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Compliance and cooperation in global value chains: The effects of the better cotton initiative in Pakistan and India

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A R T I C L E I N F O

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A B S T R A C T

The Better Cotton Imitative (BCI), the world's largest multi-stakeholder initiative (MSI) for sustainable cotton production, is a prime example of a hybrid "cooperation-compliance" model used by some MSIs to engage farmers and on-farm workers in the global South. Using a mixed methods approach, we investigate the impacts of this hybrid model on economic, environmental, and labor conditions of farmers and on-farm workers on irrigated cotton farms in Pakistan and India. In one of few cross-national comparisons of BCI impacts, we find evidence that farmers participating in BCI's "cooperation-compliance" model report (a) higher gross incomes and (b) lower input costs than comparison farmers. However, (c) BCI had no positive impacts upon labor conditions on cotton farms, as compared to conventional peers. Finally, (d) BCI's impacts are mediated by institutional and geographic differences across the study sites. We conclude that effects of MSIs are hard to generalize but can most meaningfully be understood within particular institutional designs, value chains, specific time periods, and institutional contexts.

1. Introduction

Multistakeholder initiatives (MSIs) are organizations that bring together private sector, civil society, and other stakeholders to develop and implement standards for improving economic, social, and environmental conditions of production in different global value chains (Auld et al., 2015; Guéneau, 2018; Josserand et al., 2018; Riisgaard et al., 2020; Rueda et al., 2018). Many multinational firms sourcing products and/or services from the Global South have adopted pro-active sustainability strategies to improve corporate branding, reduce reputational risks, and/or secure future raw material access and are key MSI stakeholders (Bartley, 2018; Börjeson and Boström, 2018; Lund-Thomsen et al., 2018). Alongside MSIs driven by organizations from the Global North, stakeholders interested in alternatives have also turned to "home-grown MSIs" headquartered in the South (Sippl, 2020; Sun and van der Ven, 2020; Van der Ven et al., 2021). While their numbers have grown rapidly, however, it remains debatable to what extent MSIs improve economic, social, and environmental conditions for the producers and workers they target (Nelson et al., 2018).

Scholars have argued that multinational firms and MSIs typically choose between compliance and cooperation approaches to building value chain sustainability (Locke et al., 2009; Lund-Thomsen and Lindgreen, 2014; Oka et al., 2020).[1] Here, we contribute to the literature on compliance-based and cooperation-based approaches, arguing that these strategies, often described as opposed orientations, are frequently deployed in tandem. Acknowledging these overlaps, we present a hybrid "cooperation-compliance" model of sustainability in global value chains. Following Van der Ven and Cashore (2018), we argue the cooperation-compliance model's impacts on farmers and on-farm workers are shaped by interactions with geographic, institutional, and other conditions in the places and times it is applied.

To illustrate these claims, we analyze the Better Cotton Initiative's

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[1] These authors sometimes use different expressions such as compliance and commitment (Locke et al., 2009); compliance and cooperation (Lund-Thomsen and Lindgreen, 2014), and auditing and capacity building (Oka et al. 2020a) to describe these approaches. Oka et al. also introduce a third notion – advocacy – which we do not deal with here as it does not concern field-level impacts– the analytical focus of this article.

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(BCI) field-level projects in Pakistan and India. Founded in 2010, BCI is the world's largest sustainable cotton initiative, intended 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” (BCI, 2015). BCI's membership is large, diverse, and growing. By January 2021, its 2060 members included 1784 suppliers and manufacturers, 210 retailers and brands, 19 producers, 31 civil society organizations, and 16 associates (associates are any member who does not fit the other categories; BCI, 2021a). By the 2019–20 growing season, its members accounted for 23% of world production and engaged 2.7 million farmers (BCI, 2021d).

Current evidence on BCI's impacts is mixed. On the one hand, it has been documented that the steering group leading negotiations for BCI's launch in 2010 developed a model integrating cooperation, in the form of capacity building for would-be member farmers, and compliance monitoring measures targeting those farmers (Riisgaard et al., 2020). On the other hand, the BCI's implementation of this model in India and Pakistan appeared to raise challenges for its implementing partners, organizations that supply capacity building support for prospective and current BCI farmers, which had to balance building capacity and conducting monitoring audits as projects were rapidly upscaled (Lund-Thomsen et al., 2021). In terms of ground-level results, while some studies find modest benefits for BCI farmers in Pakistan, the one randomized controlled trial to date indicates limited impacts of BCI activities in India (Pallavi, 2016; Kumar et al., 2019; Yasin et al., 2020). While methodological differences might account for some of this divergence, different findings might also reflect differences in the interaction between BCI efforts and local contexts, as Van der Ven and Cashore (2018) note of MSI's impacts more broadly. Studies finding positive results, for example, generally were conducted in Punjab, Pakistan, while more lackluster results have been documented in India. These contradictory findings point to the need better understand the impacts of BCI's capacity building and compliance monitoring approaches across contexts.

