Vouchers to Help Farmers Access Rental Equipment Markets in India

Sector(s): Agriculture, Labor Markets

J-PAL office: J-PAL South Asia

Location: Punjab, India

Sample: 7,100 farmers across 190 villages

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

Target group: Farmers

Outcome of interest: Market access Technology adoption

Intervention type: Fertilizer and agricultural inputs Vouchers

Données: http://www.nber.org/data-appendix/w29061

Research Papers: Mechanizing Agriculture

Partner organization(s): International Growth Center (IGC), Private Enterprise Development in Low-Income Countries (PEDL), Gates Foundation, United Kingdom Foreign, Commonwealth & Development Office

In many low- and middle-income countries, mechanizing farm activity could boost productivity, but accessing equipment can be difficult for small-scale farmers. They primarily depend on household members and some hired workers for labor-intensive activities during planting and harvest. Partnering with one of the biggest providers of rental agricultural equipment in India, researchers conducted a randomized evaluation to test the impact of providing agricultural equipment vouchers and cash transfers on farmers' use of machines, their decision to reallocate household labor or hire outside laborers, and their income. Farmers were more likely to rent agricultural equipment and hire workers for agricultural activities, while family members worked less in agriculture.

Policy issue

In low- and middle-income countries, most farms are small-scale operations managed by family members, and much of the work is done by hand rather than with machines. Machinery can increase farm productivity and free workers to move to other industries, however, small-scale farmers in low- and middle- income countries do not have the capital to purchase machinery. Rental markets are a viable alternative for farmers to access equipment, however, there is little evidence on whether access to formal machine rentals increases mechanization and overall well-being. Could subsidizing formal machine rentals increase mechanization and allow farmers to reallocate farm labor to other activities to increase their incomes?

Context of the evaluation

In India, approximately 44 percent of the workforce is in agriculture, yet around 80 percent of farmers' land holdings are two hectares or less. Agricultural productivity is therefore important to ensure small-scale farmers' livelihoods across India. Farmers primarily rent equipment, like tractors and rotavators, informally or through custom hiring centers (CHC) to replace some manual labor tasks that are otherwise performed by either family members or hired farm workers.

The study took place among small-scale paddy, cotton, and maize farmers in eight districts of the Indian state of Karnataka. Most farmers who participated in the study owned or worked less than four acres of land. For participating farming households, male family members mainly supervised farm labor and fertilizer application while female family members were mostly involved in sowing seeds, weeding, and transplanting and harvesting crops. About three adults lived in each household, and farmers often hired labor to assist with weeding and manure application. While 80 percent of farmers in the study reported renting some equipment, most mechanized only land preparation and not additional post-harvest activities.

Details of the intervention

Partnering with one of the largest providers of rental agricultural equipment in India, researchers conducted a randomized evaluation to test the impact of agricultural equipment vouchers and cash transfers on farmers' use of machines, their decision to reallocate household labor or hire outside laborers, and their income. Researchers randomly assigned 190 villages, a total of about 7,100 farmers, into one of three groups:

1. *Low-intensity mechanization access (70 villages):* Thirteen farmers in each village were invited to receive a voucher worth approximately two hours of an agricultural equipment rental from a nearby rental center. Farmers with a subsidy voucher could call the nearby rental center for a discount of up to the full subsidy amount off the rental price. Farmers could redeem the vouchers throughout the agricultural season, allowing them to optimally allocate the use of equipment across agricultural processes. Vouchers could be used to rent any equipment available at the rental center, including tractors, rotavators, and cultivators. Out of the thirteen farmers, six were offered an additional cash grant of the equivalent amount [either INR 2,100 (US$23.23) or INR 3,500 (US$38.71)].
2. *High-intensity mechanization access (70 villages):* Thirty-four farmers were invited to receive the voucher. Out of these 34 farmers, sixteen were offered an additional cash grant of equivalent value.
3. *Comparison group (60 villages)*: Farmers were offered neither a voucher nor a cash grant.

The study took place between June and July 2019 and March 2020. For safety reasons during the Covid-19 pandemic, only 5,500 households were asked to complete the final phone survey as opposed to the 7,100 farmers who completed the survey at the beginning of the study. To identify the impacts on labor, researchers considered four types of labor: Male household labor, female household labor, hired male labor, and hired female labor.

Results and policy lessons

Farmers who were offered the rental voucher were more likely to rent agricultural equipment to prepare their land prior to planting. Family members of farmers offered vouchers also worked less while hired labor remained constant for men and declined for women.

Rented agricultural equipment: The rental voucher increased the likelihood that farmers rented equipment by 30 percentage points relative to 11 percent of comparison households using machines (272 percent increase). Farmers who were offered the voucher increased the number of hours they rented the equipment by an average of 4.5 hours per season, or 1.4 hours per acre per season. Most farmers used the voucher to rent equipment during land preparation prior to planting crops. Researchers found no difference when delivering part of the voucher as cash, relative to delivering the entire amount as a rental subsidy.

Labor allocation: Family members of farmers offered the voucher worked less while hiring stayed the same for men and declined for women laborers. Specifically, male household labor declined by 16 percentage points (equivalent to 2.3 days of labor), and

female household labor declined by 16.6 percentage points (1.5 days of labor). In contrast, hired male labor did not change, while female hired labor declined by about 12 percentage points (4.4 days of labor). Researchers explain these differences because the tasks performed by different types of labor varied substantially, and for several tasks, gender determined who did the work. Overall, the voucher increased the ratio of hired workers to supervising labor by 6.5 percentage points (an additional 1.6 hired workers per male family member performing supervisory duties).

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