Compliance and cooperation in global value chains:

The effects of the Better Cotton Initiative on social and environmental upgrading in South Asia

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Abstract

In this article, we argue that compliance and cooperation-based approaches to sustainability in global value chains are often complementary rather than competing in nature; and that multi-stakeholder initiatives in practice use combinations of compliance and cooperation-based approaches in these chains. We study the effects of one such multi-stakeholder initiative that uses a combination of compliance and cooperation-based approaches: the Better Cotton Initiative. Our empirical analysis shows that the implementation of the BCI standard in Punjab and Sindh, Pakistan and Punjab and Gujarat, India tended to positively affect farmer productivity, their gross incomes, and resulted in the reduction of input costs related to the use of fertilizers and pesticides in most project locations. However, our analysis also suggests that there could be important un-intended consequences from BCI standard implementation with improvements in farmer productivity levels leading to a reduction in worker earnings in some instances.

Introduction

A large number of multi-stakeholder initiatives have emerged in recent years with the common purpose of improving the economic, social, and environmental conditions of local producers and workers in the Global South (Auld et al.; Guéneau, 2018; Rueda et al., 2018). Multi-stakeholder initiatives (MSIs) typically involve firms cooperating with NGOs, trade unions, and other stakeholders in developing a commonly agreed sustainability standard for a given product or a sector, working together on its implementation in particular value chains, and then monitoring whether it ultimately benefits local producers and/or workers in the Global South (Josserand et al., 2018; Riisgaard et al., 2020).

Multi-stakeholder initiatives have also witnessed the close involvement of multinational firms sourcing products and/or services in the Global South (Börjeson & Boström, 2018). Increasingly, these firms have adopted a more pro-active stance towards sustainability, incorporating it into their mainstream business practices as a way of improving their corporate branding, as a way of minimizing reputational risks (for instance, through the discovery of child or forced labor), or securing the future availability of raw materials by ensuring that they are produced in an environmentally sustainable way (Bartley, 2018; Lund-Thomsen et al., 2019).

However, does the emergence of 'corporate sustainability', or multinational firms seeking to incorporate economic, social, and environmental concerns into their core business practices, and the involvement of multinational firms in multi-stakeholder initiatives really improve the economic, social, and environmental conditions of local producers and workers in the Global South (Nelson et al. 2018)?

Scholars have argued that multinational firms typically adopt either of two paths to working with sustainability in global value chains that subsequently influences whether their sustainability efforts lead to economic, environmental, and social upgrading in the global South. One is the compliance-based paradigm which emphasizes compliance with sustainability standards by local producers as a pre-condition for market access (Locke, 2013). The other is the cooperation-based paradigm that places more emphasis on the development of long-term trading relations in global value chains, better prices for local products, and enabling local producers to comply with sustainability standard criteria through capacity building measures (Lund-Thomsen and Lindgreen, 2018). In fact, scholars have sometimes postulated that cooperation-based approaches should – at least in theory – be superior to compliance-based approaches in creating improvements in the economic, labor, and environmental conditions of local producers and workers (Locke et al., 2009). However, evidence to sustain this claim largely appears to be lacking and often compliance and cooperation-based approaches are used simultaneously by global brands in relation to their work with sustainability in global value chains (Lund-Thomsen and Lindgreen, 2014).

In this article, we make a contribution to the embryonic literature on compliance-based and cooperation-based approaches to sustainability in global value chains, arguing that these distinctions can also be usefully extended to the realm of MSIs. We suggest that cooperation-based approaches, when used in combination with aspects of the compliance-based paradigm, may in fact enable MSIs to improve the economic and environmental conditions of local producers. However, at the same time, there may also be important unintended consequences and trade-offs (Brennan & Tennant, 2018) in relation to standard implementation that can negatively affect the conditions of those laboring in local export-oriented industries in the Global South.

To illustrate these points, we will analyze one such multi-stakeholder initiative, the Better Cotton Initiative (BCI), and its field-level projects in Pakistan and India with a view to ascertaining whether its use of compliance and cooperation-based approaches make a positive difference for its intended beneficiaries – farmers and on-farm workers in both countries. For this purpose, we interviewed approximately 600, both BCI and non-BCI, farmers and on-farm workers in India and Pakistan, gathering a wide variety of quantitative and qualitative data.

Founded in 2010, the BCI is an MSI whose purpose is to "make global cotton better for the people who produce it, better for the environment it grows in, and better for the sector's future by developing Better Cotton as a sustainable mainstream commodity" (BCI, 2015). In practice, this means that the BCI should have 30% of world cotton being Better Cotton by 2020 and that five million farmers were to be involved in Better Cotton production in the same year (Zulfiqar, and Thapa, 2016).

Our article is structured as follows. First, we present the theoretical framing of our study. We then introduce the BCI and its activities in India and Pakistan before we outline the empirical findings regarding how the BCI affects the income, work, and environmental conditions of farmers and on-farm workers in India and Pakistan. Next, the discussion section highlights the implications of our study for how the compliance-based and cooperation-based paradigms towards sustainability in GVCs may positively and/or negatively affect the income, work, and environmental conditions of farmers and on-farm workers in the Global South. Finally, the conclusion includes the main findings of our article.

Which road to sustainability in global value chains - compliance or cooperation?

Global value chain scholars with an interest in sustainability issues, particularly labor rights and work conditions, have argued that there were two roads to integrating economic, social,

and environmental concerns into MNC's global value chain operations. They label the first the compliance paradigm and the second the cooperation paradigm (Locke, 2013; Lund-Thomsen and Lindgreen, 2018). In the first paradigm, MNCs typically develop a set of ethical guidelines that are to regulate the economic, social, and environmental conditions at local producer sites in the Global South. They request their suppliers to abide by these guidelines and then monitor, whether through 1st, 2nd, or 3rd party audits whether their suppliers are indeed in compliance with these guidelines. In the case of non-compliance, suppliers would typically be given a period – for instance six months – to develop and execute an improvement plan. If at the end of this period, suppliers were still not in compliance, the MNC had to sever ties with their suppliers whereas complying suppliers were to be given more orders (Locke et al., 2007; Locke et al., 2009).

The compliance-based paradigm was heavily criticized for only bringing about limited 'sustainability' improvements in the form of limiting working hours and reducing the number of industrial accidents at suppliers (Barrientos and Smith, 2007). However, it did not bring about any improvements in workers' rights to bargain collectively and join trade unions. At the same time, it left open the option for MNCs to shop around between suppliers and keep squeezing prices and operating with ever short-lead times, leading to deteriorating work and environmental conditions at supplier sites (Ponte, 2019).

As an alternative to the compliance-based paradigm the so-called cooperation paradigm was suggested. The cooperation paradigm involved MNCs engaging in long-term relationships with their suppliers, revising their purchasing practices (including providing better prices), facilitating the capacity building of local producers and workers in the sustainability criteria of their ethical guidelines, using local NGOs and trade unions to monitor the sustainability performers of local suppliers all-year round (Egels-Zandén et al., 2015). The cooperation

paradigm also involved MNCs joining multi-stakeholder initiatives to learn from each other, NGOs, and stakeholders since – according to this logic – solutions to sustainability challenges in global value chains cannot be found and executed by any stakeholder on its own (Lund-Thomsen and Lindgreen, 2018).

