

# COTTONCONNECT IMPACT REPORT 2022







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## REEL Cotton Highlights

Full REEL Cotton Programme results are reported from [page 14](#).



Reduced chemical  
pesticide use by  
**-16.6%**

The results of the REEL Cotton Programme in 2021-22 show a reduction in inputs affecting soil health and the environment, compared with control farmers.



Reduced chemical  
fertiliser use by  
**-20.4%**



Reduced  
water use by  
**-11.4%**



Increased yield by  
**+6.6%**

The results show an improvement in programme farmers' income from cotton farming, compared with control farmers.



Reduced Input cost by  
**-11.4%**



Increased profit by  
**+18.1%**



Climate Change  
Saving potential  
in CO<sub>2</sub> eq.  
**-35.9%**

An LCA study of REEL Cotton Programme data demonstrates the benefits of its sustainable practices in reducing the negative impact of cotton cultivation on the environment including on



Eutrophication  
Saving potential  
in phosphate  
**-50.3%**



Water consumption  
Saving potential in  
water consumption  
**-40.3%**

The REEL Cotton Programme 2021-22 results refer to a 11.4% reduction in water use measured on a hectare basis during a single season. The LCA study calculated the potential to reduce water consumption by 40.3%, with calculations based on per kg of fibre (i.e. affected by yield increases) over multiple years.

## Introduction from CEO



Our focus has always been on delivering positive, measurable impact – for the smallholder farmers enrolled in our sustainable agriculture programmes, for their communities, and for the environment. By connecting sustainably produced cotton directly into brands' supply chains, we play a role in increasing sustainable choices for consumers.

For us, it's not just about reducing the negative impacts of cotton cultivation on the environment, for example through reduced water and chemical use. We're also looking at the positive impact our programmes can have on the environment through improving soil health, biodiversity and water management. We aim to build the resilience of cotton farming communities through gender equality, financial equity and a just transition. More importantly, involving farmers in decision-making and providing an inspirational future.

In fact, our 'Reimagining the future for supply chains' strategy is focused on the resilience and growth of farming communities and helping

brands access more sustainable cotton and other natural fibres to create transparent and resilient supply chains.

In our first Impact Report, we're pleased to report that our core programmes have delivered positive impact results in all the environmental and social areas we measure. The REEL Cotton Programme, with data aggregated from all programmes in 2021-22, has increased profit for REEL Cotton farmers by 18.1% compared with control farmers. The sustainable agricultural practices have reduced the impact of cotton farming on the environment, with chemical use reduced by 16.6%, chemical fertiliser use reduced by 20.4% and water use reduced by 11.4%.

CottonConnect is also an implementing partner of Better Cotton, which reports on its Farmer Results in its Impact Report at [bettercotton.org](https://bettercotton.org).

Defining and measuring sustainably grown cotton is not straight-forward and we are contributing to collaborative industry efforts to determine the relevant indicators to measure,

e.g. Delta Framework Sustainability Indicators and the work of Sustainable Apparel Coalition's MSI Methodology Cotton Expert Team.

In addition to our regular programme data measurement, this year we've invested in an LCA study of REEL Cotton to better understand how the outcomes of the sustainable agricultural practices in the REEL Cotton Programme translate into potential impact on the environment and climate.

None of this is possible without the dedication and expertise of the CottonConnect Board of Directors, the global CottonConnect team and our implementing partners and we thank them for their vital contribution. Our mission has never been more urgent and we keenly feel the responsibility and privilege to bring positive impact to the lives of men and women of cotton farming communities.

A handwritten signature in black ink, appearing to read 'Alison Ward'.

**Alison Ward**  
**Chief Executive Officer**  
**CottonConnect**



## Executive Summary

True responsibility is shown in understanding not only the activities and outcomes of interventions to improve sustainability, but also the impact. CottonConnect monitors the results of its agricultural training programmes and is reporting on how its activities and outcomes can lead to positive impact on environment, climate and livelihoods.

CottonConnect is a company with a social purpose to reimagine cotton supply chains and help textile producers and farmers enjoy better livelihoods. It helps brands access more sustainable cotton and other natural fibres to create transparent, traceable and resilient supply chains that will continue to deliver the best raw materials.

For over 12 years, CottonConnect has delivered agricultural training programmes to increase cotton farmers' incomes, profitability and productivity. In the cotton growing year 2021-22 CottonConnect trained over 447,000 farmers in sustainable agricultural programmes in India, Pakistan, Bangladesh and China.

