India's Rural Employment Guarantee Boosts Demand for Agricultural Technology

Anil K. Bhargava

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The Cereal Systems Initiative for South Asia (CSISA) is a research-for-development partnership implemented jointly by five CGIAR institutions – the International Maize and Wheat Improvement Center (CIMMYT), International Food Policy Research Institute (IFPRI), International Livestock Research Institute (ILRI), International Rice Research Institute (IRRI) and World Fish – in close partnership with public and private sector organizations across South Asia.

Introduction

India's rural labor force is growing rapidly, while work is scarce in rural areas and wages for the poorest have been persistently below official subsistence levels. The country's landless agricultural laborers and marginal farmers are among the poorest people in the country.

The Government of India set up the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) in 2005 to provide a safety net for unskilled workers in rural areas. The program guarantees every unskilled laborer up to 100 days of work per year at state-level minimum wages. The focus of the program is on public works to improve rural infrastructure, particularly water supplies and roads. Thus, workers are able to develop the infrastructure of their own villages and pave the way for economic growth and poverty reduction at home.

Studies have shown that MGNREGA has caused an increase in wages for these unskilled workers in the farming sector by 3-5 percent due to the increasing opportunity cost of their time. Indeed, up to 60 percent of MGNREGA's welfare impact may be due to higher agricultural wages. Women have benefited more from the program in this regard – half of all MGNREGA workers have been women and women's agricultural wages have increased by up to 8 percent, according to some studies.

Given that farmers depend on the same pool of unskilled labor that MGNREGA targets, they, too, are likely to be affected by the outcomes of the program. In particular, increases in wages of unskilled workers are likely to influence farmers' decisions on temporarily replacing workers with labor-saving agricultural technologies. Technology adoption, combined with the improvement of rural infrastructure driven by MGNREGA (particularly roads and irrigation infrastructure), is also likely to affect farmers' long-run input decisions as it alters markets for labor and water-related technologies and workers of varying skill levels.

Unintended Consequences of MGNREGA?

A recent study[1] explores these unintended consequences in detail. The study posits that, because the program focuses on employing the poorest rural workers on (mostly) irrigation-related infrastructure, the price of unskilled labor may have increased to the point where some farmers shift production practices towards labor-saving inputs and technologies and away from water-intensive ones, at least in the short run. To the extent that these inputs and technologies increase agricultural productivity, rural laborers may eventually see more skilled agricultural work available in the long run at higher wages, provided workers are able to develop their skills.

The study employed an empirical approach called Regression Discontinuity Design to evaluate the link between increases in agricultural wages and farmers' adoption of agricultural technology (Figure 1). Using a threshold model in which farm size is the cutoff for adoption has the advantage of being flexible enough to describe both large and small farm sizes, an important variable in the Indian context where the vast majority of farms are small and many technology adoption studies are done in the large-farm context only.
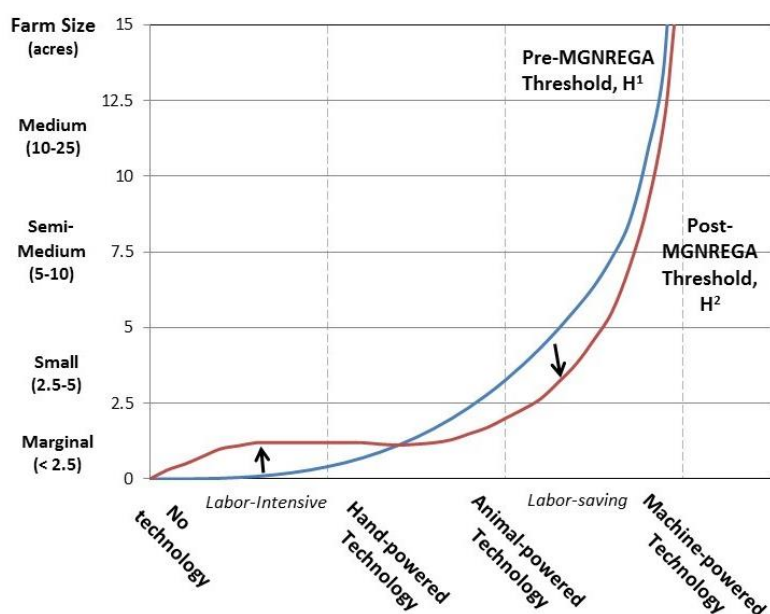

Figure 1: MGNREGA discourages use of labor-intensive technology and promotes use of basic labor-saving technology, especially on marginal and small farms

The study analyzes data from the Ministry of Rural Development's Agricultural Census Input Survey (ACIS) to assess the impact of MGNREGA on farmers' technology adoption decisions. The study takes advantage of the progressive rollout of the MGNREGA program over time and the arbitrary cutoffs for which districts implemented the program in which year.