Just like the compliance-based paradigm, however, the cooperation paradigm has been mainly driven by MNCs, not local producers or workers. The cooperation paradigm was criticized for not fundamentally altering power dynamics in global value chains, with MNCs still reaping most of the value-added from products and services being produced in GVCs (Lund-Thomsen and Lindgreen, 2014). And the paradigm was still intended to 'convince' suppliers and workers of the necessity of MNCs' sustainability priorities, rather than centering suppliers and workers in the process of defining and implementing their own sustainability agendas (Ponte, 2019).

In practice however, aspects of the compliance and cooperation paradigms would often be combined by MNCs in their sourcing and sustainability policies and practices. For instance, an MNC might threaten to exclude local producers from the value chains due to non-compliance but simultaneously offer longer-term trade relations and support suppliers and workers with sustainability training and capacity building (Riisgaard et al., 2020).

In the case of MSIs, an interesting development has happened since aspects of both the compliance and cooperation paradigms now appear to be institutionalized in multi-stakeholder fora. Traditionally, the compliance and cooperation-based paradigms were conceived as relating to MNC-first-tier supplier relationships. However, MSIs addressing sustainable raw material production generally include MNCs with lengthy and opaque value chains linking several layers of suppliers. In those domains, tracing the raw materials from which final products are composed is very challenging (Egels-Zandén et al., 2015).

Here MSIs have a role in formulating, implementing, and monitoring the sustainability criteria and principles guiding sustainable raw material production. However, rather than focusing on the relationship between MNCs and their first-tier suppliers, these MSIs often address activities in the plantations and fields at the base of the value chain, centering on interactions between farmers and primary agricultural processors (Bartley, 2018).

Yet even at the base tiers of these value chains, MSIs may incorporate aspects of the compliance and the cooperation paradigm. For instance, licensing farmers as producers of more sustainable forms of commodities requires that they abide by principles and criteria laid down in MSIs standards. MSIs must monitor compliance and sanction non-compliance with this standard, ultimately excluding non-complying farmers from participation (and certification) (Tallontire, 2007).

Here criticism of the compliance-based paradigm may be even more acute as simply requiring farmers to comply with such sustainability criteria and principles without enabling them to do so through capacity building and awareness-raising activities might either exclude them from global value chain participation or add significant costs to their production, further marginalizing producers' value-chain position (Ponte, 2021). Hence, at the base of the value chain, there remain strong arguments for providing capacity building for farmers and on-farm workers attempting to achieve a particular sustainability standard. There are also reasonable justifications for MNCs to support their suppliers to achieve certification or licensure by picking up at least part of their certification costs. Furthermore, MNCs could become more involved in long-term, stable relationships with farmers by requiring suppliers and sub-suppliers to only procure inputs from certified or licensed producers (Riisgaard et al, 2020).

It remains an open question whether such mixtures of compliance- and cooperation-based approaches to sustainability indeed make a difference for the economic, social, and

environmental conditions of farmers and on-farm workers in affected value chains. In the next section, we introduce the BCI and detail how its standard mixes compliance- and cooperation-based approaches.

The Better Cotton Initiative

The BCI is an MSI consisting of retailers/brands, producer organizations, suppliers and manufacturers of cotton-based products (garment manufacturers, fabric mills, spinners, ginners, traders, and institutions financially supporting these organizations), civil society organizations, and associate members (any organization with an interest in sustainable cotton that does not fit into the above categories). The organization set a target of 30% of global production and five million farmers trained to the standard by 2020. As of its 2019 annual report, it accounted for 22% of global production and had engaged 2.3 million farmers (BCI, 2019a).

The membership of the BCI is quite wide-ranging. By January 2021, the initiative had a total of 2060 members including 1784 suppliers and manufacturers, 210 retailers and brands, 19 producer organizations, 31 civil society members, and 16 associate members (BCI 2021a). The BCI standard system was made up of six components. These included its Better Cotton production criteria and principles, its chain of custody guidelines, a claims framework, and result and impact component, a farmer capacity building program, and a results and impact component (BCI 2019b). The BCI's key production principles are concerned with crop protection, water stewardship, soil health, biodiversity and land responsibility, fiber quality, decent work and an effective management system (BCI, 2021c).

Of particular relevance to our discussion about compliance versus cooperation are the BCI's assurance and its farmer capacity-building programs. BCI's compliance-based aspects derive

mainly from its assurance program. It should be noted here that the founders of the BCI were highly critical of traditional compliance-based approaches to sustainability in global value chains. Hence, they insisted on using the word verification rather than auditing and that verification was supposed to help farmers learn and improve their sustainability performance, rather than simply complying with some externally determined sustainability principles. This also involved helping or enabling farmers to comply with the BCI production principles and criteria through sustained farmer capacity building, for which BCI's brand members are expected to pay. Hence, BCI had a strong tilt towards cooperation-based approaches to value chain sustainability at its inception.

During our fieldwork in 2014-2016, the BCI's assurance program made a distinction between a) smallholders, b) medium farms; and c) large farms as they had different production methods and employed different workforces.[1] The BCI further divided smallholders and medium farms into the category of producer units which is a group of smallholders or medium farms that participate in the BCI program through a group assurance model. The assurance process took place on an individual basis for large farms. Moreover, smallholders were also organized into so-called learning groups. For farmers to be licensed to grow Better Cotton, they had to meet a set of minimum requirements. These included rules on reporting on results indicators, management criteria, and minimum production criteria. The latter include a globally consistent baseline for more sustainable cotton production. The purpose was to make certain Better Cotton had clearly defined standards for training, record keeping, decent work, water management, pesticide use, and a host of other factors. Improvement requirements were intended to encourage farmers to further develop sustainable practices. Farmers also responded to a questionnaire and were scored based on their answers. Farmers' results on both minimum and

[1] The BCI assurance program has since been updated in the current BCI Assurance Model version 4.0 but it still maintains this categorization of farmers (BCI, 2021b).

improvement requirements make up the Better Cotton Performance Scale. Each different farmer category's results are grouped into different bands of performance levels, with high-scoring farmers rewarded with extended Better Cotton license periods. To promote credibility, the Assurance Program uses three complementary mechanisms: a) self-assessment at Producer Unit level (for smallholders and medium farms) or individual level for large farms, b) 2nd Party Credibility Checks (by the BCI and/or partners) and c) 3rd Party verification (by independent verifiers) (Lund-Thomsen et al. 2018).

Whereas the BCI's compliance-based approach – reflected in its assurance program – was intended to ensure the standard's credibility, the cooperation-based approach exemplified in its farmer capacity building program was largely intended to support BCI farmers' compliance (Riisgaard et al., 2020). Central to the farmer capacity building program were (and still are) were the BCI's Implementing Partners. These were organizations that worked with cotton farmers to help them produce and sell Better Cotton. There were no restrictions on the types of organizations that could be implementing partners, but – in the context of this study – the BCI was working with NGOs, textile suppliers, and corporate foundations. Since the BCI (or MNC members of the BCI) did not train farmers directly, the work of implementing partners was critical to achieving the BCI's goals. In order to increase the capacity of implementing partners and the credibility of the BCI, the organization made sure that (i) implementing partners went through a consistent endorsement process; (ii) that implementing partners were involved in a train the trainer program for these partners on how to grow Better Cotton. Moreover, the performance of implementing partners was regularly monitored. Finally, best practices were shared between implementing partners with the aim of fostering joint learning. In each country, the BCI insisted that implementing partners should develop national guidance material in order to provide farmers advice and information on how the BCI's production principles and criteria could be best achieved in their particular national context (Riisgaard et al., 2017).

