Seed Fairs for the Diffusion of New Crop Varieties in India

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Sector(s): Agriculture

Location: India

Sample: 100 villages

Initiative(s): Agricultural Technology Adoption Initiative (ATAI)

Target group: Farmers

Outcome of interest: Technology adoption

Intervention type: Digital and mobile Fertilizer and agricultural inputs Improved seeds Social networks

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Research Papers: Farmer Field Days and Demonstrator Selection for Increasing Technology Adoption

Partner organization(s): Gates Foundation, UK International Development

Information and communications about technology may help improve rural farmers' access to markets for new inputs, such as improved seeds. Researchers conducted a randomized evaluation to test whether organizing short learning sessions for villagers about early adopters' use of a flood-tolerant rice seed variety, Swarna-Sub1, impacted other farmers' adoption of it. These "farmer field days" were a cost-effective strategy to improve farmers' learning about Swarna-Sub1 and increased their take-up of Swarna-Sub1 in the next planting season by 40 percent.

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New agricultural technologies, such as high-yielding or flood-tolerant crop varieties, offer the promise of improving small-scale farmers' productivity and welfare, particularly in the face of a growing risk of weather shocks. Improved rice varieties that withstand prolonged submergence, for example, have been shown to improve yields during flooding, without reducing yields in non-flood years. They can lead to welfare gains by incentivizing farmers to also take up complementary investments, like fertilizer. However, farmers' adoption of these seeds has been low, in part due to a lack of available information about their benefits compared to existing seeds. Studies have shown that peer-to-peer information sharing can be a useful source for learning about new agricultural technologies. Since farmers do not necessarily experience personal benefits from sharing their information, this type of learning may not organically happen. Can organizing short learning sessions about early seed adopters' experiences with an improved rice variety increase the spread of information about the seed variety, and thus farmers' adoption?

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Many areas in South Asia are affected by flooding during the wet season, which negatively affects rice yields. In flood-prone Odisha, a state in northeast India, 70 percent of people rely on agriculture and animal husbandry as a source of income, and rice covers 69 percent of cultivated land. During the wet season, farmers plant rice in June and harvest between late November to December. Swarna-Sub1 is a flood-tolerant rice seed variety that was released into the market in 2009 and is genetically similar to a commonly-planted rice variety, Swarna. Swarna-Sub1 provides proven flood tolerance without reducing farmers' yields in non-flood seasons. Other research has shown that, when adopted, farmers experienced welfare gains because knowing that they would not lose their crops to seasonal flooding encouraged them to invest more in their production.

Three-quarters of rice-farming households eligible to participate in the evaluation cultivated Swarna. While the majority (nearly 80 percent) of households already knew about Swarna-Sub1, only two farmers surveyed in the beginning of the study had ever used Swarna-Sub1. Around one third of participating farmers belonged to a scheduled caste, which is the most socially and economically disadvantaged social group, and about two-thirds of households were eligible for social assistance because their household income was below the poverty line (US$2.15 per day).



Rice field in India. Photo: Putul Gupta | J-PAL/IPA

Putul Gupta

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In collaboration with a local NGO, researchers conducted a randomized evaluation to test whether short, in-person learning sessions about early adopters' use of Swarna-Sub1 impacted other farmers' knowledge and adoption of the new seed variety.

To develop a small group of early adopters in each of the 100 study villages, researchers delivered 25 kilograms of Swarna-Sub1 to each village in May 2014. To understand whether the profile and selection of an early adopter mattered in whether farmers planted the new seed, five-kilogram packets (enough seed to cultivate 1–2 acres) were distributed through one of three ways:

1. *Locally-elected member (33 villages):* NGO staff delivered the seed packets to locally-elected village officials, who chose how to distribute the packets amongst villagers.
2. *Village meeting (34 villages):* NGO staff visited each village and informed members that they would be holding a short meeting to share information about a new flood-tolerant rice variety. During the meeting, the staff presented the Swarna-Sub1 packets to villagers and described the variety's benefits over the traditional Swarna variety. Villagers jointly decided who would take the packets and cultivate the new variety.
3. *Self-help group (SHG) (33 villages):* Researchers followed the same approach as the village meeting but among women's self-help groups (SHG). Only SHG members were invited to attend and have the opportunity to receive the seed packets.

