experience gains in yields. This may be because the seed variety tested required associated changes in production practices to reap returns, highlighting the importance of information on best practices and simultaneous adoption of complementary inputs or practices rather than adopting the technology in isolation.

However, many extension services do not reach all farmers directly and may be ineffective in part because they do not reflect farmers' incentives to maximize profits. Agricultural recommendations from top-down approaches often prioritize yield maximization and are based on experimental evidence from controlled test plots that do not often mirror the variety of real farming conditions in a given area [15], [21], [24], . For example, the Kenyan Ministry of Agriculture based their recommended fertilizer amounts on maximizing yields, which may serve broader food security goals, but the optimal amount from the farmers' perspective to maximize profit was considerably lower [21], . In Bali, Indonesia, seaweed farmers preferred to use the traditionally optimal amount and spacing of seaweed because adopting the recommendations of a local NGO-run extension program would have reduced farmer profits (but increased yields) [30]. Policymakers should therefore consider farmers' priorities and incentives for technology adoption in designing persuasive messaging informed by, and tailored to, local agricultural conditions.

When lack of capacity and trust in recommendations are prevalent concerns, relying on social learning to disseminate information can improve the take-up of new technologies. Nine randomized evaluations show that training "contact" farmers, or those who have social proximity to many community members and can draw on local knowledge to tailor extension messaging, can have positive impacts on farmers' decision to adopt improved or new technologies [2], [4], [5], [6], [7], [8], [23], [26], [34], . In Malawi, researchers tested whether the position of a contact farmer within a community's social network affected other maize farmers' decisions to adopt a new planting technique [5], . Farmers who had social ties with multiple contact farmers were 33 percent and 90 percent more likely to have heard about pit planting and to adopt the technique, respectively, by the second year of the program relative to farmers with no social connections. However, in Mozambique, the increase in technology adoption was concentrated among contact farmers who received training directly with modest information diffusion via social learning from others in the community [34].

In cases where variations in plot characteristics [43], or social distance between messengers and peers may inhibit social learning [5], , it may be important for farmers to see someone in their network use a new technology before they are convinced to adopt the practice themselves [@13 [21], [23], [31], [34], **.** In Western Kenya, small-scale maize farmers chosen from communities to set up experimental test plots for fertilizer and seeds on their fields were 62.5 percent more likely to continue using fertilizer in a given season [13]. However, their neighbors and friends did not increase their own usage unless the farmer explicitly invited them to witness the key moments of the demonstration on their test field—planting, applying fertilizer, and harvesting—in which case neighboring farmers' adoption increased as much as that of the test plot farmers.

While social learning is an important platform for disseminating agricultural information, contact farmers may face social incentives (e.g., positive or negative preferences for the welfare of others) that can shape program delivery [2], [4], . For example, in Mali, women farmers were more likely to be excluded from receiving agricultural information even when they had as much direct contact with the trained farmers as the male farmers on average [4]. In some cases, finding contact farmers who are well connected in village networks may be fairly easy, for example, by selecting members from the most salient farmer groups. Policymakers can therefore improve the efficacy of extension by identifying well-connected farmers, though in some contexts it may be important to also consider whether marginalized groups are being left out.

When properly incentivized or held accountable, trainers are more likely to improve technology adoption among farmers within their reach. Trainers' incentives are not always aligned with outcomes for their trainees, and in several settings, better aligning those incentives increased the adoption of technologies [6], [17], [34], . In India, providing agrodealers with experimental kits and information about a new flood-tolerant rice seed variety to pass on to their customers increased farmer-level adoption by 56 percent [17]. This increase was at least partly driven by dealers actively passing along information to farmers, themselves motivated by profits from expanded sales.

Additionally, giving farmers a mechanism to provide feedback on trainings can also improve trust and engagement with extension services [33], [36], . In Rwanda, farmer groups who received access to feedback tools for an agricultural input and training service were half as likely to have members leave the service in the following year as comparison farmer groups [33]. This suggests that offering feedback channels for farmers and aligning trainers' incentives for disseminating information can be important factors in sustaining farmer demand for agricultural extension services.

