

Better Cotton Management Response

Validating the impact of Better Cotton on cotton farmers in India

Introduction

Wageningen University and Research (WUR) was commissioned to conduct a three year-long evaluation to validate the impact of Better Cotton on agrochemical use and profitability among cotton farmers participating in Better Cotton's programmes in Maharashtra and Telangana, India. The farmers for this study were selected from three project locations, Adilabad (Telangana), Nagpur, and Jalna (Maharashtra). The projects were supported by three Programme Partners, Ambuja Cement Foundation (ACF), Deshpande Foundation (DF) and World Wide Fund for Nature – India (WWF-India).

This management response is an acknowledgement of and a response to the findings of the study. It includes the next steps that Better Cotton will take to ensure that the findings of the evaluation are used to strengthen our organisational approach and contribute to continuous learning.

Better Cotton would like to thank IDH – the Sustainability Initiative, the researchers from Wageningen University and Research, and Catalyst Management Services (CMS) for their support in making this study possible. Better Cotton is also grateful to our Programme Partners (PPs), Ambuja Cement Foundation, Deshpande Foundation and World Wide Fund for Nature – India, for their commitment to learning through their participation in the study and for their support on and off field in facilitating access to farmers.

Better Cotton is encouraged to see that the results of the study support our Theory of Change and demonstrate the impact of our programmes; the findings suggest that *"between 2018-19 and 2021-22 seasons, Better Cotton contributed to an increase in the annual profitability of farmers"*.

Better Cotton is also heartened to observe that participation in the capacity building programme, organised by our Programme Partners, helped farmers reduce use of synthetic pesticides and fertilisers, which previously had been used indiscriminately.

General Assessment of the Evaluation

Methodology and Scope

Study methodology: The study collected data at three points in time during this research project. Starting in 2019, a baseline survey of farmers in the states of Maharashtra and Telangana, India, was conducted before the Better Cotton program was implemented in the region.

The researchers from WUR followed a “pipeline approach” to assess the impact of the interventions at the end of the study period by comparing two groups of farmers at several points in time:

1. A treatment group, i.e., farmers who were part of the Better Cotton programme
2. A control group, i.e., farmers who would join the Better Cotton programme after the study period. These farmers were located in different villages from the farmers in the treatment group in order to avoid the spill-over effect, but were operating in similar socio-economic, geographic, and environmental conditions.

Two econometric models were used by the researchers to account for baseline differences between the treatment and control group and to test the robustness of the results:

1. Standard difference-in-difference (DiD¹) model
2. Matching difference-in-difference (Matching DiD²) by matching Better Cotton Farmers and Control Group farmers to balance the characteristics of the two groups.

Both models estimated the impact of Better Cotton by comparing the changes experienced by Better Cotton farmers between 2018-19 and 2021-22 (three years of programme participation), with those experienced by the control group farmers in the same period. Data was gathered from households of both groups of farmers in the form of a survey.

The methodology used in the study allowed a robust assessment of the causal impact of the implementation of the Better Cotton capacity building in the programme area. We consider that the methodology used by the WUR researchers is a reliable and credible way to determine and attribute the observed impact to our programme intervention in the study region.

Adjustments in the scope of the study: The impact evaluation was initially intended to study the effects of Better Cotton interventions in the first year of programme implementation, 2019-20.

¹ DiD - To estimate the impact of Better Cotton, the researchers used the difference in difference model using the full dataset of farmers for which the data on profits was available (960 farmers from baseline and 814 farmers from endline),

² Matching DiD - The researchers only used data of the farmers that participated in both baseline and endline surveys. They matched the farmers from the 2 groups using the propensity score matching method and baseline characteristics (yield per acre, profits per acre, share of cotton in total income, share of irrigated land in total, social class, and age of the household).

Matching DiD is a more robust model than Standard DiD to detect statistical effects with a small sample size. Hence, for the endline results the researchers mainly relied on estimating the level of effect from the matching model because of the reduced sample size. The DiD model was also used by the researchers where estimates from both models were similar.

However, due to the Covid-19 pandemic, not only was the study timeline affected as it was not viable to conduct in-person surveys, but the nature of interactions used for the programme interventions for capacity building had to be swiftly shifted from in-person trainings to remote virtual outreach. Due to these extenuating factors, the scope of the evaluation was extended to include a short virtual midline assessment at the end of 2020 and an in-person endline assessment at the end of the 2021-22 cotton season. The extension of the study timeline provided an opportunity to enhance the study as it allowed optimal time to observe changes at the ultimate outcome level among farmers involved in the Better Cotton Programme over a longer period of time.