The cotton grown is directly traceable through supply chain linkages into brands' supply chains. In 2021-22 103,000 MT cotton was traced through CottonConnect's traceability software tool TraceBale.

### REEL COTTON

The results of the REEL Cotton Programme in 2021-22 show a reduction in impact on the environment and an improvement in farmers' income from cotton farming, compared with control farmers.

- **Reduced chemical pesticide use by 16.6%**
- **Reduced chemical fertiliser use by 20.4%**
- **Reduced water use by 11.4%**
- **Increased yield by 6.6%**
- **Reduced input costs by 11.4%**
- **Increased profit by 18.1%**

These results, which are second and third-party verified, relate to the REEL Cotton Theory of Change, specifically in the areas of sustainable land management and environmental stewardship. The results are achieved by supporting farmers to adopt the sustainable agricultural practices taught in the REEL Cotton Programme. The three-year programme is farmer-led with criteria developed specifically for cotton farmers' needs.

In order to assess how the positive outcomes of the REEL Cotton Programme potentially reduce the impact on the environment, CottonConnect commissioned a Life Cycle Assessment (LCA) study. The results of this study showed a clear improvement across the majority of indicators for the REEL Cotton Programme. This demonstrates the benefits of the sustainable practices outlined by REEL Cotton Code of Conduct 3.0 in reducing the negative impact of cotton cultivation on the environment.

## ORGANIC

CottonConnect's Organic Cotton Farmer Training Programme supports farmers on a three to four year transition from conventional cotton growing to organic cotton practices. The adoption of agricultural practices such as preparing bio-pesticides and bio-fertilisers resulted in a reduction in input costs by 35.7%, as an aggregated result across Organic Cotton Farmer Training Programmes in 2021-22.

In 2021-22 farmers taking part in the programme adopted sustainable practices from the training, including

- **intercropping (98%)**
- **pest management (100%)**
- **soil fertility management (100%)**
- **water efficiency practices (55%)**

To further investigate the benefit and opportunities for regenerative agriculture in cotton farming, for the 2020-21 growing season, CottonConnect started a Regenerative Agriculture and Carbon Sequestration Pilot Project. The 2021-22 results show an increase in adoption of regenerative agriculture practices compared with the 2020-21 baseline.

## HSSE (HEALTH AND SAFETY) FOR GINS

CottonConnect has developed an HSSE programme to improve health and safety at gins. The aggregated results from all HSSE Gin programmes in India, Pakistan, Bangladesh and China in 2021-22 show an improvement in health and safety indicators. The baseline is aggregated baseline measurements recorded from HSSE programmes in 2019-20 and 2021-22.

- **Compliance with safety aspects 88.7% (baseline at 67.3%)**
- **Adoption of precautionary measures 100.0% (baseline at 51.0%)**
- **Usage of Personal Protective Equipment (PPE) by gin workers 93.3% (baseline at 36.2%)**
- **Availability of proper Water, Sanitation and Hygiene (WASH) facilities for gin workers 97.6% (baseline at 95.0%)**

## FINDINGS

1. REEL Cotton programmes continued to deliver positive results in 2021-22, reducing the use of chemical pesticides, chemical fertilisers and water, while increasing farmers' yields and incomes.
2. An LCA study demonstrated the benefits of the REEL Cotton Programme in reducing environmental impacts, including CO<sub>2</sub> equivalent which affects climate change.
3. A focus on women in cotton promotes improved livelihoods, even beyond cotton farming.
4. Addressing health and safety in gins helps advance responsible cotton production.
5. Tracing cotton from farm to fashion and connecting REEL Cotton and Organic cotton into supply chains increases responsible consumption of cotton.
6. Collaboration among the textile industry is necessary for a consistent and universally recognised criteria and measurement of sustainable cotton.

For brands, the impact results can provide assurance that the investment in these sustainable cotton programmes delivers the anticipated results to improve farmers' livelihoods and reduce the impact of cotton production on the environment, contributing to sustainable sourcing and ESG goals.

For the cotton industry, the impact results and LCA study advance understanding of how sustainable agricultural practices can have a positive impact on environment, climate and livelihoods.