Tools that simplify new practices for farmers or leverage ICTs can help farmers better understand and implement complex production processes. Providing farmers with innovative tools for the proper usage of inputs, such as fertilizer, can help them adopt improved farming practices. In Bangladesh, providing rice farmers with leaf color charts to inform urea fertilizer application aligned the farmers' timing of fertilization with productive periods during the growing cycle [32], . Similarly, in the above study in Western Kenya, providing maize farmers with a simple blue kitchen spoon to measure how much fertilizer to use increased knowledge of the recommended fertilizer quantity by 108 percent among farmers who owned the blue spoon—an effect that persisted after the intervention [13].

ICTs, such as phone calls and videos, are an increasingly common and successful medium for conveying technical information in a digestible manner. Across ten studies testing the impact of ICTs in transferring information [1], [3], [12], [15], [16], [17], [22], [25], [31], [35], [44], , eight programs found increases in farmers' knowledge, technology adoption [3], or both [1], [15] [16], [22], [31], [35], [44], . Four programs also found improvements in farmers' yields [1], [3], [12], [44], . In Ethiopia, combining traditional extension with public video screenings on integrated soil fertility management (a strategy used to improve soil productivity and combat land degradation) improved farmer knowledge and adoption of recommended practices by 15 percent and 38 percent, respectively, relative to farmers who did not receive any extension services [31], . However, the aforementioned study in India found that text messages communicating the use and benefits of a flood-tolerant rice seed variety did not improve farmer adoption or knowledge, suggesting that lighter-touch, infrequent, or general information shared through phone-based interventions alone may not be able to provide the level of training required to induce the adoption of newer or more complex technologies [17]. While learning and adoption impacts may be inconsistent or modest when delivering information via phone-based systems, they can often be designed and scaled cost-effectively.

ICTs can also be a cost-effective way to improve on traditional extension by tailoring recommendations to farmers' needs at relevant times during the agricultural cycle. Mobile phones, with their widespread usage in many low- and middle-income countries, can improve the effectiveness of extension programs by allowing organizations to deliver frequent reminders or tailored information to farmers at particular points during planting. In another study in Kenya, contracted sugarcane farmers who received SMS reminders about agricultural tasks timed to coincide with relevant parts of the growing season experienced an 8 percent increase in yields relative to the comparison group [12], . The intervention was cost-effective, at US$0.02 per text message while raising farmer revenues by US$54. However, the impacts were not sustained in the second season, due to differences in weather conditions or management challenges experienced by the contracting company. Two studies also show farmer demand for local agricultural information that would help them better calibrate their use of new technologies or inputs [14], [24], [28], . For example, in Western Kenya, researchers found that the farmers' willingness to pay for local agricultural information exceeded the costs of generating and delivering such information [24].

Mobile phones are also often used as a medium for farmers to source price information for agricultural outputs. In six [9], [11], [29], 37, 38, 41] of seven studies [9], [11], [27], [29], [37], [38], [41], , providing farmers with timely information led them to use the information productively. Specifically, when farmers knew about prevailing market prices (particularly for crops that have high price variability) or about buyers near them ready to trade, they were able to take advantage of markets for their goods [9], , negotiate better sale prices with traders [9], [37], [38], [41], , increase production [11], [29], , or reduce price dispersion across markets [9], [29], . For example, in Ghana, providing farmers weekly price alerts via SMS resulted in a 9 percent increase in yam prices in the first year of the program relative to the comparison group—an effect largely driven by farmers leveraging price information to bargain with traders for fairer prices [41]. The program was also highly cost-effective, with returns on farmer revenue equal to over 200 percent of the total implementation costs (the service cost about US$51 per farmer in 2011). However, none of these studies show an impact on the average prices that farmers received across markets, suggesting that policy interventions that focus on providing price information to farmers alone may not be sufficient in overcoming market power wielded by traders in many settings.

In contrast, two studies highlight the importance of engaging traders [9], [45], . Due to fixed costs in trade, Ugandan farmers' ability to use price information from a digital marketplace and e-commerce app to sell in new markets was limited, whereas when traders used the digital marketplace, information allowed them to adjust their prices in a way that benefited farmers in surplus areas [9]. On the Kenya-Uganda border, researchers found that providing price and tariff information *to traders* may be more effective in reducing prices at the market level, as traders can better take advantage of price differences [45].