This article helps address this gap in our knowledge by tracing the impacts of the BCI's cooperation-compliance model on farmers and on-farm workers in similar geographic conditions but different institutional contexts. We take a mixed-methods approach. We use survey data from interviews with approximately 600 farmers and on-farm workers in Punjab and Sindh, Pakistan, and Punjab and Gujarat, India, to test for positive impacts from BCI's hybrid cooperation-compliance model for farmers and on-farm workers. We join this quantitative analysis with qualitative data from key-informant interviews and, particularly, focus groups with farmers and on-farm workers to investigate the contextual factors that might explain the pattern of impacts we document.

Our article is structured as follows. First, we review the cooperation and compliance strategies and their integration in the cooperation-compliance model. We then introduce the BCI and its activities in India and Pakistan before outlining our methods for assessing its impacts and investigating potential contextual factors driving them. Next, we analyze how the BCI affects the income, work, and environmental conditions of farmers and on-farm workers in India and Pakistan. The discussion and conclusion sections highlight the implications of our study for how cooperation-compliance models may positively and/or negatively affect costs, incomes, and wages for farmers and on-farm workers in the Global South.

2. A hybrid cooperation-compliance model

Recent research on downstream firms' strategies for raising production standards in their value chains has identified two broad approaches. The first, compliance, means setting a strict standard backed by monitoring and sanctions. This approach has been criticized for relying on pre-announced, short audits where auditors review company-produced paper trails, interview workers that might have been coached by management, and fail to detect violations beyond factory walls (Lebaron and Lister, 2015; LeBaron et al., 2017). Firms adopting a cooperation strategy, by contrast, actively work with suppliers to raise production standards. Generally, this strategy targets producers enrolled in long-term trading relationships with firms in the global North. Northern brands and retailers, in return for improved standards, ostensibly provide more secure market access, higher prices, or demand for more volume than the producer could otherwise secure. Advocates of this approach encourage lead firms to shoulder the costs of training and capacity building local producers require to meet these standards (Lund-Thomsen and Lindgreen, 2014).

Literature on global value chain sustainability tends to treat compliance and cooperation as separate, sometimes irreconcilable, strategies (Locke et al., 2009; Locke et al., 2009; Riisgaard et al., 2020). Yet they frequently overlap in practice. We argue that the literature on cooperation and compliance strategies, therefore, could benefit from recognizing a hybrid “cooperation-compliance” model that better reflects firm and MSI strategies. In our hybrid model, we suggest that cooperation between brands/retailers/MSIs and local producers in global value chains *precedes and enables* local producer *compliance* with sustainability standards. Following capacity building of farmers, compliance monitoring of local producers takes place. This can be undertaken by 1st party (from the brand/retailer/MSI staff), 2nd party (local producers themselves), and/or third party (independent) auditors. The hybrid model incorporates cooperation features, with the brand/retailer/MSI paying for both auditing and capacity building, alongside *compliance* features, as only local producers who abide by sustainability standard requirements after capacity building and training can continue to enjoy access to brand/retailer value chains. In the spirit of the compliance approach, local producers who fail audits are given time – for instance six months - to come into compliance. If local producers fail to come into compliance after this period, they are then excluded from selling their goods to high end retailers/brands that are part of their value chains.

In theory, this hybrid model would provide economic upgrading for local producers, environmental upgrading for production processes, and social upgrading for workers (i.e. improvements in the enabling rights and conditions of workers in export-oriented industries) by harnessing and combining complementary benefits of both cooperation and compliance approaches.

In practice, however, hybrid models are likely to have several drawbacks. Recent studies suggest that the desired outcomes of using cooperation and compliance approaches may fail to materialize or appear in very circumscribed forms. This may in part be due to a failure to address unequal power relations in the value chain (see e.g. Lund-Thomsen and Coe, 2015; Riisgaard et al., 2020). In line with Van der Ven and Cashore's (2018) argument about impact assessment, we also suggest that the compliance-cooperation model's impacts will be conditional on factors including (a) MSIs' differing institutional designs; (b) the goals, sustainability criteria, and implementation strategies in place at the time of the study; and (c) particular geographical and institutional contexts (see also, Distelhorst et al., 2015).

Assessing BCI's hybrid cooperation-compliance model's impacts in India and Pakistan, therefore, requires considering (a) the characteristics of BCI's specific cooperation-compliance model, (b) the state of this model during the study period (i.e. five years after BCI's 2010 launch), and (c) the institutional and geographic contexts in our study areas in India and Pakistan, both regions boasting relatively advanced, irrigated cotton production and substantial BCI uptake.

3. The Better Cotton Initiative in India and Pakistan

At the time of our fieldwork, the BCI standard combined several elements: the Better Cotton production principles and criteria, the chain of custody guidelines, the claims framework, the results and impact component, and the farmer capacity-building program (BCI, 2019b). The BCI's key production principles address the use of chemicals for crop protection, water stewardship, soil health, biodiversity and land responsibility, fiber quality, decent work, and farm-level management (BCI, 2021c). As a voluntary initiative, however, it relies on pecuniary motivations to encourage producers to join – that is, adopting BCI practices must be worth farmers' time and resource investments.