The BCI has been active for several years, but, as is the case with many MSIs, evidence of on-the-ground impacts is currently limited. In a survey of 600 female cotton pickers in Punjab, Pakistan, Yasin, et al. (2020) find evidence that workers on BCI fields have fewer health complaints and slightly lower health costs than workers on non-BCI fields. Pallavi (2016) reports on a survey of 50 BCI and 50 non-BCI growers in Telangana, India, finding evidence of higher willingness to take risks and better knowledge and implementation of best practices among BCI growers. Zulfiqar and Thapa (2018) point out that it is better to think of BCI not as a binary variable but as a series of practices that might be adopted with different levels of intensity. In a survey of 161 BCI farmers in Punjab, Pakistan, they find that formal information access is the only variable consistently significantly related to BCI adoption intensity. Zulfiquar, et al. (2019) use panel data across two cropping seasons in Punjab, Pakistan, finding significant increases in farmer margins and, with the exception of labor, lower resource use. Zulfiqar and Thapa (2016), similarly, use propensity score matching with a survey of 302 farmers, also in Punjab, Pakistan, similarly found BCI cultivation to support lower input use and better financial returns than non-BCI cotton. Tempering these promising results, however, Kumar, et al. (2019) report the results of a randomized controlled trial in Andhra Pradesh, India, with a sample of 729 households, finding some savings on specific costs for BCI households, but no statistically significant differences in costs overall. Nor do they find statistically significant differences in yields.

The current evidence on BCI impacts, in short, is mixed. While some studies indicate some modest, positive impacts, the one randomized controlled study to date finds more modest impacts, though, as the authors point out, the follow-up study took place in the early years of BCI implementation and might miss long-term impacts. While it is possible that methodological differences might account for these divergences, these results might also reflect differences in the interaction between BCI efforts and local contexts. Several of the studies

finding positive results cited above, for example, were conducted in Punjab, Pakistan, while Kumar, et al.'s (2019) study was carried out in Andhra Pradesh, India. There is, therefore, a need for further evidence regarding how BCI's impacts differ across context. It is this gap that we seek to addres through our comparative Pakistan-India study of the BCI's effects on farmers and on-farm workers in both countries.

3. Method

3.1 Research Design

The data set used for this study comes from a wider research project on how the BCI standard has been formulated, implemented, and affected the economic, labor, and environmental conditions of farmers and on-farm workers in India and Pakistan (see Riisgaard et al., 2017, 2020; Lund-Thomsen et al., 2019). Overall, approximately 700 interviews were carried out as part of this study, involving international brands and retailers, their sourcing offices in India and Pakistan, BCI garment suppliers, fabric mills, spinners, ginners, and farmers/on farm workers. In addition, interviews were carried out with BCI staff in Europe and South Asia, the organizations' implementing partners in South Asia, and government representatives at national, state/provincial, and local levels in both countries. For this article however, we use the data set that deals with the economic, labor, and environmental conditions of approximately 600 BCI and conventional farmers and on-farm workers in Punjab and Sindh, Pakistan and Punjab and Gujarat, India.

We adopted a mixed method approach; using a survey design to map the similarities and difference in the economic, work, and environmental conditions of BCI and conventional cotton farmers and on-farm workers in India and Pakistan. We combined this with qualitative

data generated through field-level observations and focus group discussions with BCI farmers and on-farm workers to help us interpret the quantitative survey findings. We gathered data regarding farmer productivity (defined as mean yield in KG per acre), price levels (mean prices per 100 KG of cotton in PPP$), farmers' gross income from crops (productivity x price per acre in PPP$), total pesticide and fertilizer costs incurred by farmers (mean expenditure in PPP$), wages, working hours, occupational health and safety, freedom of association and collective bargaining. However, we did not gather data that could be directly related to some of the environment-related production principles of the BCI – namely, water usage, biodiversity levels, soil health, and fiber quality. In spite of these limitations of the study, we believe that the study provides some interesting indications of what a mainstream sustainable cotton MSI such as the BCI can and cannot achieve in terms of improving the income, work, and environmental conditions of farmers and on-farm workers in smallholder contexts in major producer countries such as India and Pakistan.

3.2 Sample

We carried out a livelihoods survey in 2014-15 cotton season in Punjab and Gujrat states in India and the provinces of Punjab and Sindh, Pakistan, carrying out approximately 300 interviews with farmers (180 in India and 120 in Pakistan) and 300 interviews with on-farm workers (180 in India and 120 in Pakistan), divided between BCI and Non-BCI farms. Sites were selected to include only BCI projects, which had been implemented for a minimum of three years in order to ensure that there would be sufficient time for the projects to make a visible impact on the income, work, and environmental conditions of farmers and on-farm workers.

To select our sites, we first selected the two states/provinces in India and Pakistan that produced the greatest amount of cotton [per capita/per area]. Within each province, we then selected administrative subdivisions (tehsils in India and Pakistan) with the greatest cotton production [per capita/per area] in the state/province. Finally, we selected areas engaged in a BCI project that had been active for at least three years, as well as areas unaffected by a BCI project.

After screening the survey form for data entry, a small number of survey forms in Pakistan were rejected due to incomplete interviews, high levels of missing data and illegible or otherwise unclear responses. The final sample achieved is presented in Table 1.

Table 1 – Sample for BCI and Non-BCI (Comparison) Groups by States/Provinces in India and Pakistan

Categories	India		Pakistan		Total
	Punjab	Gujrat	Punjab	Sindh	
BCI Farmers	60	60	35	28	183
Non-BCI Farmers	30	30	22	35	117
BCI Workers	60	60	29	30	179
Non-BCI Workers	30	30	28	29	117
Total	**180**	**180**	**114**	**122**	**596**

3.3 Analytical Procedure

Since the goal of our research was to determine the effects of BCI interventions in India and Pakistan, we developed two structured surveys to collect data from farmers and on-farm workers associated with BC and non-BC groups in each target area. The survey included

questions about farmers' land holding, cotton production per acre, and market prices for cotton. Using these variables we calculated cotton income per acre and converted it to PPP $ to standardize the results for comparative analysis.[2] We also collected data from farmers on their expenditure on fertilizer and pesticides and standardized results in PPP $. PPP $ conversion rates for 2015 were obtained from the World Bank website. These variables were in line with one of the BCI's central claim of having an effect on farmers' income and economic conditions by (1) reducing the costs on agricultural inputs, particularly on two major costly inputs, chemical fertilizer and pesticides; and (2) increasing production by offering support, advice and information at training activities hosted by implementing partners.

Selection effects pose a significant challenge for analyzing MSIs' impacts on on-the-ground practices and outcomes. Because there are strong incentives for farmers that are closer to – or perhaps even already meeting – standards' criteria to certify, it is possible that associations between standards and positive outcomes occur because standards are attractive to already sustainable producers, not because they actually incentivize sustainability improvements (Blackman & Naranjo, 2012; Blackman & Rivera, 2011). Ideally, studies could address selection effects/biases using panel data detailing operations' activities before and after certification and taking advantage of heterogeneity in certification onset or, even better, random assignment, for causal identification. Kumar, et al.'s (2017) randomized controlled trial, finally, provides an excellent example in this regard. Studies like these provide excellent evidence, but they are necessarily limited in scope, as they rely on coordination with implementing partners to randomize interventions, making it difficult to compare across institutional contexts. While not employing randomized controlled trials, Zulfiquar, et al.