Farmers may benefit more when information helps them to overcome behavioral biases, like procrastination, or highlights important traits they previously ignored. Extension may be effective when providing information on a profitable practice that overcomes a behavioral bias, such as limited attention, procrastination, or where learning through direct observation is difficult. In the above study in Bali, Indonesia, seaweed-farmer-led experimentation allowed farmers to change their production methods [30], . Experiments and information highlighting new planting techniques led farmers to optimize seed pod size—a hard-to-observe trait that impacts yields. Two studies in India [15], and Bangladesh [32], also suggest that subsidies for new inputs may drive farmer bias toward believing that more is always better. In both cases, simplistic tools such as "soil health cards" [15], and "leaf color charts" [32] helped farmers improve their knowledge of effective fertilizer management through optimal quantity and application timing. In some cases, policymakers can generate effective extension through targeted information that can help farmers notice new or neglected production techniques.

The information and agricultural extension programs reviewed did not consistently lead to improvements in farmers' yields or profits. Overall, 12 of the 41 studies found improvements in farmer yields or profits from agricultural extension programming [2], [7], [12], [18], [20], [22], [26], , [29], [32], [35], [37], [44], . For example, a program in Uganda that leveraged social networks to disseminate agricultural advice to subsistence farmers resulted in a 44 percent increase in agricultural profits—a result partly driven by an increase in farmers growing marketable crops like vegetables and fruit [2], . However, another extension program in Uganda that focused on contact farmers' technical training in dairy cow feeding practices resulted in a 0.12 standard deviation increase in the adoption of new feeding practices among other dairy farmers in the village [6], . This led to a 0.13 standard deviation increase in milk production, but it did not lead to a meaningful increase in profits earned. Researchers suggest that this may be due to additional difficulties in measuring milk production and profits from dairy farming. Another evaluation in Ethiopia that tested the use of video-mediated agricultural extension relative to traditional extension services found that videos led to an increased reach of the government's conventional extension service as well as to an increased uptake of the technologies promoted [1]. However, the improvements to yields were limited. Researchers suggest this may be related to the fact that the government's chosen promoted technologies may have been misaligned with the productivity constraints that farmers actually faced rather than due to the design and delivery of extension services.

There may be several reasons why extension may fail to change measured profits on average, ranging from incomplete take-up of extension services to inherent differences in the profitability of promoted technologies to challenges in measuring agricultural yields and profits. What seems clear is that extension should not be seen as an all-encompassing solution for low farm productivity. Policymakers should emphasize extension as an effective standalone tool for increasing profits when they identify profitable but unfamiliar technologies. In other contexts, policymakers should leverage extension as a supporting intervention, bundled with other services that promote technology adoption and encourage demand for extension.

Women farmers experienced improvements in empowerment and inclusion in agriculture when extension programs focused on alleviating gender-specific constraints. Five programs [8], [19], [35], [39], [40], that were intentionally designed to reach women through extension services improved their agricultural outcomes. For example, in two studies, targeting both men and women of farming households increased women's engagement with advisory services and knowledge of new technologies [8], [35], . In Uganda, maize-farming households were shown a video about improved maize management practices, with the video shown to either the male member of the household, the female member, or both as a couple [35]. Involving women as recipients of information improved their knowledge and adoption of the recommended practices by 13 percentage points relative to when only male members of the household received information (an increase of about 267 percent). Importantly, women who received information also experienced an increase in agricultural decision-making power, though this was largely driven by providing only the female member of the household with information (rather than jointly).

Three studies also demonstrate that bundling agricultural advisory services with other offerings can improve outcomes given the multidimensional constraints that women small-scale farmers face [19], [39], [40], . In another study in Bangladesh, agricultural training—focused on the cultivation of high-value crops and bundled with nutrition information and gender sensitization training—was delivered to both male and female members of farming households [40]. Receiving all three interventions together increased the number of women who felt empowered by 52 percent, which was higher than the impact of any individual intervention. Policymakers should intentionally include and target women through extension programs. Innovative approaches, like video-based learning and bundling, can be effective in empowering women to become agricultural decision-makers. Future research should focus on how the content and delivery of agricultural extension services can be made more relevant to the unique constraints that women farmers face.

Sector chair(s) or Academic lead(s)

Jeremy Magruder

Insight author(s)

Brindha Gopalakrishnan

Emily Sylvia

Abdul Latif Jameel Poverty Action Lab (J-PAL). 2023. "Improving agricultural information and extension services to increase small-scale farmer productivity." J-PAL Policy Insights. Last modified September 2023.