Initially the study included farmers participating under three Programme Partners, ACF, DF and WWF-India; however, the farmers in Jalna under WWF-India were not included in the endline assessment as the programme interventions in the project area were implemented at a scale smaller than required to be meaningfully included in the study.

Furthermore, there was a spill-over of programme activities into the control group in Adilabad, as the capacity building activities were expanded into the area of the control group in season 2020-21; hence, the control group in Adilabad could no longer be used as a counterfactual in the study. These farmers were then included in the study as a group who received lower-intensity treatment (i.e., one or two seasons instead of three), thus making it difficult to detect a significant impact of Better Cotton interventions in this region. Better Cotton is committed to ensuring the quality of research is maintained and will take appropriate measures to ensure that control groups in future studies are not compromised.

Time of data collection	Farmers from Better Cotton villages who joined in season 2019-20	Farmers from control villages supported in 2020-21 or not yet	Sample size (50% treatment, 50% control)
Jul.-Aug. 2019 (Baseline)	Treatment group, before support	Control group, no support	68 villages: 16 in Nagpur (Maharashtra), 18 in Jalna (Maharashtra), 34 in Adilabad (Telangana) 1,360 farmers
Nov.-Dec. 2020 (Midline)	Treatment group, after 1-season support	Control group, no support (ACF, WWF-India) or limited support (DF)	68 villages (same as baseline) 1,130 farmers
Mar.-Apr. 2022 (Endline)	Treatment group, after 3-season support	Control group, no support (ACF) or 2-season support (DF)	50 villages: 16 in Nagpur (Maharashtra) and 34 in Adilabad (Telangana) 860 farmers

Better Cotton is confident that the research study is reliable and credible due to:

- The large sample size could allow identification of outliers and enable reliable analysis and credible results.

- The tools developed for the study were relevant and adapted to the context, as the researchers engaged with the Programme Partners as well as with Better Cotton India and global teams to build a robust contextual understanding of the areas in which the study took place.
- Wageningen University & Research is a reputed research centre, with extensive experience in natural and social science, and strong expertise in sustainable agricultural development.

Findings

Improved profitability: Overall, the study indicates progress toward improved profitability among Better Cotton Farmers. There was a significant reduction in synthetic input costs in Nagpur and Adilabad. Additionally, Better Cotton farmers in Nagpur received a better price - US\$ 135/tonne, equivalent to a 13% higher price than for the control group farmers in 2021-22 season, and overall, 20% more than the price received during the baseline.

Even though Better Cotton does not interfere with pricing and does not mandate any premium for licensed Better Cotton, we are gratified to see that our supported farmers benefit from a preferential price in some of our programme areas.

There was some evidence that Better Cotton Farmers in Nagpur had better fibre quality as they adopted appropriate cotton segregation practices. Furthermore, the Better Cotton Farmers were better informed on market prices. However, the evidence was not statistically significant to prove why a better price was received. We will be conducting a qualitative study to understand the mechanism behind the price differentiation benefitting Better Cotton Farmers in Nagpur, and potentially replicate it with other Programme Partners and in other states.

Increased use of biopesticides: The increase in the use of biopesticides among 47% of Better Cotton farmers in Nagpur and 10% of Better Cotton farmers in Adilabad is a positive reflection of the training imparted by our Programme Partners who have been training farmers on alternatives to reduce the use of synthetic pesticides on farms. The lower use is reflected in the reduction in synthetic insecticide costs by 75% among Better Cotton Farmers as compared to the decrease of 47% among control group farmers.

It is encouraging to see results from this study validate the expected outcomes of the impact pathway of our Theory of Change.

Better practice adoption and knowledge: Record keeping of inputs and costs is a learning tool that supports farmers in farm planning and budgeting. The improvement of a net 29% in record keeping of inputs used and related costs among Better Cotton Farmers in Nagpur as compared to the control group is encouraging, however, we are aware that these results are limited in understanding the accuracy of the contents in records maintained by the farmers. A data quality validation process to provide better insights about records keeping at farm level is currently under development at Better Cotton.

The study results showed an increase in knowledge and adoption of Good Agricultural Practices³ among Better Cotton Farmers in Nagpur. All Better Cotton Farmers in Nagpur included in the endline assessment were reported to have used minimum personal protective equipment while spraying pesticides. Even though the endline could not attribute this increase in practice adoption to Better Cotton programmes, it is still encouraging to see that there is raised awareness and adoption among Better Cotton Farmers. Better Cotton Farmers in Nagpur were observed to practice improved level of safe storage of pesticides as compared to control group farmers.

