

The Effects of Varying Input Market Timing and Access to Credit on Farmers' Agricultural Investment in Mali

Researchers:

Andrew Dillon

Nicoló Tomaselli

Sector(s): Agriculture**Fieldwork:** Innovations for Poverty Action (IPA)**Sample:** 140 villages (approximately 7,000 households)**Initiative(s):** Agricultural Technology Adoption Initiative**Target group:** Farmers Agro-dealers**Outcome of interest:** Technology adoption Productivity**Intervention type:** Commitment devices Credit Fertilizer and agricultural inputs**AEA RCT registration number:** AEARCTR-0002032**Partner organization(s):** Soro Yiriwaso, USAID Development Innovation Ventures, National Union of the Agro-Input Dealers (UNRIA)

In many parts of sub-Saharan Africa, few farmers use inputs like fertilizer to increase farm productivity, and when they do, many use too few inputs to maximize productivity. Among other factors like access to credit and high transaction costs, the timing of input availability affects farmers' demand for agricultural inputs. In Mali, researchers conducted a randomized evaluation to test how the design and timing of a physical market for inputs (village input fairs) with varying levels of credit access affected farmers' investment decisions. They found that farmer investment and input adoption increase when village input fairs are organized just after the previous harvest, regardless of credit offers. These effects are similar to those when input fairs are organized at planting time with credit offers, suggesting that the timing of market formation has an effect similar to that of loosening liquidity constraints during planting.

Policy issue

In many parts of sub-Saharan Africa, few farmers use inputs, like fertilizer, to increase farm productivity, and when they do, many farmers use too few inputs to maximize productivity. Inputs can be costly, and farmers often have to travel long distances to reach markets to purchase them. Among other factors like access to credit, the timing of input availability also affects farmers' demand for agricultural inputs. In addition to constraints that farmers face, agro-dealers, whose business is to sell agricultural inputs to farmers, also face challenges. Specifically, they face high transportation costs to reach remote areas and lack information about farmers' demand for their products.

One way to support both farmers and agro-dealers is through Village Input Fairs (VIF). VIFs are one-day markets that allow farmers to buy agricultural inputs from agro-dealers at a central location in a village, rather than having farmers travel to the closest city as is the norm when traditional extension agents organize input markets. Typically, markets are organized during the planting season when farmers need to use inputs to plant their crops but are in general more cash constrained given the

duration of time since selling their last harvest. Could varying the timing of the input market help alleviate farmers' cash constraints and affect farmers' likelihood of purchasing and using more productive inputs?

Context of the evaluation

Agriculture is Mali's main source of economic activity, despite the fact that 65 percent of the land is desert or semidesert.¹ Sixty percent of people work in agriculture and roughly half the population lives in poverty.² Households typically depend on agriculture for their livelihoods, their work is labor-intensive, and they have limited access to agricultural inputs like equipment, water, labor, seeds, fertilizers, or insecticides. Transaction costs are the main barrier to input purchase and use, exacerbated by the cost of transporting inputs to rural markets, which accounts for around one-third of the total price. In addition, agro-dealers, credit providers, and farmers are often unable to connect at the times when farmers need to be able to access markets to purchase inputs. For example, 70 percent of small-scale farmers participating in this evaluation reported that they did not have access to an agro-dealer in their village in the year prior to the study.

This study was conducted among rural households in the Sahel region of southern Mali. Farmers in this region mainly produce millet, rice, and cotton among other crops, and cultivate 5 to 7 plots of land approximately between 1.5 to 2 hectares each. Although Soro Yiriwaso, a microfinance institutional that engages in agricultural lending, has operated in Mali for over twenty years, farmers have limited access to credit because they often lack the collateral necessary to take out loans. The National Union of the Agro-Input Dealers (UNRIA) is the primary national association of agro-dealers that provides access to inputs—including fertilizer, improved seeds, pesticides, and equipment—for small-scale famers and plays an active role in agricultural policy.

Details of the intervention

Researchers collaborated with Soro Yiriwaso, UNRIA, and Innovations for Poverty Action to conduct a randomized evaluation to test the impact of varying contract terms of input purchases and access to credit on farmers' decisions to buy and use inputs at village input fairs (VIFs). Researchers randomly assigned 140 villages to one of seven groups, comprising twenty villages each. The groups varied by the timing of agricultural input fairs, the up-front payment required, and access to credit.