Similar to other MSIs and sustainability standards (see e.g., Marques and Eberlein, 2020; Ponte et al., 2020), BCI's cooperation-compliance model's on-the-ground impacts are best understood in light of how the BCI is embedded in the broader political economy of the cotton value chain and diverse national contexts (see also Sun and van der Ven, 2020). In India and Pakistan, the complexity of the cotton global value chain is almost staggering. From farms, cotton goes through ginning, spinning, weaving, and stitching, operations connected by specialized traders and brokers. Cotton's path from farm to garment is frequently opaque, often by design, and buyers regularly are ignorant of their own material sources (Alexander, 2018).

In India, BCI entered a national cotton production landscape already populated with organic and fair trade standards, as well as some local standards like non-pesticidal management. In part because of its lower costs and requirements, BCI has rapidly gained ground relative to existing standards. Starkly contrasting with organic or fair trade standards, for example, BCI permits genetically modified seeds (Singh, 2019; Zulfiqar and Thapa, 2018). In Pakistan, organic cotton production was not widespread at the time of our fieldwork. However, WWF-Pakistan, a leading BCI implementing partner, had significant organizational capacity and a pre-existing infrastructure of project offices, trained staff, and knowledge of the BCI standard. Several Indian implementing partners, conversely, were new to BCI, even if they had experience with other sustainability standards (Lund-Thomsen et al., 2021). Cotton growing conditions also differ to some extent across South Asia. For instance, the Indian state of Punjab and the provinces of Punjab and Sindh in Pakistan rely mainly on irrigated whereas Gujarat, India, relies on both rainfed and groundwater irrigation.

In spite of these differences, there are also significant similarities in the production set-up in both countries. Both Pakistan and Indian cotton production are dominated by small-scale farmers with low levels of mechanization. Subsidies are available to famers in both countries. In India, farmers can receive subsidies for chemical fertilizer and power for groundwater extraction, as well as for training, capacity building, and inputs for sustainable production. They also enjoy minimum price supports, backed by public procurement strategies (Singh, 2019). Pakistan, similarly, offers small subsidies for fertilizer in Punjab and Sindh, and in Punjab also subsidizes cotton seeds. Government extension services, however, are often of lesser quality (see also Zulfiqar and Thapa, 2018). Differing formal and informal institutions more broadly are also important. For example, while child labor is illegal in India, and minimum wages are specified for various types of work, there is very little monitoring or enforcement, especially when it comes to migrant labor. In Pakistan, similarly, labor and environmental laws tend not to be fully implemented, and both clandestine child labor and contracted labor with limited protections are widespread. Ancillary market players also shape the context in both countries, as pesticide and fertilizer companies are very active in marketing, often working closely with farmers (Lund-Thomsen et al., 2021).

Like other MSIs, BCI is an evolving system, so we must interpret its impacts in light of its institutional design as of 2014–2016, when we undertook our fieldwork. While its founders were critical of compliance-only approaches, BCI included compliance-based elements through its assurance program, reimagining it as a feedback system to help farmers learn and improve their sustainability performance, rather than a simple compliance-checking audit. To close the loop, the BCI linked assurance to a cooperation strategy in which its implementing partners, which in our study areas included civil society organizations, textile suppliers, and corporate foundations, helped farms meet its standards. Implementing partners' capacity-building programs were bankrolled by BCI's brand and retail members, mostly headquartered in the Global North. The resulting model was a clear example of a hybrid cooperation-compliance strategy.

BCI's combination of cooperation and compliance elements is highly strategic. Whereas the BCI's compliance-based verification program was designed to protect standard's credibility, its cooperation-based farmer capacity-building program was intended to help the initiative scale up, supporting farmers to implement the BCI standards in their local context (Riisgaard et al., 2017, 2020). To boost implementing partners' capacity and its own credibility, the BCI ensured implementing partners went through a consistent endorsement process, participated in a "train the trainers" program on how to grow Better Cotton, submitted to regular performance monitoring, shared best practices, and engaged in joint learning.

Despite its interesting strategy, evidence on BCI's impacts is limited. In a survey of 600 female cotton pickers in Punjab, Pakistan, Yasin et al. (2020) found evidence that workers on BCI fields had fewer health complaints and slightly lower health costs than workers on non-BCI fields. Pallavi (2016) reported on a survey of 50 BCI and 50 non-BCI growers in Telangana, India, finding evidence of better knowledge and implementation of best practices among BCI growers. Zulfiqar and Thapa (2018) argue we should think of BCI compliance not just as a binary variable, but, rather, 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 found that formal information access was the only variable consistently significantly related to BCI adoption intensity. Zulfiqar et al. (2019) used panel data across two cropping seasons in Punjab, Pakistan, finding significant increases in farmer margins and, with the exception of labor, lower resource use associated with BCI adoption. Zulfiqar and Thapa (2016), similarly, used propensity score matching with a survey of 302 farmers, also in Punjab, Pakistan, and 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) reported 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 overall production costs or yields.

As noted in our introduction, it is difficult to discern whether the divergence in findings on BCI's impacts is attributable to differences in methods, with the most rigorous study designs failing to find substantial effects, or, conversely, difference in locations, with the BCI for some reason performing more effectively in Pakistan than India. In the following section, we outline the ways our study, which employed the same methods on either side of the Indo-Pakistani border, adds a much need comparative dimension to the evidence on the BCI's effects.

