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Irrigation and Agricultural Transformation in Ethiopia

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Background

Ethiopia's rivers and streams (Figure 1) and its ground water potential of 2.6 billion m3 of groundwater potential (Awulachew et al., 2008) is estimated to have a potential to irrigate 5.3 million hectares of land. So far, less than 5 percent of the potentially irrigable land is currently irrigated, exposing the country's agriculture to the vagaries of nature.

Figure 1: Rivers and streams in Ethiopia

Note: Darker blue are rivers and lighter blue are streams.

The startling divergence between irrigation potential and utilization has been the subject of policy discussions in the recent decade, which results in a significant impetus towards irrigation development in the country both in expressed commitments and actual investments. For instance, the current 10-year

development plan of the country placed irrigation as the main catalyst for accelerated agricultural transformation. In terms of investment, there are at least 13 ongoing large-scale irrigation development projects with a combined command area of more than 400,000 hectares (close to twice the current size of irrigated area by smallholder farmers). The government has also recently allowed duty-free imports of irrigation technologies to encourage small-scale irrigation development.

The questions

Given the renewed interest on irrigation development, it is high time to rigorously assess and quantify the contribution of irrigation to agricultural transformation and welfare improvements based on the realized gains on irrigated plots.

1. Does irrigation increase the adoption of productivity enhancing inputs (i.e., fertilizer and agrochemicals)?
2. Does irrigation increase smallholder farmers' market participation (as measured by share of marketed surplus)? and
3. Does irrigation increase income (as measured by consumption expenditures)?

The study generated empirical evidence for these questions by systematically comparing irrigator and non-irrigator households using representative and longitudinal household data from the four main agriculturally important regions of Ethiopia – Amhara, Oromia, SNNP, and Tigray regions.

The answers

The results show a positive and significant effects of irrigation on intensification, commercialization, and household welfare. The results show that farm households with irrigated plots: (i) use more fertilizer and agrochemicals; (ii) sold sizable share of their harvest; and (iii) spend more on food and non-food expenditures.

More specifically, the results show that

1. Irrigated plots use about 13Kgs per hectare more fertilizer because of irrigation. Out of the 29Kg difference in fertilizer use per hectare between irrigated and non-irrigated plots, about 45 percent can be ascribed to differences in irrigation use.

2. Farmers spend about 430 Birr more on agrochemicals per hectare on irrigated plots because of irrigation.

3. Irrigation increases the share of crops sold on irrigated plots by 39 percentage points compared to what would have been sold on that plot from a harvest without irrigation.

4. Irrigation leads to an increase on total daily food and non-food expenditure (by about 9 Birr) compared to the counterfactual case that these households were non-irrigators.
5. The counterfactual analysis on what would have been the effect of irrigation on currently non-irrigated plots indicate a stronger result across all outcome indicators, suggesting further the importance of expanding irrigation in accelerating agricultural transformation and welfare improvement in Ethiopia.

Additional details of the methodology, findings, and discussions of the study will be available soon in an upcoming IFPRI Discussion Paper.

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