The government rolled out MGNREGA in three phases. The 447 poorest districts in India were ranked according to the Planning Commission's Backwardness Index (BI), which is calculated using wages, productivity and other population characteristics from the early and mid-1990s. The poorest 200 districts received MGNREGA funds in 2006, while the next 130 began the program about a year-and-a-half later. The analysis compares adoption rates of the first group (those participating in MGNREGA from 2006) to the second group (those just about to start MGNREGA) in mid-2007.

Results

This study shows that the program leads small and marginal farm owners to adopt labor-saving technologies that replace labor-intensive alternatives. In other words, MGNREGA decreases the threshold farm size associated with basic labor-saving technology use, as shown in Figure 1.

The empirical analysis aims to explain the apparent 'jump' in the use of labor-saving technology shown in Figure 2, where farmers who just missed the first phase of MGNREGA implementation – those just to the right of 200 on the horizontal axis – use less labor-saving technology. Deeper analysis by technology type shows about a 10-20 percentage point decrease per district in the farms using labor-intensive technologies and a 15-25 point increase in low-powered labor-saving technologies, such as animal-operated implement.
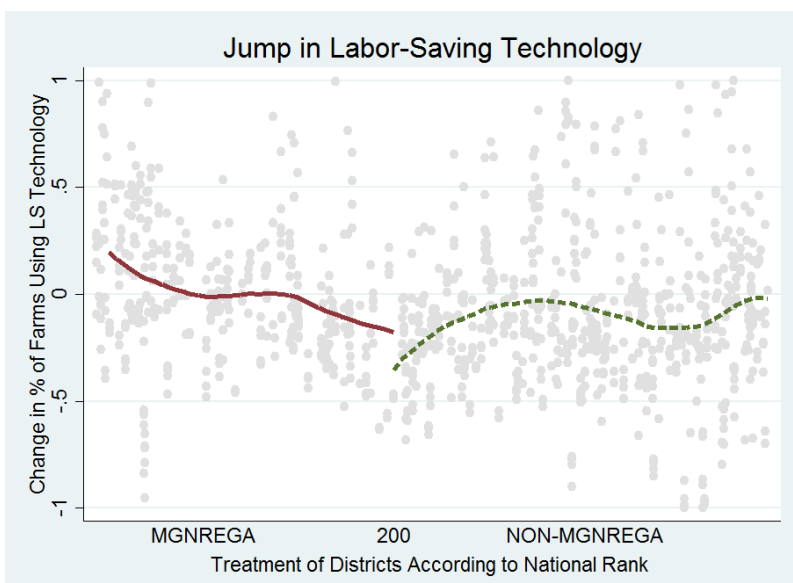
Figure 2: Farms that just made it onto the first phase of MGNREGA used significantly more labor-saving technologies than those that just missed the cut

In addition to impacts on uptake of labor-saving technology, MGNREGA's focus on providing public water infrastructure (roughly 50 percent of all public works projects) appears to be decreasing the use of diesel and electric-powered water pumps.

Policy and Research Implications

The short-term effect of MGNREGA is clear – unskilled laborers, especially women, are receiving more income and higher wages in both the public works and agricultural sector. This is evidence of a successful de facto enforcement of the minimum wage in rural areas. Farm owners, on the other hand, must deal with increases in labor costs and water availability and, thus, adapt through adjusting their use of technology.

The long-term effects of MGNREGA, however, are still uncertain. Continued reverberations between labor, technology and agricultural output in an MGNREGA rural economy can result in a win–win for farmers and laborers if the technologies adopted increase farm productivity and newly created public infrastructure increases market access. This would increase demand for labor, especially at high-skill levels. However, laborers could be worse off in a post-MGNREGA era if the quality of infrastructure remains poor and educational levels and skill development are low.

Where MGNREGA will fall between these two extremes depends on at least three factors: (1) how much adoption of new technology will lead to farm expansion or intensification; (2) whether or not farmers can easily switch back and forth between labor-saving technology and unskilled labor using custom hiring, as equilibrium agricultural wages fluctuate with and without MGNREGA; and (3) the type and quality of infrastructure developed by MGNREGA. A focus on education and agricultural skill development may augment the chances that workers are prepared for a higher-productivity agricultural sector. Future data on long-run labor use, wages, output and technology adoption patterns will give much better insight into where MGNREGA villages end up in the long run.

[1]Bhargava, A.K. (2014), The Impact of India's Rural Employment Guarantee on Demand for Agricultural Technology, IFPRI Discussion Paper no. 01381 (Washington, DC: International Food Policy Research Institute).

Author Details

Anil K. Bhargava was a Ph.D. Candidate in the Department of Agricultural and Resource Economics, University of California, Davis, during the development of this research. He is currently a Postdoctoral Research Fellow at the University of Michigan. *anilbhar@umich.edu*