[2] We collected data on cotton yield per acre and cotton price per kg, computing cotton income per acre based on farmers' landholdings. We also computed another variable which calculates cotton income after deducting input costs for fertilizer and pesticides to have an idea about the effect of input cost on cotton net income.

(2019) use a panel model to address selection bias, taking advantage of heterogenous adoption to estimate BCI's effects. Because of the general unpredictability of which operations will and will not opt to engage in a given MSI and the high expense of field-based livelihoods surveys, however, panel studies are also difficult to carry out across contexts.

In the absence of panel datasets, numerous studies take advantage of propensity score matching techniques to estimate the effects of certification on social, economic, and environmental outcomes (Blackman & Naranjo, 2012; Kleemann & Abdulai, 2013; Tankam & Djimeu, 2020; Takahashi & Todo, 2017). These quasi-experimental techniques assemble a dataset that balances potential confounding variables across treatment (in our case, BCI) and control (non-BCI) groups. Zulfiqar and Thapa (2016), for example, use propensity score matching to compare BCI and non-BCI respondents in a survey in Punjab, Pakistan. As in their approach, propensity scores have typically been estimated with probit or logistic regression, using variables of interest to predict whether or not an observation was in the treatment group and then selecting observations with similar estimated propensities to have been treated (Dehejia & Wahba, 2002). While this approach provides a helpful way to mitigate systematic differences between treatment and control groups that can confound inferences, it has the drawback that it involves eliminating observations from the dataset, effectively throwing away hard-won information. An alternative approach is to weight observations using the propensity score to achieve balance without throwing out information. We adopt this approach using Griffin, et al.'s (2014) Toolkit for Weighting and Analysis of Nonequivalent Groups (TWANG), which uses machine learning algorithms to optimize propensity-score-based weights to create balanced datasets for quasi-experimental analysis. After creating the weights, we use the survey package (Lumley, 2010) in R 3.6.2 (R Core Team, 2019) to estimate weighted linear regressions. We present plots of the post-weighting distribution of our matching variables for each estimated model in Appendix 1.

One the basis of our survey, the generalization of findings regarding the income, work, and environmental conditions to all BCI farmers and on-farm workers in the target areas is not possible. As such, we did not have a sufficient sample size that reflected the characteristics of the overall population of farmers and on-farm workers that took part in the projects. Instead, our findings provide an indicative sense of the income, work, and environmental conditions of BCI and conventional farmers and on-farm workers in the project areas studied. In spite of this limitation of the study, we do think that the study provides some interesting indications of what a mainstream sustainable cotton MSI such as the BCI can and cannot achieve in terms of improving the income, work, and environmental conditions of farmers and on-farm workers in smallholder contexts in major producer countries such as India and Pakistan.

4. The economic, labor, and environmental conditions of BCI farmers and on-farm workers in India and Pakistan.

4.1 Farmers' characteristics

Overwhelmingly, farmers in both countries are male and even where females have land titles in their names, males generally have control over agricultural land use, buying agricultural inputs and selling the produce to the market. Data on demographic and socio-economic variables such as age, literacy, cultivated land and credit for cotton cultivation was organized in a table presented in Appendix 1. These findings validate our assumption that selecting control group from the same geographical area would enhance internal validity of our analysis and give us comparable non-BC farmers with similarities in demographic and socio-economic variables to the BC farmers.

Both groups (i.e. BC and non-BC farmers) in India and Pakistan in the target states/districts are between 32 and 41 years of age and 73% to 93% literate, with a notable outlier in Sindh, Pakistan, where 49% of farmer respondents are literate. In terms of average school years, BC farmers in all target states/districts in India and Pakistan reported more years of schooling as compared to non-BC farmers; however, this difference is not statistically significant. At the same time, we found no statistically significant differences between BCI and non-BCI farmers due to high variability among BC farmers (SD 23.34). In terms of credit for cotton cultivation, it appears that both BC and non-BC farmers in India accessed and used credit for cotton cultivation, while neither group did so in Pakistan.

4.2 Cotton yield, prices and income

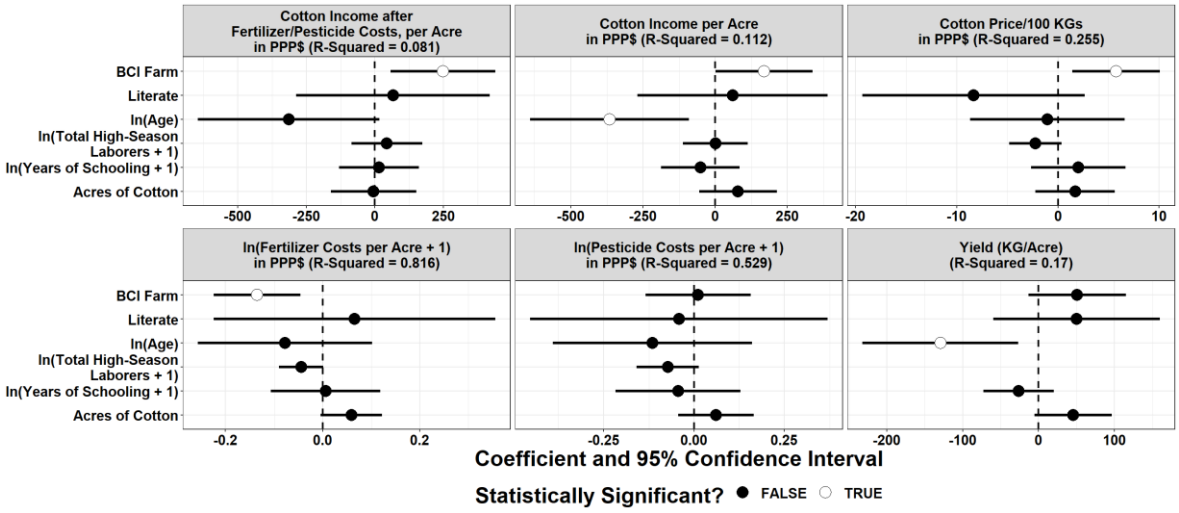

Figure 1. Estimated weighted linear regression coefficients and 95% confidence intervals. Dependent variables listed in panel headings. Dots represent estimated coefficients. White dots denote coefficients that are statistically significantly different from zero at the 0.05 level. Fixed effects by state/province.

Following matching, we find that while BCI farmers report almost 50 KG more production per acre than non-BCI farmers, the average treatment effect is not statistically significant. Qualitatively, however, there is evidence that at least some BCI farmers report yield benefits as a result of training and other support. One farmer in Punjab, India, for example, reported that;

> *"I had problem with my cotton crop, I asked X (implementing partner representative) to come and see what happened to it. He prescribed some fertilizer and pesticides. We followed him and my cotton crop yield was good"*.

Another group of farmers in Gujarat shared their account;

> *"Our cost of production for cotton reduced and yield and profits increased due to BCI. We have received a lot of information on how to reduce cost and increase production by using less water"*.