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1. Abate, Gashaw T., Tanguy Bernard, Simrin Makhija, and David J. Spiegelman. 2023. "Accelerating Technical Change through ICT: Evidence from a Video-Mediated Extension Experiment in Ethiopia." *World Development* 161 (January): 1–14.

Research Paper, | J-PAL Evaluation Summary

2. Bandiera, Oriana, Robin Burgess, Erika Deserranno, Ricardo Morel, Munshi Sulaiman, and Imran Rasul. 2023. "Social Incentives, Delivery Agents, and the Effectiveness of Development Interventions." *Journal of Political Economy: Microeconomics* 1, no. 1 (February): 162–224.

Research Paper, | J-PAL Evaluation Summary

3. Baul, Tushi, Dean Karlan, Kentaro Toyama, and Kathryn Vasilaky. 2022. "Improving Smallholder Agriculture via Video-Based Group Extension." *Social Science Research Network* (December).

Research Paper

4. Beaman, Lori and Andrew Dillon. 2018. "Diffusion of Agricultural Information within Social Networks: Evidence on Gender Inequalities from Mali." *Journal of Development Economics* 133 (July): 147–161.

Research Paper, | J-PAL Evaluation Summary

5. Beaman, Lori, Ariel BenYishay, Jeremy Magruder, and Ahmed Mushfiq Mobarak. 2021. "Can Network Theory-Based Targeting Increase Technology Adoption?" *American Economic Review* 111, no. 6 (June): 1918–1943.

Research Paper, | J-PAL Evaluation Summary

6. Behaghel, Luc, Jeremie Gignoux, and Karen Macours. "Social Learning in Agriculture: Does Smallholder Heterogeneity Impede Technology Diffusion in Sub-Saharan Africa?" CEPR Discussion Paper #15220, August 2020.

Discussion Paper, | J-PAL Evaluation Summary

7. BenYishay, Ariel and Ahmed Mushfiq Mobarak. 2018. "Social Learning and Incentives for Experimentation and Communication." *The Review of Economic Studies* 86, no. 3 (May): 976–1009.

Research Paper, | J-PAL Evaluation Summary

8. BenYishay, Ariel, Maria Jones, Florence Kondylis, and Ahmed Mushfiq Mobarak. 2020. "Gender Gaps in Technology Diffusion." *Journal of Development Economics* 143 (March): 1–27.

Research Paper

9. Bergquist, Lauren Falcao, Craig McIntosh, and Meredith Startz. "Search Costs, Intermediation, and Trade: Experimental Evidence from Ugandan Agricultural Markets." Working Paper, August 2021.

Working Paper, | J-PAL Evaluation Summary

10. Bridle, Leah, Jeremy Magruder, Craig McIntosh, and Tavneet Suri. "Experimental Insights on the Constraints to Agricultural Technology Adoption." Working Paper, March 2019.

Working Paper, | B, log

11. Camacho, Adriana and Emily Conover. 2019. "The Impact of Receiving SMS Price and Weather Information on Small Scale Farmers in Colombia." *World Development* 123 (November): 1–11.

Research Paper

12. Casaburi, Lorenzo, Michael Kremer, Sendhil Mullainathan, and Ravindra Ramrattan. “Harnessing ICT to Increase Agricultural Production: Evidence from Kenya.” Working Paper, September 2019.

Working Paper, | J-PAL Evaluation Summary

13. Chandrasekhar, Arun G., Esther Duflo, Michael Kremer, João F. Pugliese, Jonathan Robinson, and Frank Schilbach. 2022. “Blue Spoons: Sparking Communication About Appropriate Technology Use.” NBER Working Paper #30423, September 2022.

Research Paper, | J-PAL Evaluation Summary

14. Cole, Shawn A. and A. Nilesh Fernando. 2020. “‘Mobile’izing Agricultural Advice: Technology Adoption, Diffusion and Sustainability.” *The Economic Journal* 131, no. 633 (July): 192–219.