The selected early adopters planted the seeds during the 2014 season, and NGO staff returned to all villages part way through the season—in September—to collect information about early adopters' demographics, how much land they planted with Swarna-Sub1, and how the crop was performing. In November, which is late enough in the wet season that the early adopters had gained experience with the seeds but the plants had not yet been harvested, half of the 100 villages were randomly assigned to receive farmer field days and the other half served as the comparison group. Field days consisted of two-hour sessions in which NGO trainers described Swarna-Sub1's benefits and similarities to Swarna, and gave practical advice on how to cultivate Swarna-Sub1. Early adopters spoke about their experiences using the seeds and answered questions. Attendees then had the chance to observe Swarna-Sub1 in the field.

After the field days, from February to March 2015, non-early adopter farmers were surveyed about their knowledge of Swarna-Sub1 and its benefits and planting characteristics. In May, immediately prior to the next growing season, each farmer who had been surveyed was again visited at their homes by NGO staff and offered Swarna-Sub1 for purchase, to measure farmers' interest in switching from the traditional Swarna variety to Swarna-Sub1. Seeds were sold at a price comparable to the existing market value of Swarna-Sub1.

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Farmer field days were a cost-effective strategy that improved farmers' take-up of Swarna-Sub1 in the next planting season.

Learning about Swarna-Sub1: While farmers' existing knowledge of Swarna-Sub1 was high, field days led to small increases on some components of how to cultivate the variety. Farmers with access to field days were 55 percent more likely to know how long Swarna-Sub1 seeds withstand flooding, for example, but they only performed about 6 percent better overall on a knowledge survey than did farmers in comparison villages.

Adoption of Swarna-Sub1: About 59 percent of rice-farming households attended the field days, and field days increased farmers' adoption by 41 percent compared to an average adoption rate of 29.7 percent in comparison villages (a 12 percentage point increase). Almost all farmers that purchased seeds bought one or two 5-kilogram packages of seeds (equivalent to around 10–40 percent of their land), suggesting that field days helped spur purchases by farmers who were interested in trying out smaller amounts of Swarna-Sub1. Purchases of one 5-kilogram package increased by 59 percent, while purchases of two or more packages rose by 25 percent. Field days had the biggest impact on the most marginalized farmers. Households belonging to scheduled castes and those below the poverty line were more likely than other groups to purchase Swarna-Sub1 seeds after attending a field day.

Early adopter identity: Using different methods to select early adopters changed the composition of who was selected to be an early adopter, including by reducing favoritism amongst local village officials through the participatory village meetings. However,

field days' success was not impacted by this difference. Specifically, there was no difference in the level of Swarna-Sub1 take-up between the three groups during the next season, suggesting that, in this context, farmers learned just as well when early adopters were selected by their peers than when they were chosen by village officials.

Cost analysis: The costs associated with delivering field days was about US$200 per village, while the benefits accrued in villages where farmers adopted Swarna-Sub1 were about US$261.00. Using estimates from existing research on Swarna-Sub1, researchers estimated that farmer field days were cost effective after only a single growing season, provided seeds were available at local markets. While further research is needed to know whether the same cost ratio holds if this strategy is scaled up, researchers suggest that farmers' ability to reuse and trade Swarna-Sub1 seeds across seasons is a positive sign that the benefits extend into future growing seasons.

Taken together, these results show that simple interventions to help farmers learn from each other are a promising avenue to boost technology adoption. Future research could focus on extension programs that combine such interventions with traditional extension models of social learning from lead farmers.