In Punjab, Pakistan, farmers highlighted the timely provision of information and advice from the BCI implementing partner and recognized it as one of the factors that helped increased their cotton production. As a group of farmers during FGDs described;

> *"Due to information and timely advice from BCI, we were able to increase our production per acre which ultimately means we can earn more per acre"*

Similarly, in Sindh, Pakistan, farmers during FGDs recounted;

> *"The BCI project is a great initiative and very helpful for us. The field team provides us useful information and advice to help us improve our production. The team helped us identifying pest/insects that are good for our crop and in the past we used to kill them as well. The learning group activities are also useful as group discusses issues and problems that we face. Following their advice we were able to save in terms of money and at the same time are having better production (yield)".*

BC farmers are reported to have received slightly better prices (approximately 2.4% higher) for their cotton than non-BC farmers. While this difference is small in substantive terms, prices are quite stable, so BCI farmers' average prices are five standard deviations higher than the weighted mean reported price. Importantly, BCI interventions are not intended to help farmers achieve higher prices. Nevertheless, the perception that better cotton should get a better price than conventional cotton is prevalent in all targeted states/provinces in India and Pakistan, as a group of farmers in Punjab, India put it;

> *"Cleaner cotton fetches a higher price…… we get 10 to 20 rupees per mund (4o kgs.) more…. Sometimes we get 50 to 60 rupees per mund higher for better cotton…… better cotton sells at a higher price as it is cleaner and of better quality than the conventional cotton".*

Similarly, in Gujarat, India, farmers have reported to have seen an "increase of 10 to 15 rupees per kilogram of cotton". The situation in Pakistan is no different where in Sindh province farmers anticipate higher price for better cotton, as they put it, *"We also would like to request you to get us better price than usual cotton (conventional cotton)"*. In Punjab, Pakistan also,

farmers reported to have received a premium for better cotton as compared to conventional cotton and deliberated;

> *"Since we are with BCI for sometimes now, we heard that farmers elsewhere are getting extra money for growing better cotton while over here, some farmers do get it (sometimes 20 to 50 rupees) per mund and some farmers don't get it at all. It will be good if some additional money is paid to us as we work hard to keep the cotton clean. Although BCI friends told us that no additional money on growing better cotton (good cotton, as they say it) is paid anywhere".*

Combining the slight benefits in price and yield, however, does appear to result in a modest increase (8%) in earnings per acre. The difference becomes even more substantial (14.6%) when factoring in fertilizer and pesticide costs. The FGDs support the notion that farmers broadly accept that BCI does affect their overall income from cotton production. Still, market demand is also of course critically important for cotton prices and, ultimately, income. In Punjab, Pakistan for example, farmers summed up as;

> *"We are able to increase our production per acre which ultimately means that we can earn more per acre however, it also depends on the market prices that are sometimes quite volatile depending on the markets. Sometimes when there is higher demand in the market, contractors come to us and pay us extra on top of ongoing market rates".*

The farmers in Punjab, India painted an optimistic picture and stated;

> *"We earn about Rs 5000/acre extra as we consider savings that we managed to achieve due to BCI as income. So for example, if we have saved Rs.2500 and sold our cotton for a better price due to our clean cotton, which helps us, fetch a higher price. Other thing, we have started working in collaboration and share labor and machines".*

However, in Gujrat, India, farmers experienced difficulties due to external factors such as weather and pest attack and reported that overall, the situation was not that encouraging in terms of overall cotton income and said;

> *"Last few years have been bad for cotton farming. There have been no positive changes and we have faced so many losses due to the rains. Every farmer is in debt as we also have pest attack … mealybug that ruined our entire efforts".*

4.3 Expenditure on agricultural inputs

We collected data on two major costly inputs (i.e. fertilizer and pesticides). BCI claims to help farmers reduce fertilizer and pesticide use, generating cost savings. As seen in Figure 1, BCI does seem to be associated with a modest (12.6%) reduction in fertilizer costs, though it is not associated with a substantial difference in pesticide costs.

While the quantitative results are mixed, qualitative data from the FGDs indicated farmers were a bit more positive regarding BCI's association with input cost reductions. When farmers in Punjab, India were asked if they are saving on fertilizer, they responded;

"It could be that soil became addicted and we had to put a lot of fertilizer before BCI, but now we put only 2 bags of urea as recommended and far less than what we used to in the past. There is a lot of improvement due to BCI. We used to apply fertilizers as the cotton plants get yellowish, but now we apply the recommended dose only without caring for the color of the cotton plants. We reduced the fertilizer input as they asked us to apply other fertilizers than urea. We put in zinc and other fertilizers now".

Farmers in Gujarat, India, shared their views on the use of pesticides as a result of meetings with BCI implementing partner in the area. Farmers noted;

"They (BCI implementing partner) also told us about proper use of pesticides, earlier we used to spray 4 pumps now we only spray 2 pumps. They hold one meeting every month in cotton season. These meetings have helped us a lot. Earlier we never used to think whether there is a need to spray pesticides. If another farmer was doing it, we would do it too. But now, we know when to spray and how much to spray because of meetings conducted by BCI".

In Punjab, Pakistan farmers identified changes that took place as a result of BCI intervention in the area for adopting practice that helped them ensuring appropriate use of fertilizer and pesticides, as farmers put it;

"The changes happened in our cultivation practices, identifying friendly pests and sensible use of fertilizer and pesticides and water when needed. In the past we used to spray if we see another farmer is spraying around our fields or when representative from companies used to tell us. Since they (pesticide companies) were making money from us, we were spraying without thinking,

it used to costs a lot as well. Now since BCI-IP friends are coming here, we get advice and sometime training, demonstration etc."

In Sindh, Pakistan, farmers demonstrated an understanding about practice that the BCI implementing partner in the area advocating in terms of adopting practice that could help farmers using fertilizer and pesticides appropriately in order to minimize costs. During FGD in Sindh, Pakistan farmers maintained;

"We understand and realize that it is good for us to adopt and follow the advice and help that we are extended from BCI and team as they also come and visit us time to time. It is beneficial for us to use less fertilizer, pesticides and water and maintain the soil quality as it improves our crop and lower our input costs. The information, advice and guidance provided by BCI to us really helped us in two ways. Firstly it helped us spending less on agricultural input for example spray and fertilizer and secondly it improves our production due closely watching our crop and taking action in time in case if there are pest attacks".

4.3 Cross-national Differences

While the above results paint an overall positive picture for BCI's impacts on farmers' bottom line, disaggregating the analysis by country shows some important differences between India and Pakistan. As Figure 2 shows, when comparing matched samples of BCI and non-BCI farms only within the two countries, we find substantial and statistically significant reductions in pesticide expenditures and increases in cotton yields only in Pakistan. To be clear, part of this is because splitting the samples by country necessarily decreases our statistical power, making

it more difficult to find statistically significant effects, but as the plot for pesticide costs, in particular, shows, there is a decided difference between Pakistan and India, with Pakistan exhibiting substantial reductions in pesticide investments for BCI farmers, while India's BCI farmers are not statistically significantly different from their non-BCI farmers in this regard.