# Overview of CottonConnect

## PROGRAMMES

Programmes reporting 2021-22 results in this report:  
REEL Cotton, including Women in Cotton  
Organic Cotton Farmer Training Programme  
HSSE (Health and Safety) for Gins



Programmes underway but not reporting 2021-22 results in this report:



## FARMERS

Number of farmers trained in 2021-22:

**447,000**

Total farmers

Traceable fibres TraceBale volume in 2021-22:

**103,000**

MT cotton

## COUNTRIES

Locations of programmes reporting 2021-22 results in this report:

PAKISTAN

INDIA

BANGLADESH

CHINA

## FOCUS AREAS



Environment



Climate



Livelihoods



Gender

## Context

Cotton accounted for almost a quarter (24%) of global fibre production in 2020, with 30% of cotton used in the fashion and textiles industry coming from sustainable cotton programmes and initiatives recognised by the Textile Exchange 2025 Sustainable Cotton Challenge<sup>1</sup> of which CottonConnect was a founding signatory. The signatory companies aim to meet targets to source 100% sustainable cotton by 2025. Brands and retailers partner with CottonConnect and other organisations to accelerate their sourcing of sustainably produced cotton.

CottonConnect defines sustainable cotton as cotton that has been produced using farming practices which minimise environmental impact, such as by reducing the use of water, chemical fertilisers and pesticides, and improve the livelihoods of the cotton farmers through increased income and social fairness.

CottonConnect's REEL Cotton is recognised by Textile Exchange as preferred cotton. Textile Exchange currently defines a preferred fibre or material as "one which results in improved environmental and/or social sustainability

outcomes and impacts compared to conventional production." Textile Exchange is evolving a new definition of preferred fibre for adoption in 2023.<sup>2</sup>

CottonConnect's agricultural programmes have been specifically designed to address the sustainability issues in cotton production. Conventional practices within cotton production can have detrimental impacts on the environment. Excessive use of chemical pesticides and fertilisers can harm soil health, contaminate water and other crops and can pose a health and safety risk. High water consumption can deplete local water resources. That is why farmers are trained to reduce the use of chemical pesticides and fertilisers and use water management methods to minimise water consumption.

A resilient future also requires taking a holistic view of cotton farming communities beyond their cotton production by supporting with training on alternative income sources, specific training for women and promoting education for children.





When assessing the impact of its sustainable cotton programmes, CottonConnect recognises the importance of listening and learning from farm communities. In December 2020 and January 2021, CottonConnect conducted a survey amongst farmers, implementing partners, ginners, verification partners and employees in India, Pakistan, Bangladesh and China. When asked what they considered to be the most important environmental issue with regard to sustainable cotton and sustainable cotton supply chains, the responses revealed climate change and the monsoon cycle to be the most important issue, followed by chemical use and soil health. The most important social issues were health, hygiene and safety, living wages and migratory labour rights.

The effects of climate change are currently being seen in cotton farming communities. In 2022 Pakistan endured a record-breaking heatwave followed by catastrophic floods. The floods had a severe impact on cotton farming, with estimates of 40% of the country's cotton crop lost due to the floods<sup>3</sup>. Working with its local partners, CottonConnect provided relief aid in the form of food packages, medical kits and

temporary shelter to those affected. However, the recovery will take years. CottonConnect is now focusing on a rebuild plan working with local Government institutions to support communities to re-establish their farms and livelihoods.

Sustainable cotton programmes therefore need to include mitigation of the effects of climate change already happening, and increased focus on reducing carbon emissions to limit further global warming, in line with the Paris Agreement<sup>4</sup> to limit global warming to 1.5°C by 2050.

This requires greater understanding of the impacts of reducing the use of chemical fertilisers and the benefits of regenerative agriculture practices to improve soil health, water quality and biodiversity. Measuring these longer-term impacts can be difficult however, and relies on emerging technology and methodologies for accurate measurement. By contributing to industry measurement projects such as the Delta Framework<sup>5</sup>, CottonConnect seeks to support aligned monitoring and reporting across the cotton sector.



1. Textile Exchange Sustainable Cotton Challenge Fourth Annual Report 2022
2. Textile Exchange Preferred Fiber & Materials Market Report, October 2022
3. <https://www.pakistantoday.com.pk/2022/09/26/pakistan-floods-raise-fears-of-hunger-after-crops-wrecked/>
4. <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>
5. <https://www.deltaframework.org/about/>

## Reimagining the Future for Supply Chains

The results measured and reported in this impact report are of direct relevance to CottonConnect's core business operations of delivering sustainable agricultural and supply chain programmes. This is driven by the Reimagining the Future for Supply Chains strategy (2020-2023), with its vision to help global brands source more fairly and sustainably thereby enabling textile producers and raw material farmers to work more responsibly and enjoy better livelihoods.