UNRIA and Soro Yiriwaso organized an input fair in six out of the seven groups. The remaining group served as a comparison group and did not host an input fair. At the village input fairs, participating farmers could place orders for agricultural inputs, such as fertilizer and agro-chemicals, from agro-dealers. Researchers varied the timing of the input fairs, either after the harvest in January or at the start of the planting season in June. Agro-dealers then delivered the purchased inputs to farmers at the beginning of the planting season.

Of the six groups that hosted VIFs, farmers in three were offered credit by Soro Yiriwaso at the input fair. When the VIF was organized during the post-harvest season, farmers were required to pay an up-front deposit as a percentage of their purchase order, which acted as a commitment mechanism to secure the inputs. Farmers in one group were asked to make a 10 percent deposit on their purchase, a "soft" commitment, and farmers in another were asked to make a 50 percent deposit, a "hard" commitment. Farmers were required to pay the remaining balance at the time the agro-dealers delivered the inputs in June. If farmers reneged on their purchase, the deposit paid at the VIF was given to the agro-dealer.

The full breakdown of the groups was as follows:

Figure 1 .

	Post-harvest season VIF		Planting Season VIF	No VIF
	10 percent deposit	50 percent deposit	No deposit	No deposit
Credit	Group 1	Group 3	Group 5	
No Credit	Group 2	Group 4	Group 6	Group 7

Results and policy lessons

Among the various VIF models, those that were organized during the planting season had greater participation among farmers than at VIFs organized after the harvest. However, when farmers were offered credit and required to make a “soft” commitment payment at the VIFs organized after the harvest, their participation in the VIF increased and they made larger input purchases.

Purchase of inputs: More farmers purchased inputs at VIFs that were organized at the time of planting than at fairs organized earlier, after the previous harvest. Specifically, 71.1 percent of farmers in group 5 made a purchase, while between 26.6 percent and 45.3 percent of farmers in groups 1–4 made an input purchase at the VIF. Researchers explain that markets organized just after the harvest required more trust between agro-dealers and farmers relative to markets organized during planting. This resulted in lower participation because contracts were based on a commitment to provide inputs when planting began the following season rather than allowing farmers to retrieve the inputs at the point of transaction. Among the fairs organized in the post-harvest season, farmer participation was highest in the VIF where farmers were offered credit and required to make a “soft” commitment (group 1), at 45.3 percent. The combination of a “soft” commitment with access to credit increased the likelihood that farmers purchased inputs.

Although more farmers bought inputs at fairs organized during planting, farmers made larger purchases at fairs organized in the post-harvest season, particularly with access to credit with the 10 percent deposit requirement. The average transaction amount was XOF 25,218 higher (around US\$45) in group 1 compared to group 2, which did not receive access to credit. This is equivalent to a difference of around 100 kilograms of fertilizer (a 104 percentage point increase). This suggests that credit expanded the purchasing power of farmers, allowing them to make a bigger upfront investment. In contrast, farmers that were offered credit but required to make a 50 percent deposit purchased less fertilizer. Farmers in group 3 had the lowest average transaction amount of XOF 3,529 (US\$6). Researchers posit that the high up-front deposit reduced farmers’ demand so much that the additional effect of credit was neutralized.

Fertilizer use: Whether organized during planting or after the harvest, village input fairs led farmers to use more fertilizer. Farmers who participated in the “soft” commitment fairs organized after the harvest (group 2) used 14.2 percentage points more fertilizer relative to the comparison group (a 17.7 percent increase). Farmers in groups 5 and 6, where the fairs were organized at planting with no deposit requirements, also used between 8.2 and 14 percentage points more fertilizer, respectively, relative to farmers in the comparison group (a 10.2 and 17.5 percent increase respectively).

Agricultural productivity: Agricultural yields increased for farmers in all groups that were offered a VIF (groups 1–6). The increase in yields ranged between 1.25 kg/hectare and 1.819 kg/hectare of the comparison group’s yields, which were on average 10.685 kg/hectare (between a 11 to 27 percent increase).

Taken together, VIFs spurred farmers’ investment in agricultural inputs, and increased farmers’ use of productive inputs.

Informed by the results of this study, researchers are scaling a version of the VIF in Mali. The bundle includes the village input fair organized after the harvest, with the 10 percent commitment device, and access to credit. Researchers are conducting a randomized evaluation to test a market-based approach to scaling up this bundled VIF model on the purchase and use of inputs by small-scale farmers as well as the profitability of agro-dealers.

1. United States Agency for International Development, Mali Country Profile, February 2019.
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2. United Nations, Accelerating global actions for a world without poverty: the experience of Mali, March 2020,
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