4. Methods

4.1. Research design

The analysis presented here uses data from a larger, mixed-methods research project studying BCI's formulation and implementation in India and Pakistan. The research included 63 key-informant interviews with respondents at BCI's headquarters and offices in the study area, affected brands and retailers, donor agencies, BCI Implementing Partners, and third-party auditors, and 20 interviews with garment factories, textile mills, spinners, and gin factories, as well as government officials in both countries. The analysis presented here, however, relies primarily on another part of the research – interview-based household surveys conducted with approximately 600 farmers and on-farm workers in India and Pakistan, representing an approximately even number of BCI and non-BCI farms, as well as qualitative data derived from a total of 16 focus groups, 8 in India and 8 in Pakistan, conducted with farmers and on-farm workers. Our survey gathered data on farmers' productivity (defined as mean yield in Kilograms, or KGs, per acre), price levels (mean prices per 100 KGs of cotton in PPP$), gross income from crops (yield x price per acre in PPP$), total pesticide and fertilizer costs (mean expenditure in PPP$), wages, and working hours, among other variables. Due to resource limitations, we did not gather data that could be directly related to the BCI's environment-related production principles, such as water usage, biodiversity, soil health, and fiber quality.

In the project areas, we selected our focus-group participants based on whether or not they had received BCI training, ensuring that we included a diversity of farmers/workers in terms of their age, gender (in the case of workers), background, farm size, educational levels, and worker status (local vs. migrant worker). The interviews were either recorded and/or detailed handwritten interview notes were taken by our field staff in each project location. We subsequently coded these interview transcripts, looking at the categories that we had identified as relevant to our study: farmer perceptions of BCI training, yields and gross income obtained, pesticide and fertilizer usage, occupational health and safety, and labor conditions (including child and forced labor). Moreover, we conducted on-site transect walks in the cotton fields and villages where our fieldwork took place. We also compared our data with insights from articles and policy papers in India and Pakistan on the impacts of BCI and other sustainability standards in South Asia to interpret our findings.

4.2. Sample

Our livelihoods survey was conducted in the 2014–2015 cotton season in Punjab and Gujarat, India, and Punjab and Sindh, Pakistan. We conducted 300 structured interviews with farmers (180 in India and 120 in Pakistan) and 296 with on-farm workers (179 in India and 117 in Pakistan), divided between BCI and Non-BCI farms.

To choose fieldwork sites, we first selected the two states/provinces in India and Pakistan that had both a substantial area under cotton and produced cotton in large volumes. Within each area, we then selected the administrative subdivisions with the greatest cotton area and production. Within these areas, we selected areas engaged in a BCI project that had been active for at least three years, to allow time for the projects to generate impacts, as well as areas unaffected by any BCI project. The final sample after removing interviews with large numbers of missing responses is presented in Table 1.

4.3. Analytical procedure

Because there are strong incentives for farmers that are closer to – or perhaps even already meeting – standards' criteria to join them, it is possible that associations between standards and positive outcomes occur because standards are attractive to already sustainable producers, not because they incentivize improvements (Blackman and Naranjo, 2012; Blackman and Rivera, 2011). Ideally, studies could address such selection effects using panel data detailing operational activities before and after certification, taking advantage of heterogeneity in certification onset or, even better, by using random assignment (Kumar et al., 2017; Kumar et al., 2019; Zulfiqar et al., 2019). Where these strategies are prohibitively costly, however, studies also can apply propensity score matching to estimate the effects of certification on social, economic, and environmental outcomes (Blackman and Naranjo, 2012). 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). We used Griffin et al.'s (2014) Toolkit for Weighting and Analysis of Nonequivalent Groups (TWANG) to generate our propensity scores. Their method uses machine-learning algorithms to optimize propensity-score-based weights to create balanced datasets for quasi-experimental analysis. After creating the weights, we used the survey package (Lumley, 2010) in R 3.6.2 (R Core Team, 2019) to estimate weighted linear regressions and difference-of-means tests to compare outcomes for BCI and non-BCI farmers. We present plots of the post-weighting distribution of our matching variables for each estimated model in our Online Appendix.

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

Categories	India		Pakistan		Total
	Punjab	Gujarat	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

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

5.1. Farmers' characteristics

Overwhelmingly, surveyed farmers in both countries were male and even where females have land titles in their names, males generally controlled 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 are presented in a table in our Online Appendix. The similarity between the treatment and control samples, even prior to matching, was quite high, suggesting that our strategy of selecting control groups from the same geographical area did yield more comparable groups.

The sample BCI and non-BCI farmers in India and Pakistan were between 32 and 41 years of age and 73% to 93% literate, with a notable outlier in Sindh, Pakistan, where only 49% of farmer respondents were literate. In terms of average school years, BCI farmers in all target states/districts in India and Pakistan reported more years of schooling as compared to non-BCI farmers, though the difference was not statistically significant. Both BCI and non-BCI farmers in India accessed and used credit for cotton cultivation, while neither of the groups did so in Pakistan.