Research Paper, | J-PAL Evaluation Summary

15. Cole, Shawn A. and Garima Sharma. 2018. "The Promise and Challenges of Implementing ICT in Indian Agriculture." *India Policy Forum* 14, no. 1: 173–240. Research paper

16. Cole, Shawn, Tomoko Harigaya, Grady Killeen, and Aparna Krishna. 2025. "Using Satellites and Phones to Evaluate and Promote Agricultural Technology Adoption: Evidence from Smallholder Farms in India." *Journal of Development Economics,* (September). Research Paper.

17. Dar, Manzoor, Alain de Janvry, Kyle Emerick, Elisabeth Sadoulet, and Eleanor Wiseman. “Private Input Suppliers as Information Agents for Technology Adoption in Agriculture.” *American Economic Journal: Applied Economics* (forthcoming).

Working Paper, | J-PAL Evaluation Summary

18. Deutschmann, Joshua W., Maya Duru, Kim Siegal, and Emilia Tjernström. 2025. “Relaxing Multiple Agricultural Productivity Constraints at Scale.” *Journal of Development Economics, (May).*

Research Paper

19. Donato, Katherine, Margaret McConnell, Dan Han, Nilupa S. Gunaratna, Masresha Tessema, Hugo De Groote, and Jessica Cohen. 2020. “Behavioural Insights to Support Increased Consumption of Quality Protein Maize by Young Children: A Cluster Randomised Trial in Ethiopia.” *BMJ Global Health* 5, no. 12 (December): 1–11.

Research Paper, | J-PAL Evaluation Summary

20. Duflo, Esther, Daniel Keniston, Tavneet Suri, and Céline Zipfel. “Chat over Coffee? Diffusion of Agronomic Practices and Markey Spillovers in Rwanda.” NBER Working Paper #31368, June 2023.

Research Paper

21. Duflo, Esther, Michael Kremer, and Jonathan Robinson. 2008. “How High Are Rates of Return to Fertilizer? Evidence from Field Experiments in Kenya.” *The American Economic Review* 98, no. 2 (May): 482–488.

Research Paper, | J-PAL Evaluation Summary

22. Dzanku, Fred Mawunyo, Robert Darko Osei, Paul Kwame Nkegbe, and Isaac Osei-Akoto. 2022. "Information Delivery Channels and Agricultural Technology Uptake: Experimental Evidence from Ghana." *The European Review of Agricultural Economics* 49, no. 1 (January): 82–120.

Research Paper

23. Emerick, Kyle and Manzoor H. Dar. 2021. “Farmer Field Days and Demonstrator Selection for Increasing Technology Adoption.” *The Review of Economics and Statistics* 103, no. 4 (September): 680–693.

Research Paper, | J-PAL Evaluation Summary

24. Fabregas, Raissa, Michael Kramer, Jonathan Robinson, and Frank Schilbach. "The Value of Local Agricultural Information: Evidence from Kenya." Working Paper, November 2019.

Working Paper, | J-PAL Evaluation Summary

25. Fabregas, Raissa, Michael Kramer, Matthew Lowes, Robert On, and Giulia Zane. 2025. "Digital Information Provision and Behavior Change: Lessons from Six Experiments in East Africa." *American Economic Journal: Applied Economics*, no. 1 (January): 527–566.

Research Paper

26. Fafchamps, Marcel, Asad Islam, Abdul Malek, and Debayan Pakrashi. 2021. “Mobilizing P2P Diffusion for New Agricultural Practices: Experimental Evidence from Bangladesh.” *The World Bank Economic Review* 35, no. 4 (November): 1076–1101.

Research Paper, | J-PAL Evaluation Summary

27. Fafchamps, Marcel and Bart Minten. 2012. "Impact of SMS-Based Agricultural Information on Indian Farmers." *The World Bank Economic Review* 26, no. 3 (February): 383–414.

Research Paper , | J-PAL Evaluation Summary

28. Fernando, A. Nilesh. 2021. “Seeking the Treated: The Impact of Mobile Extension on Farmer Information Exchange in India.” *Journal of Development Economics* 153 (November): 1–17.

Research Paper

29. Goyal, Aparajita. 2010. "Information, Direct Access to Farmers, and Rural Market Performance in Central India." *American Economic Journal: Applied Economics* 2 no. 3 (July): 22–45.

Research Paper

30. Hanna, Rema, Sendhil Mullainathan, and Joshua Schwartzstein. 2014. “Learning Through Noticing: Theory and Evidence from a Field Experiment.” *The Quarterly Journal of Economics* 129 (3): 1311–1353.