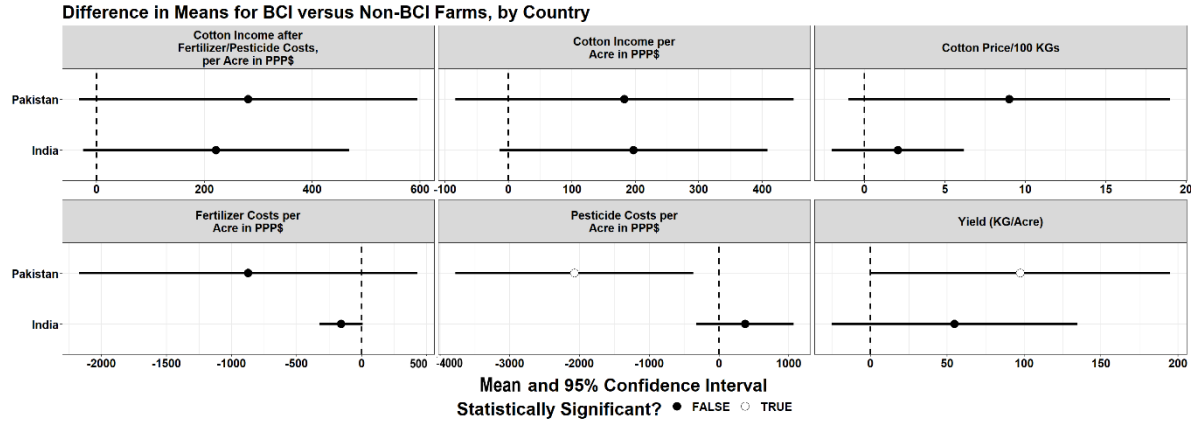

Figure 2. Difference in means and 95% confidence intervals for BCI versus non-BCI farms, estimated assuming a t-distribution from matched samples separated by country.

We suspect that this may have to do with the BCI projects in Pakistan being undertaken by a highly capacitated implementing partner. This organization had several years of experience implementing sustainable cotton projects prior to the launch of BCI in 2010. A brand representative with intimate knowledge of several implementing partners in both India and Pakistan commented on this organization,

"[It is their] people, expertise, reach in the field and all those kinds of things. They have understood the system. They already have the capital investment. They have already trained their manpower. They already have field facilitators in place. They know the system."

4.5.Wages for On-Farm Workers

Data on daily wages, daily working hours and use of safety equipment for pesticide spry was collected for on-farm workers in both groups in India and Pakistan and is presented in Figure 3.

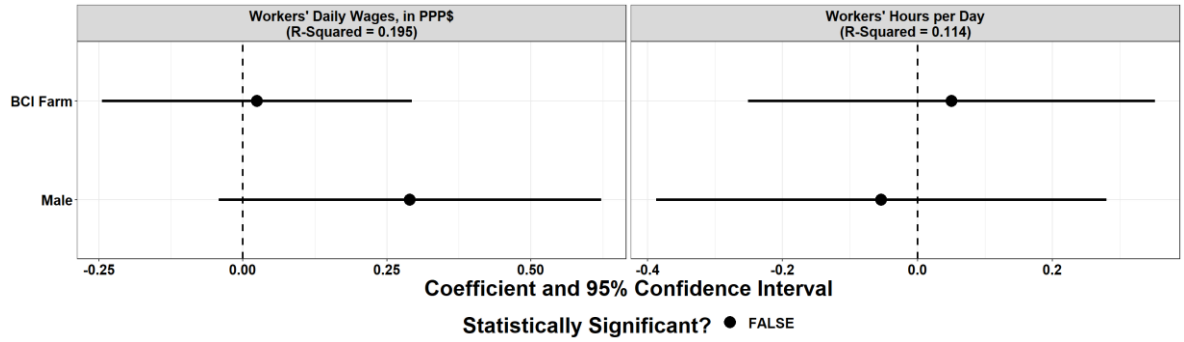

Figure 3. Estimated weighted linear regression coefficients and 95% confidence intervals for models based on farm worker survey. Dependent variables listed in panel headings. Dots represent estimated coefficients. White dots denote coefficients that are statistically significantly different from zero at the 0.05 level. Fixed effects by state/province.

We find no statistically significant differences for wages or working hours for BCI farmworkers as compared to non-BCI workers. The qualitative data collected through FGDs highlighted the complexities of wages for on-farm workers and also indicated little difference in wages between BCI and non-BCI farms. In Gujrat, India, for example, female on-farm workers usually engaged in sowing, weeding, spraying pesticides, and picking cotton, reported that;

"We earn 40% of our total income from cotton…… we are paid in cash. However, wages for each picking are different; we are paid more for 2nd and

3rd pickings as compared to 1st picking as we get lower quantity in 2 earlier pickings. We are paid by weight as well as per day.

Interesting, these female on-farm workers also complained that due to BCI training that they received from their implementation partner, their income reduced due to less use of pesticides and water and demand for cleaner picking of cotton. This explained the quantitative findings stipulating lower wages for BC on-farm workers as compared to non-BC on-farm workers. They said;

"BCI training negatively affected our income when we are engaged in picking and spraying pesticides. After training we are spraying less pesticides, it reduced our number of days now as compared to in the past. Similarly, while picking clean cotton require more time and we end up picking less now as compared to before. We are not paid extra for clean picking".

In Gujarat, India, male on-farm workers also raised concerns over demand for clean picking. They questioned;

"So if pick clean cotton, you are able to pick less amount. That means you get less wages according to the weight for cotton picking. Is that a good thing or a bad thing?"

In Punjab, India, however, women on-farm workers associated wages with good cotton crop and said;

> *"When they (farmers) have good crop, we also have good income, however when there is crop failure we get less work. If crop failed, we get less work and we cannot demand money from farmers. We are more affected by yield as compared to what price do farmers get".*

In Punjab, India, male on-farm workers usually involved in farm work i.e. weeding, spraying pesticides and uprooting the sticks as well as sharecroppers. Thus, the nature of their wages is slightly different than that for females. Male on-farm workers usually get 25% of the produce as their share while the cost of agricultural input is borne the landowners. Therefore, there is an interest from these on-farm workers to adopt BCI production principles to maximise the yield using advice and information extended by the BCI implementing partner in the area. As they explained;

> *"We get 25% of what the farmer makes, so if the farmer gets low returns then our share is also reduced. They tell us about precautions that need to be taken while spraying pesticides. That is useful for us because we do that work. The cost of production is not our concern as a Bhagidaar (labor tenant) gets 25% regardless of the costs to grow cotton. All the costs are borne by the farmer"*

In Pakistan, cotton picking is overwhelmingly done by female on-farm workers as a seasonal work. They usually work during picking season in the local vicinity of their villages. However, there are migrant workers also involved in cotton picking during the season. Migrant labour usually work as contract workers as compared to wage workers. In terms of wages, workers are paid the ongoing market rates which they are not satisfied with but cannot do anything about, as female on-farm workers from Punjab, Pakistan shared;

"As you know we are poor people and it is very expensive to buy necessary household stuff. We are paid by mund (40 kilograms) and wages are not good, however we are paid the ongoing market rate and we cannot ask for more. The wages are same at BC farms and non-BC farms".