5.2. Cotton input use, yields, prices and income

Fig. 1 presents the results of matched, propensity-score weighted, linear regressions comparing BCI and non-BCI farmers on a range of variables. For ease of presentation, our discussion follows the path of BCI's potential impacts from inputs, through yields, to prices, and, ultimately, farmer income. In principle, BCI's implementing partners are hoping for outcomes like those reported in a focus group in Gujarat:

> *"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".*

The models in Fig. 1, however, suggest, these ideal improvements do not always accrue for the average farmer. We collected data on two major costly inputs, fertilizer and pesticide, which BCI claims to help farmers reduce. As seen in Fig. 1, BCI does seem to be associated with a modest (12.6%) reduction in fertilizer costs, but no substantial difference in pesticide costs. While the quantitative results are mixed, qualitative data from the FGs indicated that farmers were a bit more positive regarding BCI's association with input cost reductions.

When farmers in Punjab, India, were asked if they were saving on fertilizer, they reflected,

> *"It could be that the soil became addicted and we had to put a lot of fertilizer before BCI, but now we put only two bags of urea as recommended."*

In Punjab, Pakistan, similarly, farmers reported using less fertilizer, as well as less pesticide:

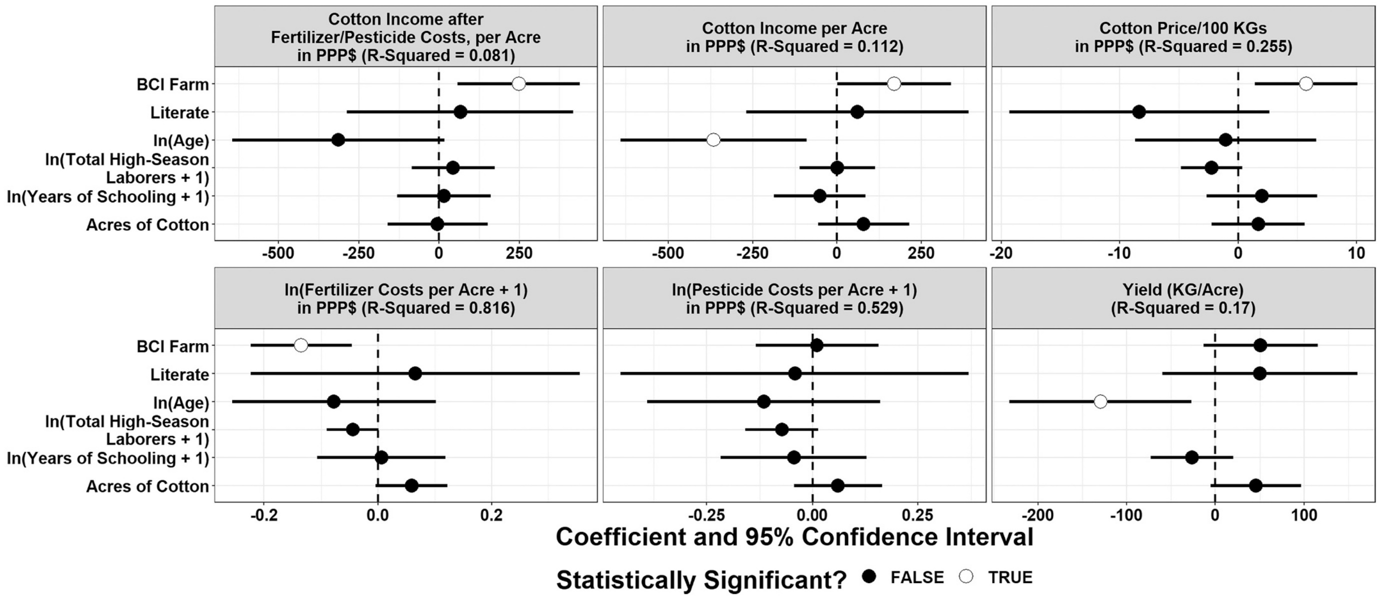

Fig. 1. Estimated weighted linear regression coefficients and 95% confidence intervals. Dependent variables listed in panel headings. Dots represent estimated coefficients. White dots denote coefficients that are statistically significantly different from zero at the 0.05 level. Fixed effects by state/province.

> *"Changes happened in our cultivation practices, identifying friendly pests and sensible use of fertilizers, pesticides and water when needed."*

Farmers in Sindh, Pakistan, similarly reported that BCI implementing partners had convinced them that.

> *"It is beneficial for us to use less fertilizer, pesticides and water and maintain the soil quality as it improves our crop and lowers our input costs."*

In terms of yields, however, the story is less promising. Following matching, we find that while BCI farmers report yields almost 50 kg. per acre higher than those by non-BCI farmers, the average treatment effect is not statistically significant. In the focus groups, however, several BCI farmers nevertheless linked yield benefits to implementing partners' training and support.

While their yields do not appear to be higher than those of their conventional peers, BCI farmers garnered slightly better prices (2.4% higher). While a small substantive difference, prices were quite consistent at the time of the fieldwork, meaning BCI farmers' average prices were five standard deviations higher than the weighted mean reported price. Interestingly, BCI was not explicitly intending to boost prices, though the idea that Better Cotton should fetch higher returns was prevalent across the study sites, reflecting the point made above that voluntary standards rely on these kinds of motivations to scale.