The study reported a reduction in intercultural operations⁴ being carried out in the Better Cotton farms on soil between sowing and harvesting. A decrease in labour costs associated with intercultural operations hence was observed. However, there is not enough information about reduction in what type of intercultural practices contributed to this change among the Better Cotton Farmers. This will be discussed further between the Better Cotton programme team in India and the Programme Partners.

Low yields in season 2021-22: Besides the positive outcomes, Better Cotton also acknowledges findings observed that deviate from our Theory of Change. In the endline, 58% of all surveyed farmers reported having lower yields, but the decrease in yield among Better Cotton Farmers in Nagpur was almost 23% greater than the control farmers when compared to the baseline.

A reduction in yield was expected that season due to pest infestation problems and untimely rainfall, however there was little statistical evidence to explain the greater reduced yield among Better Cotton Farmers in Nagpur as compared to the control group of farmers in the same area. Better Cotton in collaboration with our Programme Partner will investigate this further in 2023, through a qualitative approach.

No significant change in costs: Additionally, it was surprising that there were no changes observed in costs associated with total inputs and irrigation in the endline among Better Cotton Farmers when compared to the control group farmers. There is evidence of reduction of synthetic fertiliser inputs in Nagpur and decreased synthetic insecticide costs among Better Cotton Farmers, but no significant decrease of overall input costs was observed during their first seasons of participation in the Better Cotton programme.

With a substantial increase in bioinsecticide use among Better Cotton Farmers in Nagpur, increased costs of bioinsecticides were seen due to the purchase of these inputs. The study also noted that biopesticide costs were lower where farmers were trained on homemade preparation; hence by training more farmers on preparation of biopesticides and biofertilisers the associated input costs will be addressed. Furthermore, there is a need for contextual data to understand the results of the irrigation costs in the study.

³ Farmers were evaluated on good agricultural practices such as pest monitoring, beneficial insects monitoring, crop damage monitoring, crop spacing, application of manure compost, gap filling, neem oil/extract sprays, use of border crops, pesticide group rotation, soil testing, crop rotation, cover cropping, use of trap crops, and mulching.

⁴ Intercultural operations are carried out on the soil between sowing and harvesting. Activities such as, but not limited to, weeding, fertiliser application, mulching etc. are considered to be intercultural operations.



In the midline assessment, change visible at only output level: The results from the midline assessment showed improved knowledge and record keeping among Better Cotton Farmers after the first season with Better Cotton but there was no statistically significant change at outcome level (reduction of agrochemical use, reduced input costs, increased profit) after that initial year of engagement. Better Cotton is conscious that change through programme interventions takes time. The first year of the programme implementation is an important phase for participating farmers to be introduced to the Better Cotton Standard and start building a strong knowledge base. With this understanding, the Assurance Programme evolved to include a set-up phase for new Producer Units in their first season of implementation.

Conclusion

Robust independent research such as this impact evaluation provides Better Cotton and our stakeholders credible insight into the attributable changes in the field through the implementation of the Better Cotton Standard System. The learnings from the research provide us with an opportunity to understand and reflect on our impact potential in the smallholder context in Maharashtra and, to an extent, in Telangana. Given the diverse contexts in India, we acknowledge that the study findings cannot be generalised to all Better Cotton programme locations in the country and beyond.

Furthermore, evaluations such as this study complement our annual monitoring of [Better Cotton Farmer Results](#) which provides insights to the outcome of our programme at scale, by measuring field level impacts in depth.

Better Cotton is cognizant of the fact that our programme alone does not influence change among cotton farming communities. There are several external factors that affect people in the regions where we operate. We are encouraged to learn that despite the challenges encountered in the duration of the study, the researchers were able to find empirical evidence supporting positive impacts of the implementation of the Better Cotton Standard System.

In the spirit of continuous improvement at Better Cotton, the programme team in India is already working on strengthening the capacity building approach and exploring other ways to support farmers with its Programme Partners by diversifying the range of topics that would be contextually relevant for better implementation of the programmes on field. Furthermore, the results of this study will inform the capacity building strategy in India to enhance Programme Partner and ginner engagement.

We invite anyone reading the report on the study, *Validating the impact of Better Cotton on cotton farmers in India*, to [reach out to us](#) if you have any questions or recommendations to share.