In Punjab, Pakistan, male on-farm workers usually work as hired labor engaged in activities related to cultivation also work as sharecroppers. They generally mentioned poverty as a big issue for them and complained that wages are not sufficient for them to earn a living out of cotton on-farm workers. They also showed their frustration on the part of ginners and contractors who do not pay fair prices for their clean cotton. The group of framers during focus group discussion explained;

"There are no particular labor related issues. Poverty is a major issue and sometimes we are not able to get fair share of the hard work we do. The wages are only enough to keep is us going as cotton prices are up and down all the time. In addition local contractors and ginners don't give us fair prices and make deductions from cotton produce saying that they are deducting to make up for the wastage and that they have to further clean it. This is despite we and our landlords work with BCI project that provide us information on how to pick cotton as cleanly as possible. But even than we end up losing money."

Women on-farm workers in Sindh, Pakistan mentioned that they work as a group, which usually consists of several families and their elders usually negotiate wages and work conditions. Women also reiterated that cotton is very important for their livelihood and stated;

"There are no labor issues, we are poor people and work hard during hot weather and get paid for that cotton that we pick. We have good relationship

with our landlord as our elder usually deals with issues of wage, work and conditions."

However, male on-farm workers in Sindh, Pakistan, work under different arrangements. They are work on monthly salary and engage in farm activities for landlords who pay for agricultural inputs through traders and middlemen. They do not get share from the produce but work as waged labor. They further elaborated;

"Our work involves all farm related activities on our respective farms. Cotton off course is an important crop for us. The working arrangement for us here is that we work on salary for landlords who pay us on monthly basis. Laborer and waged workers are available locally as well as seasonal migrants however there is no assurance or job security, benefits or facilities."

4.5 Working hours for on-farm workers

The working hours usually depend on the type of working arrangements for on-farm workers. In India, cotton pickers usually start early morning and work between 5 and 7 hours while sharecroppers usually work longer. Similarly, in Pakistan the situation is no different in Punjab while in Sindh, Pakistan, on-farm workers both female and male working under slightly different arrangements than Punjab, Pakistan. There are two types of female cotton pickers, the one who work within the vicinity of their villages while the other are the one who migrate seasonally. The migratory workers usually work longer than local female cotton pickers as they moved to earn their living for few months. In case of male on-farm workers, the focus group discussions revealed that in Sindh, Pakistan, the working arrangements are based on monthly

salary. They engage in all type of farm activities but do not get any share in the produce unless agreed upon. Generally, they are hired labor on monthly salary.

4.6 Occupational safety for on-farm workers

The use of safety equipment for pesticide spray was recorded during the data collection. Table 2 shows the results of a weighted logistic regression predicting the probability of safety equipment use. The results here are much more striking than was the case for BCI's impacts on the variables surveyed above. We find that the odds of safety equipment use are 5.3 times higher in BCI farms than non-BCI farms.

Variable	Odds Ratio Coefficient (Standard Error)
BCI Farm	5.33*** (1.34)
Literate	0.909 (2.04)
ln(Age)	0.650 (1.71)
ln(Years of Schooling + 1)	0.946 (1.34)
Acres of Cotton	1.39 (1.28)
ln(Total High-Season Laborers + 1)	1.44* (1.19)
Constant	1.04 (8.79)

Table 2. Estimated coefficients from weighted logistic regression model predicting safety equipment use. Fixed effects by state/province.

The FGDs underlined effects of BCI interventions in terms of extending training on occupational safety for on-farm workers. In India, BCI implementing partner provided training to the on-farm workers on taking safety precautions while spraying pesticides. On-farm workers confirmed that they received training and provided with gloves, goggles and masks to use while spraying pesticides. Some attended these sessions once while some twice and showed demonstration of using the safety equipment as well as spraying pesticides. In Gujrat, India,

on-farm workers reported that *"headaches and other illnesses that used to happen due to pesticide spraying have reduced due to wearing of safety equipment"*, thus providing evidence that these training made a difference. They further highlighted;

> *"Earlier, when we sprayed pesticides, we never used any safety equipment. During spraying of pesticides, if drops of it fell on our hands, it would burn our hands. But now they give us gloves so that does not happen anymore."*

In Punjab, Indian women on-farm workers also put forward that *"they ask us to cover the mouth and head for health and safely so that we don't catch any disease"*. While male on-farm workers from Punjab, India realized the benefits of these training sessions and reported that they made use of *"hand gloves and masks as well as are encouraged to apply mustard oil on body while spraying pesticides and preferably do it in the morning time".*

In Punjab, Pakistan on-farm workers showed limited knowledge about BCI interventions. They however realized that the BCI project provide information and advice on protecting on-farm workers form dangerous chemicals. They further shared their experience;

> *"We are told that BC farms use less chemical which is good for us as we pick cotton with bare hands and we were told that these chemicals can harm our health so the less the chemical the less is harm. We are particularly told about spray and safety precaution that we have to take while spraying."*

The on-farm workers in Sindh, Pakistan have not yet attended any training sessions on occupational safety and said that they yet to come across any implementing partner or organization that could help them make their tasks easier.

4.7 Child labor, freedom of association and collective bargaining

The quantitative results are not presented as all farmers and on-farm workers responded negatively to items asking about child labor, freedom of association and collective bargaining. However, qualitative data collected through FGDs highlighted the intricacies of these issues on the ground in target states/provinces in India and Pakistan.

In Gujarat, India, on-farm workers reported that children in fact do work for wages with them during over the weekends and during holidays on which even BCI farmers do not raise any objection. In addition, it is also observed that generally when on-farm workers come from outside the village, they travel as a family with children and stay take time off from school for the picking season. In Punjab, India, on-farm workers also reported a similar trend, where children aged between 10 and 12 years are reported to take part in cotton picking over the weekends and during school holidays. Among some families in Punjab, India, children are reported to skip school as well to take part in cotton picking.

In Punjab, Pakistan, since picking is overwhelmingly carried out by females and girls, children are also reported to accompany them to the cotton fields. Although on-farm workers showed awareness that since BCI meetings and sessions made them aware about the harmful effects of picking on children, children only involvement in cotton picking is limited. However, In Sindh, Pakistan, on-farm workers openly admitted the use of child labor in cotton picking and explained;

> *"As far as child labor is concerned, traditionally children do work with us and give us a hand when we need. Since we migrate here with families, children also come with us and they work with us in difference chores i.e. girls aged 10 to 12 help us in picking as well as taking care of younger siblings and help us in domestic chores i.e. collecting fuel wood, fetching water etc."*

There is no evidence from quantitative as well as qualitative sources about the existence of farmer organizing in groups to protect their interest i.e. wages, working conditions or collective bargaining. The FGDs provided insight in the arrangement around wages and working conditions. There are two distinctive methods used by on-farm workers to negotiate wages of working conditions. Firstly, migratory on-farm workers usually work through contractors and are organized in groups or extended families. In this case group elders negotiate wages and working conditions with the contracts or landowners and the whole group travel and live together and follow agreed terms and conditions. Secondly, the market dictates the wages and working conditions and usually functions on the principle of supply and demand. Higher demand of on-farm workers during peak season may push the wages upward and also compel landowners and farmers to offer some concessions i.e. food, tea, water, shelter, transportation etc.

5. Discussion

So were the founders of the BCI right in predicting that cooperation-based approaches to sustainability in GVCs, in combination to what they called verification, would be effective in relation to improving the income, work, and environmental conditions of cotton farmers and on-farm workers?