A group of farmers in Punjab, India, for example, reported getting.

> *"10 to 20 rupees per mund (40 kgs.) more… Sometimes we get 50 to 60 rupees per mund higher for better cotton… [It] sells at a higher price as it is cleaner and of better quality than the conventional cotton."*

Similarly, in Gujarat, India, farmers reported seeing an "increase of 10 to 15 rupees per mund of cotton."

In Pakistan, however, the situation was a bit different. In Sindh, farmers asked the researchers to help them get "better price[s] than usual cotton (conventional cotton)," while farmers in Punjab reported hearing.

> *"Farmers elsewhere are getting extra money for growing Better Cotton while over here, some farmers get it (sometimes 20 to 50 rupees per mund) and some farmers don't get it at all."*

Like their compatriots in Sindh, focus group members in Punjab reflected that.

> *"It will be good if some additional money is paid to us as we work hard to keep the cotton clean."*

These price benefits, perhaps in combination with some yield increases, do appear to result in a modest increase (8%) in earnings per acre for BCI farmers. The difference between BCI and non-BCI farmers becomes even more substantial (14.6%) when factoring in input costs, which, as noted above, favor BCI farmers. Focus group farmers generally believed that BCI affected their overall cotton income, though market prices remained the paramount driver. Farmers in Punjab, India, for example, painted an optimistic picture:

> *"We earn about Rs 5000/acre extra as we consider savings that we managed to achieve due to BCI … [F]or example, if we have saved Rs. 2500 and sold our cotton for a better price due to our clean cotton."*

In Punjab, Pakistan, and Gujarat, India, however, volatile prices and pest outbreaks, not BCI, were viewed as the primary concerns at the time of fieldwork.

While the above results paint a modestly positive picture of BCI's impacts on farmers' bottom line, disaggregating the analysis by country shows some important cross-national differences. As Fig. 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.

These findings are important because they highlight the potential role of local context in mediating BCI's impacts. While the differences in income and income minus costs per acre between BCI and non-BCI farmers are substantively similar in the two countries, cost reductions, yield improvements, and price increases are substantively greater in Pakistan than in India, though higher variance and a smaller sample size in the Pakistani responses means we cannot detect statistically significant difference between BCI and non-BCI farmers in the country on some of these measures. In short, similar income outcomes across the two countries hide substantial differences in the mechanisms leading to those outcomes at the farm level.

A significant caveat, however, is that in the 2014–2015 season, cotton production in India, particularly in Punjab, was substantially

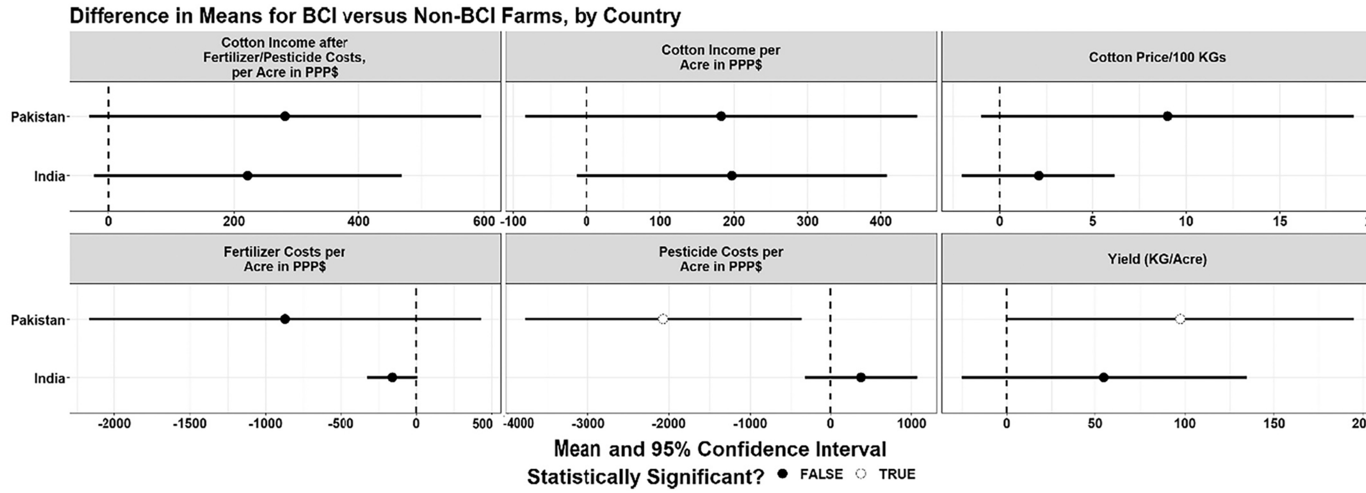

Fig. 2. Difference in means and 95% confidence intervals for BCI versus non-BCI farms, estimated assuming a t-distribution from matched samples separated by country.

affected by pests, making it difficult for BCI partners to cut both pesticide and fertilizer use.