## REEL Cotton Theory of Change

The REEL Cotton Theory of Change illustrates how the interventions of the REEL Cotton Programme lead to positive impact, for example training farmers on the use of bio-pesticides leads to outcomes e.g. farmers using bio-pesticides in place of chemical pesticides, which in turn leads to impact e.g. soil health is preserved through the use of bio-pesticides and reduced use of chemical pesticides.

For each REEL Cotton Programme, specific key performance indicators (KPIs) are measured:



### YIELD

By increasing the amount of cotton harvested, farmers have more cotton to sell, thus increasing their income. This is especially important for smallholder farmers relying on growing cotton to make a living.



### INPUT COSTS

Introducing sustainable agricultural methods which reduce the use of chemical pesticides and fertilisers reduces the expenditure on these inputs.



### PROFIT

Increased profit due to higher yield and reduced input costs which can have a significant impact on profit means more income is retained by the farmer.



### WATER USAGE

Growing cotton conventionally uses a lot of water, so sustainable agronomic training promotes water efficiency to preserve this natural resource. Farmers are encouraged to adopt measures to optimise water use for irrigation and recharge water resources.



### CHEMICAL PESTICIDE USAGE

Chemical pesticides can be harmful to farmers during application and can have a negative impact on biodiversity. Farmers are taught to use non-chemical methods of pest control, as well as how to identify friendly and enemy insects, and apply pesticides accordingly.



### CHEMICAL FERTILISER USAGE

Chemical fertilisers can have negative environmental impacts and can often be a costly input. Introducing composting and crop rotation can reduce the need for chemical fertilisers, reducing input costs and protecting soil health.

Definitions from ISEAL Code of Good Practice "Assessing the Impacts of Social and Environmental Standards Systems":

### OUTCOME

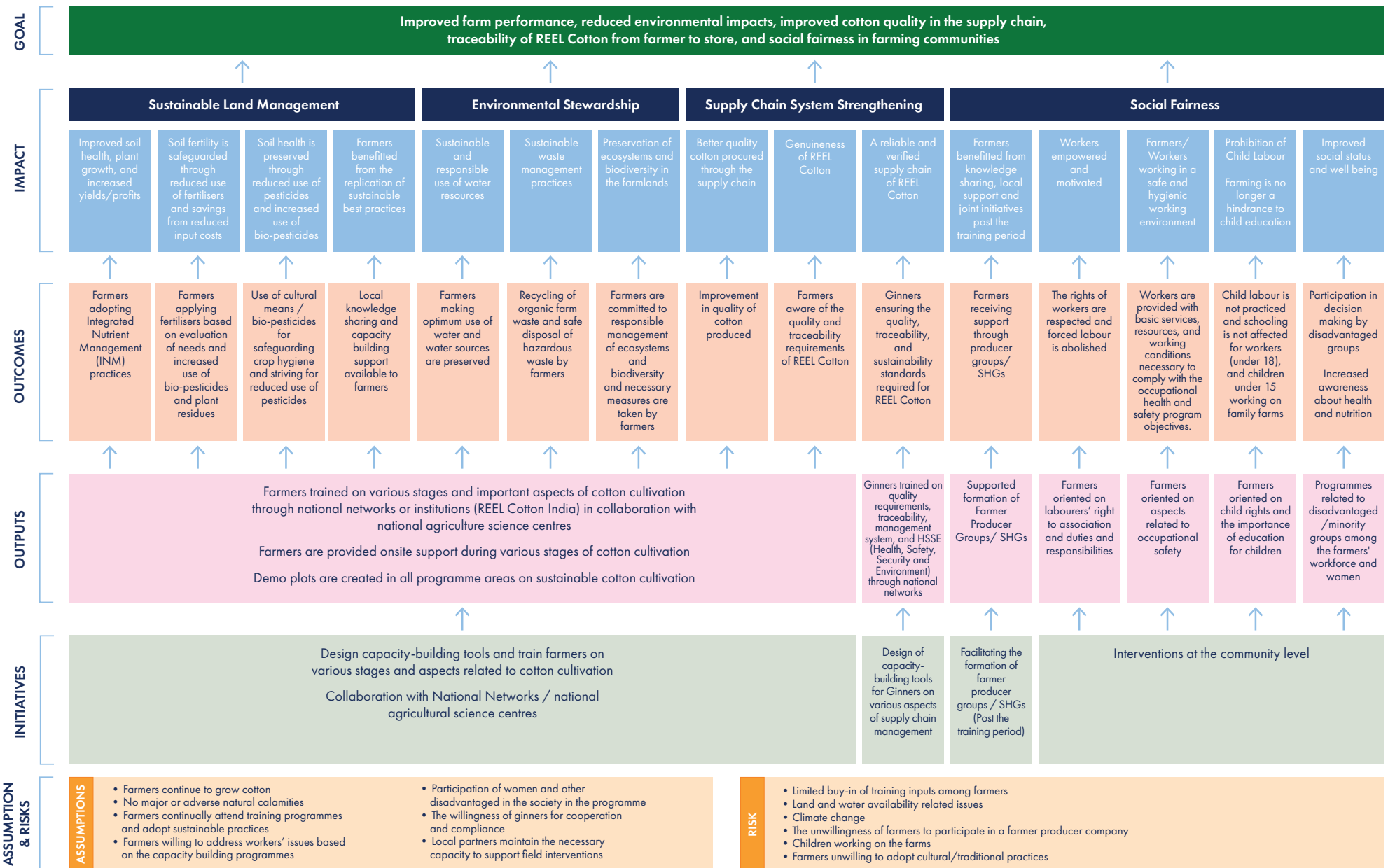
The likely or achieved short-term and medium-term results from the implementation of a standards system's strategies. (Adapted from OECD Glossary, 2002).

