BD56, an early-maturing and drought-tolerant variety for Bangladesh: Results from a pilot evaluation[1]

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Overview

The research team initiated a pilot evaluation of BD56 starting in the 2015 wet season. BD56 is a recently released rice variety of IRRI that offers both early maturity and drought tolerance. The pilot evaluation was carried out in 35 villages in western Bangladesh.

Results of the pilot evaluation suggest that BD56 matures earlier and changes the cropping calendar of farmers – potentially benefiting crops grown outside of the wet season. However, BD56 yields less than longer duration varieties.

The researchers are currently running a larger experiment in 256 villages in the Rajshahi division of Bangladesh. The full experiment will measure both the overall profitability impacts throughout the entire cropping year and study alternative methodologies of agricultural extension for increasing diffusion.

Background

The pilot study was carried out in 35 villages of Rajshahi and Natore districts of Bangladesh, 29 of which were assigned to "treatment" and 6 to "control".

In 29 treatment villages, five farmers were selected to receive a five kilogram (kg) minikit of BD56 for the Aman (wet) 2015 season. This seed quantity (5 kgs) is sufficient to cover about 35% of the wet season rice area.

The five treatment farmers were selected either (a) randomly (in six villages), (b) as the largest farmers (in five villages), (c) farmers that were "closest to average" in terms of several observable characteristics (in six villages), (d) farmers that were willing to return the most harvested rice in exchange for the minikit (in six villages), and (e) farmers that were voted best by other farmers in a village census carried out before the start of the pilot (a total of 145 farmers receiving minikits). In the six control villages, any farmer that would have been selected under one of the above criteria was surveyed (126 farmers). In addition, 10 non-recipients were also surveyed in 29 treatment villages to assess knowledge of BD56.

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Results

Effect on dry crop season – start date and crops

One of the main results is that BD56 shifts up the planting date for the Boro (dry) season crop. As a result of shifting planting dates, the pilot found that BD56 also changed the farmers' choice in terms of the earliest dry season crop (see Figure 1).

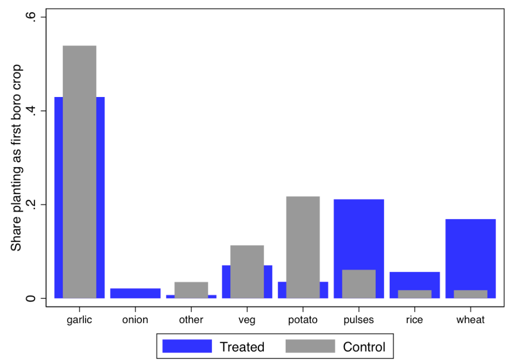

Figure 1. Distribution of first dry-season crop for treatment and control farmers

The earliest planting date for the dry season crop was approximately 5 days earlier for treatment farmers (Figure 2).

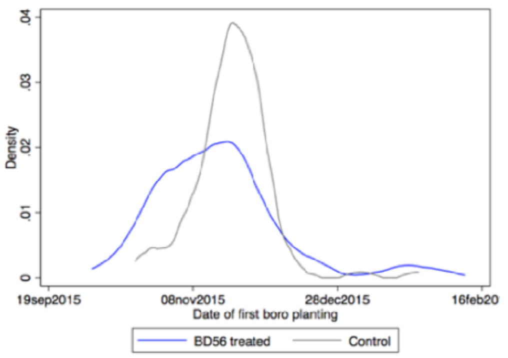

Figure 2. Kernel densities of earliest dry-season planting date, by treatment status.

That is, the average control farmer planted their first dry season crop on November 18 versus November 13 for the treatment farmers. The first boro crop was also affected (Figure 1).

Treatment farmers were more likely to start with wheat or pulses while control farmers were more likely to start with potatoes or other vegetables.

The full experiment will investigate whether these changes in behavior translate into economic gains that can offset the losses in rice yield from early maturity.

Effect on water use and yields

Other results are suggestive that BD56 required less supplemental irrigation, but yields less than longer duration varieties. The proliferation of shallow tubewells gives most farmers access to irrigation which can be used to supplement Aman season rainfall. As a result of requiring less water, the pilot suggests that BD56 reduced the number of supplemental irrigations. One benefit is reduced irrigation costs (since most water is bought).

However, rice yield during the Aman season was about 10 percent lower for treatment farmers, suggesting that BD56 offers lower yield during the Aman season relative to varieties grown by farmers. While the rice yield in treatment is lower than control, it varies by the type of farmer (one of the six types identified), and in one case, the yield is higher (for the largest farmers in treatment). Besides farmer heterogeneity, another explanation for reduced yield could be the shorter growing season for BD56.

Although BD56 likely reduces yields relative to longer duration varieties, the more important question is whether the reduced risk from drought and savings from irrigation (and other inputs) as well as shifts in dry season cropping (a third crop) more than offset these reduced yields in terms of farm profitability and household income.

Diffusion of information

The pilot found that 30 percent of villagers had knowledge of BD56 in villages where the largest farmers were chosen as demonstrators. This contrasts with only 15 percent of farmers having knowledge in villages where demonstrators were chosen randomly (Figure 3).

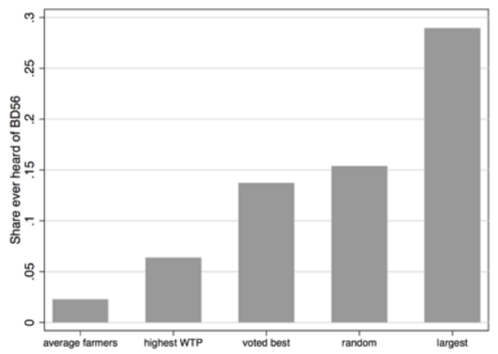

Figure 3. Share of farmers with knowledge of BD56 as a function of how demonstrators chosen.

Hence, farm size might be a useful proxy for how impactful a demonstrator is for spreading information.

As part of the full study, social network information was collected for over 20,000 farmers in all 256 villages. These complete network data will be used to determine whether large farmers are more central for diffusion and more importantly whether farm size is a simple proxy that can be used to target technology in order to maximize diffusion.

In addition to spreading information, the full experiment will explicitly measure adoption, allowing the researchers to separate effects of large farmers on spreading information versus encouraging adoption.

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