5.3. Benefits for on-farm workers

While we find evidence of pecuniary benefits at the farm level, there is little evidence from our survey that these benefits trickle down to workers. Fig. 3 presents the results of propensity-score weighted linear regressions predicting BCI- and non-BCI workers' daily wages and average hours worked per day. We find no statistically significant differences between BCI and non-BCI farm workers on either measure.

Focus group discussions indicate these null findings are likely a result of the complexity of the local labor regimes with which BCI interacts. In Gujarat, India, for example, female on-farm workers reported earning nearly half their income from cotton. However, these workers primarily were tasked with sowing, weeding, spraying pesticides, and picking cotton, and one female on-farm worker reported,

> *"BCI training negatively affected our income … [because] we are spraying less pesticide, and that reduced our number of days now as compared to the past. Similarly, picking clean cotton requires more time and we end up picking less … We are not paid extra for clean picking."*

The situation is different, however, for workers engaged in a labor tenancy arrangement. In that system, tenant farmers receive about a 25% share of cotton production, while landowners bear most input and production costs. To the extent that BCI was understood to increase yields, therefore, tenants might benefit. The same pattern was also reported in Punjab, India.

The structure of the value chain is an important factor alongside labor patterns. In Pakistan, cotton pickers are overwhelmingly female, seasonal but often local, workers, alongside some migrant contract workers. Perhaps improving their bargaining power relative to female workers in the Indian sites, female on-farm workers in Sindh worked in groups, usually consisting of several families. Typically, their elders negotiated on their behalf to determine working conditions and wages, which were constrained by market rates. These women reported no discernible difference between BCI and non-BCI operations. Similarly, female on-farm workers in Punjab, India, suggested yield and harvest size were more important to their wages than the cotton price. Male farm workers in Punjab, Pakistan, expressed a similar view, noting their weak negotiating position vis-à-vis other value-chain actors.

6. Discussion

Understanding how firms or MSIs combine cooperation and compliance strategies in hybrid cooperation-compliance models helps us connect the BCI's theory of change to impacts in our study areas in Punjab and Sindh, Pakistan, and Punjab and Gujarat, India. As both the BCI and regional market conditions have evolved since the time of our

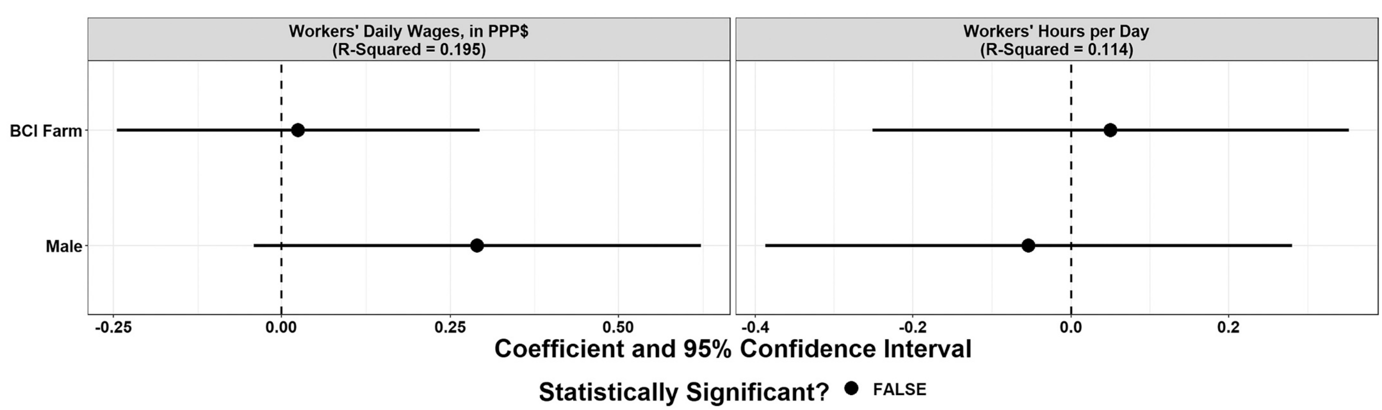

Fig. 3. Estimated weighted linear regression coefficients and 95% confidence intervals for models based on farm worker survey. Dependent variables listed in panel headings. Dots represent estimated coefficients. White dots denote coefficients that are statistically significantly different from zero at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

fieldwork in the 2014–2015, we might well find very different results if we were to undertake the study now or if we were to investigate areas practicing different agricultural techniques or with different levels of BCI uptake. As we have argued above, however, MSIs' impacts are always going to be contextually contingent, which is why we combine our quantitative analysis with qualitative data to help better interpret our findings.

To summarize the discussion in the previous section, our analysis found that, relative to their conventional peers, BCI farmers enjoyed (a) higher gross incomes and (b) lower input costs for fertilizer and, in Pakistan, pesticides. However, (c) BCI had no notable positive impacts on daily wages or working hours. Like all sustainability measures, it would be unreasonable to expect BCI to be a panacea. While the cooperation-compliance model's effects may not universally generalizable, we nevertheless believe they can at least be understood in light of particular institutional designs, value chains, time periods, and institutional contexts.