Research Paper, | J-PAL Evaluation Summary

31. Hörner, Denise, Adrien Bouguen, Markus Frölich, and Meike Wollni. "The Effects of Decentralized and Video-Based Extension on the Adoption of Integrated Soil Fertility Management: Experimental Evidence from Ethiopia." NBER Working Paper #26052, July 2019.

Research Paper , | J-PAL Evaluation Summary

32. Islam, Mahnaz and Sabrin Beg. 2021. “‘Rule-of-Thumb’ Instructions to Improve Fertilizer Management: Experimental Evidence from Bangladesh.” *Economic Development and Cultural Change* 70, no. 1: 237–281.

Research Paper, | J-PAL Evaluation Summary

33. Jones, Maria and Florence Kondylis. 2018. “Does Feedback Matter? Evidence from Agricultural Services.” *Journal of Development Economics* 131 (March): 28–41.

Research Paper

34. Kondylis, Florence, Valerie Mueller, and Jessica Zhu. 2017. “Seeing Is Believing? Evidence from an Extension Network Experiment.” *Journal of Development Economics* 125 (March): 1–20.

Research Paper

35. Lecoutere, Els, David J. Spielman, Bjorn Van Campenhout. 2023. “Empowering Women through Targeting Information or Role Models: Evidence from an Experiment In Agricultural Extension in Uganda.” *World Development*, 167: 1–13.

Research Paper

36. Masset, Edoardo and Lawrence Haddad. 2015. "Does Beneficiary Farmer Feedback Improve Project Performance? An Impact Study of a Participatory Monitoring Intervention in Mindanao, Philippines." *Journal of Development Studies* 51, no. 3: 287–304.

Research Paper

37. Mitra, Sandip, Dilip Mookherjee, Maximo Torero, and Sujata Visaria. 2018. "Asymmetric Information and Middleman Margins: An Experiment with Indian Potato Farmers." *The Review of Economics and Statistics* 100, no. 1: 1–13.

Research Paper

38. Nakasone, Eduardo. “The Role of Price Information in Agricultural Markets: Experimental Evidence from Rural Peru.” Working Paper, October 2013.

39. Olney, Deanna K., Lilia Bliznashka, Abdoulaye Pedehombga, Andrew Dillon, Marie T. Ruel, and Jessica Heckert. 2016. “A 2-Year Integrated Agriculture and Nutrition Program Targeted to Mothers of Young Children in Burkina Faso Reduces Underweight among Mothers and Increases Their Empowerment: A Cluster-Randomized Controlled Trial.” *The Journal of Nutrition* 146, no. 5 (April): 1109–17.

Research Paper

40. Quisumbing, Agnes, Akhter Ahmed, John Hoddinott, Audrey Pereira, and Shalini Roy. 2021. “Designing for Empowerment Impact in Agricultural Development Projects: Experimental Evidence from the Agriculture, Nutrition, and Gender Linkages (Angel) Project in Bangladesh.” *World Development* 146

(October): 1–24.

Research Paper

41. Soldani, Emilia, Nicole Hildebrandt, Yaw Nyarko, and Giorgia Romagnoli. 2023. "Price Information, Inter-Village Networks, and 'Bargaining Spillovers': Experimental Evidence from Ghana." *Journal of Development Economics* (May): 1–63.

Research Paper

42. Suri, Tavneet and Rachel Glennerster. "Agricultural Technology and Nutrition: The Impacts of NERICA Rice in Sierra Leone." Working Paper, March 2016.

Brief, | J-PAL Evaluation Summary

43. Tjernström, Emilia. "Learning from Others in Heterogeneous Environments." Working Paper, April 2017.

Working Paper, | J-PAL Evaluation Summary

44. Van Campenhout, Bjorn, David J. Spielman, and Els Lecoutere. 2020. "Information and Communication Technologies to Provide Agricultural Advice to Smallholder Farmers: Experimental Evidence from Uganda." *American Journal of Agricultural Economics* 101, no. 1: 317–37.

Research Paper

45. Wiseman, Eleanor. "Border Trade and Information Frictions: Evidence from Informal Traders in Kenya." Working Paper, January 2023.

Working Paper, | J-PAL Evaluation Summary