Our analysis points to three interrelated observations. First, both from our quantitative and our qualitative data, it would appear BCI has positive effects on profitability, likely as a combination of slightly higher prices, slightly higher yields, and slightly lower costs relative to those of non-BCI operations. These patterns, echoed in our qualitative data, seem well in line with the BCI's objectives of reducing environmental pollution on cotton farms and creating a 'business case' in relation to their participation in the BCI.

Second, it also appeared as if there might be important trade-offs between different policy objectives as a result of unintended consequences of implementing the BCI standard. While it generally appeared that there were no statistically significant differences in the wages of BCI and non-BCI on-farm workers, some on-farm workers reported that the reduced use of pesticides and the pre-occupation with 'clean picking' meant there was either less work for them or the cotton picking process was slower than before, negatively affecting their earnings. Hence, the BCI's creation of a 'business case' for farmers through reduced use pesticide and fertilizers on farms might unintendedly cause a reduction in income for some on-farm workers.

Third, worker wages and hours appeared to be significantly more affected by regional variations in gendered labor markets than by the implementation of the BCI standard in itself in particular localities. Hence, understanding this varied nature of labor markets and generating locally appropriate solutions to improve worker wages and hours, particularly in a broader, gendered perspective, seems to be key policy challenge for the BCI.

6. Conclusion

In this article, we made a conceptual argument about the compliance and cooperation-based approaches to sustainability in global value chains being complementary rather than competing in nature. We highlighted that MSIs may in practice often be employing combinations of compliance and cooperation-based approaches to sustainability in GVCs, using the BCI as a key exemplar of this trend. In our empirical investigation of the effects of the Better Cotton Initiative in Punjab and Sindh, Pakistan and Punjab and Gujarat, India, our results indicated that the implementation of the BCI standard tended to positively affect farmer productivity, their gross incomes, and resulted in the reduction of input costs related to the use of fertilizers and pesticides in most project locations. However, our analysis also indicated that there could be important un-intended consequences from BCI standard implementation with improvements in farmer productivity levels leading to a reduction in worker earnings in some instances.

Nevertheless, although quantitative results show BC farmers arguably performing better in cotton yield, cotton price, use of fertilizer and pesticides and overall cotton income than non-BC farmers, however not all results are statistically significant. The qualitative results on the other hand provide insight into the perception of BC farmers who view the support in terms of capacity building by the BCI and its implementing partners in both countries as effective and valuable. The information, advice and training is viewed by the BC farmers more as impartial, particularly in the absence of effective extension services by the government department and aggressive sales tactics used by corporate players selling fertilizer and pesticides in pursuit of huge profits. Our analysis thus supports the assertion that MSIs, such as the BCI, may usefully employ a cooperation approach to sustainability in GVCs to facilitate farmer compliance with their key sustainability production principles and criteria.

Appendix 1

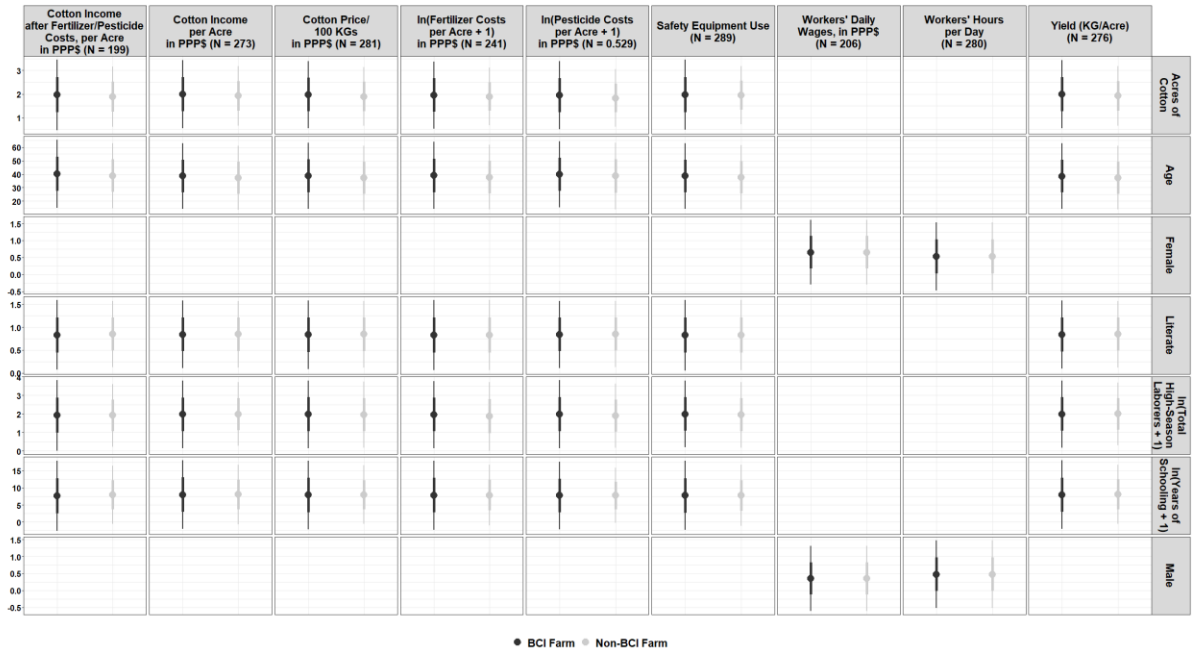

Figure A1. Means (dot), one standard deviation (thick line), and two standard deviation (thin line) for post-weighting distributions of matching variables, by linear regression model. The plot provides strong evidence that the TWANG algorithm generated balanced samples for all models reported in the article.

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Annex 1 – Characteristics of Better Cotton (BC) and Non-Better Cotton (NBC) Farmers by States/Districts in India and Pakistan

	India						Pakistan					
	Punjab			Gujrat			Punjab			Sindh		
	BC	NBC	p-value	BC	NBC	p-value	BC	NBC	p-value	BC	NBC	p-value
Average Age (in Years)	41.69	37.63	.169	39.03	35.0	.085	41.26	39.80	.665	32.30	32.19	.964
	(13.11)	(13.27)		(11.66)	(10.14)		(12.59)	(13.53)		(9.14)	(9.94)	
Literate (Yes = 1)	0.90	0.83	.368	0.92	0.93	.784	0.79	0.71	.462	0.49	0.73	.068
	(0.30)	(0.37)		(0.27)	(0.25)		(0.41)	(0.45)		(0.50)	(0.45)	
Average School Years	10.40	10.19	.770	10.35	9.68	.344	9.31	7.48	.116	10.81	8.94	.063
	(2.93)	(3.16)		(3.09)	(2.86)		(3.87)	(2.87)		(3.12)	(2.38)	
Average Cultivated Land (in Acres)	5.16	6.13	.252	8.62	7.78	.704	16.33	4.17	.055	12.29	10.52	.448
	(3.81)	(3.72)		(13.19)	(5.92)		(23.34)	(3.15)		(6.32)	(9.27)	

Credit for Cotton Cultivation (Yes=1)	0.92	0.90	.777	0.73	0.69	.669	0.32	0.14	.093	0.26	0.43	.231
	(0.28)	(0.31)		(0.44)	(0.47)		(0.47)	(0.35)		(0.44)	(0.50)	

Results are Mean, standard deviation (in parentheses) are calculated from Independent Sample T-Test. Significance values are calculated using 1000 bootstrapped samples.

P value denotes ***<0.01, **<0.05

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