In the case of cotton MSIs, the institutional design of the BCI as opposed to other sustainable cotton MSIs, such as those for organic production, appeared to facilitate the rapid take-up of Better Cotton in the value chain. Organic cotton includes the production of a perceived high quality, niche product that is made in smaller quantities than Better Cotton and sold at higher mark-ups in Northern markets. Organic cotton production involves stricter sustainability criteria, more frequent auditing/monitoring, and higher costs related to segregation of organic cotton throughout the entire value chain to ensure traceability. In turn, farmers also have the possibility of earning a premium on their production. In the case of BCI, the quantities of Better Cotton produced are much larger. As a result of the high demand from giant retailers, buyer demand for Better Cotton is automatically "transported" down the value chain through garment manufacturers to fabric mills, spinners, ginners and farmers. Indeed, spinners and ginners simply respond to customer demand higher up the chain. At the same time, BCI sustainability criteria are not as stringent as those of organic production and the use of "artificial" pesticides is allowed, giving cotton farmers the ability to combat pests that arise in some seasons. Hence, not only is retailer demand for Better Cotton much higher than it is for organic cotton, entry barriers into BCI value chains also appear to be lower for small-scale farmers in South Asia than is the case with organic cotton production.

The higher prices we observe for BCI farmers in the 2014–2015 growing season, for example, might result from retailer/brand demand for Better Cotton in India and Pakistan exceeding supply at the time of the research (BCFTP, 2016). As supply has since substantially increased, prices for Better Cotton may have declined. Without price premiums for Better Cotton, it is unclear whether or not differences in yield would be sufficient to maintain differences in income per acre as compared to conventional farms.

Temporal context also helps us interpret another clear finding. In both India and Pakistan, BCI's cooperation-compliance model appeared to benefit farmers more than laborers. It is important to remember BCI's training was designed to create an environmental "business-case" for farmers, helping reduce costs, and our focus groups indicate that, even if cost reductions are not always statistically significant, several farmers in our study areas believed they were enjoying lower input costs and higher prices. It is only more recently that the BCI has begun to address working regimes on cotton farms (BCI, 2021d).

Our study also demonstrates that cooperation-compliance models' impacts can be contingent on institutional context. We documented some substantial differences in impacts in our Pakistani, as compared to our Indian, study areas. These differences may be explained by a combination of factors. First, the study areas in Pakistan had a history of working with pre-BCI projects focused on improving environmental management on cotton farms since 2006. These projects were subsequently reformed and incorporated into BCI capacity-building initiatives. In contrast, while Indian farmers had engaged a variety of standards, our interviews suggested that BCI projects in our study areas there were generally starting from scratch, engaging farmers who had little to no previous training in environmental management. Second, in Pakistan, the implementing partner responsible for both projects studied benefitted from a pre-existing infrastructure of local offices, trained manpower, field facilitators, and detailed knowledge of the BCI standards already in 2010. Implementing partners in our Indian study areas did not enjoy such advantages. Still, focus group farmers in both study sites in Pakistan explicitly attributed their income benefits obtained from this implementing partner's BCI training. In Pakistani Punjab, for example, farmers reported that.

> *"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".*

In Sindh, farmers were even more laudatory:

> *"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)."*

Finally, while the cooperation- compliance model did not appear to have much impact on work conditions of on-farm workers, variegated institutional contexts can help explain this null result. As explained above, agricultural labor regimes were substantially different in the four study areas. Differences in labor regimes, wage-negotiation procedures, migration patterns, and the extent of sharecropping all mean that BCI can have substantially different implications for different types of workers in different places.

7. Conclusion

MSIs like the BCI often combine compliance and cooperation strategies for promoting more sustainable production in global value chains. All such market-based governance programs rely on financial benefits to farmers, and, ideally, workers in order to drive uptake. Using a mixed-methods analysis of BCI's impacts on farmer's input costs, yields, and income per acre, we find evidence that BCI is associated with modest, but statistically significant, increases in farmer income due to cost reductions, and, in the case of our study areas in Pakistan, improved yields. However, these benefits did not trickle down to on-farmer workers at the time of our fieldwork.

At the same time, BCI focus group farmers in both countries generally thought BCI-related capacity building was effective, valuable, and impartial, particularly absent effective extension services by the government and in contrast with aggressive sales tactics used by firms purveying fertilizers and pesticides. Our analysis thus supports the assertion that MSIs, such as the BCI, may be able to employ robust cooperation-compliance models that enable farmer compliance with sustainability at least some principles and criteria.

Another important caveat, however, is that in 2014–2015 cotton production in India, particularly in Punjab, was affected by pests, making it difficult for BCI partners to cut their use of pesticides and fertilizers in that particular season. This indicates temporal and locational factors often interact to shape MSIs' impacts.

Future research on cooperation-compliance strategies and MSIs in general will benefit from careful analysis of how differing MSI designs, alongside temporal, contextual, and value chain dynamics shape initiatives' impacts. Mixed-methods approaches like the one presented here, which can identify large-scale differences and also investigate possible factors driving those differences, will continue to be invaluable for developing our understanding of the conditions under which these initiatives can have positive impacts, as well as the situations where they may impose costs on vulnerable groups.

Declaration of Competing Interest

The authors have no conflicts of interest of which they are aware.

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Appendix A. Supplementary data

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