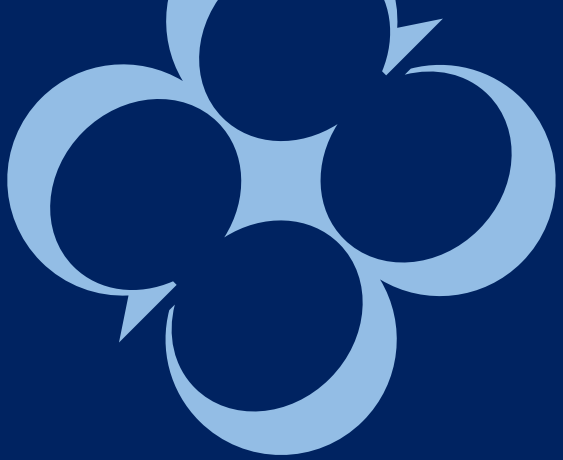
### IMPACTS

Positive and negative long-term effects resulting from the implementation of a standards system, either directly or indirectly, intended or unintended. (Adapted from OECD Glossary, 2002).



# REEL Cotton Theory of Change





# Impact results 2021-22

(April 2021-March 2022)



## REEL Cotton results

REEL Cotton results for 2021-22 aggregated for all REEL Cotton programmes in India, Pakistan, Bangladesh and China.



Increased yield by

**+6.6%**



Reduced Input cost by

**-11.4%**



Increased profit by

**+18.1%**



Reduced chemical  
pesticide use by

**-16.6%**



Reduced chemical  
fertiliser use by

**-20.4%**



Reduced  
water use by

**-11.4%**

**KPIs measurement units:** Yield (kg/acre), Water use (m<sup>3</sup>/acre), Pesticides (ml/acre), Fertiliser (kg/acre), Input cost (USD/acre), Profit (USD/Acre)

**Sample size:** Approximately 50% sample of farmers in REEL Cotton training programmes compared with an equivalent of 10% of project sample farmers as control farmers adopting conventional farming methods.

**Verification:** Second-party verified by CottonConnect and third-party verified by FLOCERT.



## How the impact results demonstrate the Theory of Change

### Sustainable Land Management

Improved soil health, plant growth, and increased yields/profits

Soil fertility is safeguarded through reduced use of fertilisers and savings from reduced input costs

Soil health is preserved through reduced use of pesticides and increased use of bio-pesticides

Farmers benefitted from the replication of sustainable best practices



Yield increased

**+6.6%**



Chemical fertiliser use reduced

**-20.4%**



Chemical pesticide use reduced

**-16.6%**



Profit increased

**+18.1%**



Input costs reduced

**-11.4%**

### Environmental Stewardship

Sustainable and responsible use of water resources

Sustainable waste management practices

Preservation of ecosystems and biodiversity in the farmlands



Water use reduced

**-11.4%**

See [page 12](#) for the complete Theory of Change

## Analysis

The purpose of the impact evaluation is to assess the efficacy of the REEL Cotton Programme in delivering positive impacts as intended through the Theory of Change.



