



BT BRINJAL IMPACT ASSESSMENT

Outcome Brochure

Background

Agricultural advancements have transformed Bangladesh from a food-deficit to surplus country. Now, agricultural innovations are needed to confront emerging challenges: the slowdown in agricultural growth, low agricultural diversity, the effects of climate change, and a rise in pest infestations and plant diseases, to name a few.

Brinjal (eggplant) is a high-value crop widely grown and consumed in Bangladesh. Brinjal is highly vulnerable to the fruit and shoot borer pest, and farmers spray the crop heavily with pesticides. Farmers' spending on pesticides reduces their income; and increased pesticide use heightens their risk of contracting pesticide-related illnesses, and facing related medical costs. Developing modern, pest-resistant crop varieties can help tackle these issues.

Agricultural biotechnologies such as Bt brinjal hold promise. Although the Government of Bangladesh approved cultivation of 4 Bt varieties in 2013, evidence on their potential is still lacking.

What is the Bt Brinjal Study?

In 2017–2018, IFPRI and the Government of Bangladesh partnered to estimate the impacts of Bt brinjal on production systems, producer welfare, and health outcomes.

The study was designed by IFPRI's Bangladesh Policy Research and Strategy Support Program (PRSSP), implemented by the Ministry of Agriculture under the Department of Agricultural Extension (DAE) and the Bangladesh Agricultural Research Institute (BARI), and coordinated by the Agricultural Policy Support Unit (APSU). Project partners regularly monitored the brinjal plots throughout the implementation period.

The Bt brinjal impact assessment was supported by the Government of Bangladesh, the US Agency for International Development (USAID), the CGIAR Research Program on Policies, Institutions, and Markets (PIM), and Cornell University.

Design

Using a randomized controlled trial method, IFPRI-PRSSP researchers evaluated Bt brinjal's impact, comparing 600 farmers who were willing to grow Bt brinjal (treatment) with 600 farmers who agreed to grow non-Bt brinjal of the same variety (control) in four northwestern districts: Bogra, Gaibandha, Naogaon, and Rangpur.

IFPRI's impact evaluation involved two rounds of household surveys: a baseline survey was conducted before the study farmers planted brinjal and the endline survey was conducted on the same farm households half a year later—after brinjal harvest.

Before cultivation, BARI scientists trained DAE extension officials on improved agronomic practices for growing brinjal, who then trained field-level extension agents. The stages of brinjal cultivation followed a similar schedule and timing in all districts. Apart from the seed variety, Bt and non-Bt farmers received the same inputs and training.

| Milestone | Timeline |
|---|-----------------------|
| BARI-led training for DAE | August 2017 |
| DAE-led training for sub-assistant agriculture officers | Sept 16 - 19, 2017 |
| DAE-led training for farmers | Sept 20 - Oct 1, 2017 |
| DAE monitoring training | Nov 26, 2017 |
| Baseline survey | Nov 25 - Dec 13, 2017 |
| Endline survey | July 4 - 17, 2018 |

Results

IFPRI's Bt brinjal impact assessment provides scientific evidence of the benefits of Bt brinjal cultivation in Bangladesh in terms of reduced pest infestation and pesticide use, greater production and yields, and higher revenues and net profits.

Pest infestation and pesticide use

Bt brinjal farmers significantly reduced the number of applications and amount of pesticide sprayed. Fruit and shoot borer infestation was nearly eliminated among Bt plants, whereas infestation of conventional brinjal plants dropped only slightly. Bt brinjal farmers' lower pesticide use decreased their production costs.

Production and yields

Bt brinjal yields increased by 40 percent compared with non-Bt brinjal, driven by larger harvests (up 113 kg per farmer) and less crop loss to pests and diseases.

Marketing, costs, revenues, and profits

Bt brinjal farmers' production costs declined, largely due to reduced pesticide use. Farmers' revenues increased by 55 percent, amounting to an increase in net profit of over 30,000 taka (about US\$370) per hectare.

In addition to profitability, the study also looked at market prices and traders' attitudes toward Bt brinjal, which are key for understanding the potential for technology diffusion and adoption after the study.



Market prices of brinjal varied widely during the postharvest season. Despite price fluctuations, farmers reported that they consistently sold Bt brinjal to traders at higher prices than local brinjal.

Toxicity and health

At the end of the study, Bt brinjal farmers were 6-8 percentage points less likely than conventional brinjal farmers to report symptoms consistent with pesticide poisoning. Bt brinjal farmers were also less likely to seek medical care for these symptoms, or spend money on medical treatment.

Way Forward

Bt brinjal cultivation improved brinjal productivity, farmers' income, and health outcomes among brinjal farmers in this study. The Ministry of Agriculture may use these positive results to guide its roll-out strategy for Bt brinjal cultivation in other parts of Bangladesh.



For any questions, please contact Dr. Akhter Ahmed, Bt Brinjal Project Lead, IFPRI | a.ahmed@cgiar.org

International Food Policy Research Institute, Bangladesh Office
House 10A, Road 35, Gulshan 2, Dhaka 1212, Bangladesh

February 2019