Adoption of sustainable water management practices such as alternate furrow irrigation and deficit irrigation paved the way for reduced use of irrigated water by project farmers in comparison to conventional farmers (-11.4%).



Following the guidance provided about the selection of pest-resistant seed varieties and efficient irrigation practices, along with effective nutrient and pest management practices (reducing chemical pesticide usage by 16.6%), has helped in achieving higher yields for project farmers (+6.6%).



Optimised usage of fertilisers based on soil test results has helped project farmers to reduce the use of chemical fertilisers (-20.4%).



Efficient use of fertilisers and pesticides by project farmers helped them in reducing input costs (-11.4%).



Better yields, reduced inputs costs and efficient utilisation of resources contributed towards better profits for the project farmers (+18.1%).



## Analysis continued

### LIMITATIONS OF THE ANALYSIS

- There are multiple methods available for the estimation of impact numbers. The globally accepted methods are followed in estimating the impact. If a different methodology is used to assess the impact, there could be slight variations in the impact numbers.
- There is scope for assessing the impact under more KPIs. However, due to the need to limit the data collection points in order not to inundate farmers with questions and data requests, there are a limited number of indicators prioritised.
- The results are provided at a global level. The specific interventions and relevant outcomes at regional levels are not evident in the above results.

### HOW THE CONTEXT MAY AFFECT THE RESULTS

- In certain regions and with some farmers in Pakistan and Bangladesh, the usage of chemicals, though lesser than the control group, is still higher than in India on average. This trend is due to increased usage amongst farmers in case of rampant pest attacks. With further support and confidence building, the farmers are expected to trust the sustainable practices being followed even in emergent cases.
- Highly erratic weather patterns and rainfall in the recent seasons due to climate change has forced the farmers to resow (involving more seeds and higher labour costs), and uneven use of pesticides and fertilisers to salvage crops. This can be avoided by continued exposure to the sustainable cotton production practices.

### RECOMMENDATIONS

- Continuous long-term implementation of sustainable agronomic practices will not only help the farmers solve immediate issues like higher production costs and reduce the impact of harmful chemicals to their soils, but also prepare their soil to combat the effects of climate change and retain or increase its organic matter in the longer term. Declining soil fertility is a major concern from an environmental and farmer livelihoods perspective.
- The REEL Cotton Programme equips the cotton farmers with tools to combat climate change, restore soil and farm biodiversity and replenish the soil's moisture retention capacity.
- The data suggest that there is room to further improve the yield. Continued innovation and linkages to better and high yielding seed varieties may help farmers improve yield, income and profitability levels.



## VERMICOMPOSTING HELPED REDUCE RELIANCE ON CHEMICAL FERTILISERS, REDUCE EXPENSE AND IMPROVE SOIL HEALTH

Jayesh Madhav Patel of Kayavarohan village in Gujarat, India grows cotton and castor on his family farm. He joined CottonConnect's REEL Cotton Programme in the year 2021-22 and was introduced to vermicomposting. He decided to give it a try, as in the previous year he had observed a steep rise in his expense due to the use of chemical fertilisers. Like other conventional farmers around him, Jayesh had been applying DAP, urea, ammonia and potash with the hope of a better and higher yield.

The programme team trained him to prepare his own compost and provided a vermicompost bed to initiate composting. With training support and guidance from the team, he was able to prepare enough manure to use in his field. The use of compost helped Jayesh reduce his expense and also improved the quality of the soil.

When he used chemical fertilisers, he would apply 82.5 kg/acre each of DAP, potash and ammonia and 165 kg/acre of urea. In addition to the expense of buying these fertilisers, the use of these had rendered the soil incredibly dense and destroyed the earthworms and other beneficial bacteria in the soil. Using the compost bed provided as part of the REEL Cotton Programme, Jayesh produced two tons of compost. This practice also helped him deal with all the waste on his farm which he used for composting.

Jayesh has observed that this season his soil was healthier and the fertility had improved. The practice helped Jayesh save more money and get a healthier harvest this year. He shared that he was now aware of the harmful effects of chemical fertilisers on soil, air and humans and he's happy that by practising vermicomposting, he is able to positively contribute towards improving air, water and soil quality.



NAME:

**JAYESH MADHAV PATEL**

LOCATION:

**KAYAVAROHAN, GUJARAT, INDIA**

*“ We’re pleased to see CottonConnect’s programmes are reducing the negative impacts of cotton production on the environment and also promoting practices to deliver improvements in soil health, water, biodiversity, climate, and communities. This supports Textile Exchange’s end goal to help scale a global cotton production system that not only works to reduce negative impacts but harnesses the positive co-benefits that cotton can bring to people and the environment.”*

**LA RHEA PEPPER, CATALYST AND CO-FOUNDER, TEXTILE EXCHANGE**



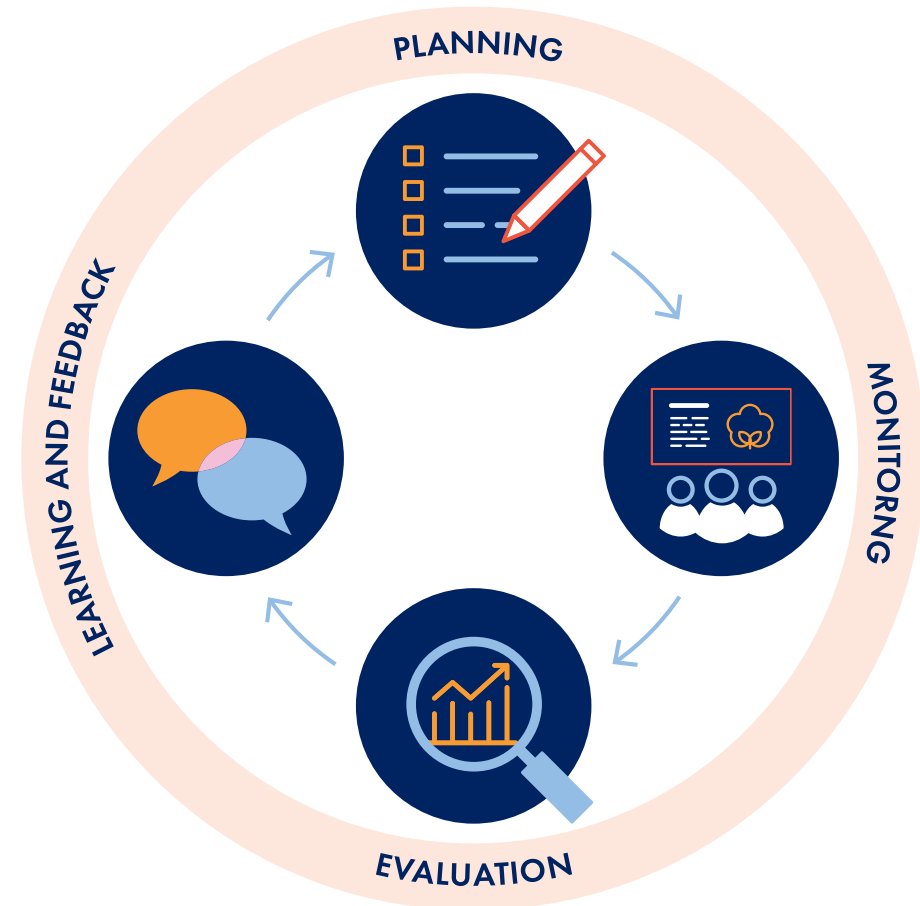
# Methodology

## DATA COLLECTION

- **Baseline:** Basic information such as demographic, agronomic, and socio-economic details of the previous season is collected by the local implementing partner to analyse the need of the group of farmers. The baseline is conducted only once in the first year of the three-year programme.
- **Farmer Field Book:** Farm-level data is collected throughout the season in Farmer Field Books (on farm inputs, cotton production and income) to supplement the year-end impact assessment and claims. The data is collected by field executives of the local partners at the respective stages of cotton production – land preparation, fertiliser and pesticide application, irrigation, harvesting and selling. The data is reviewed, validated and digitised by the supervisors and shared with the CottonConnect team.

## DATA ANALYSIS

- **Analysis:** The digitised dataset is checked and validated by CottonConnect, liaising with the local partner with any queries. The dataset is then analysed against the KPIs. Based on the KPIs, the data tables are developed. Historical data analyses are conducted for the completed farmer batches as well as for the ongoing farmer batches based on the results obtained.
- **Insights:** Field-level insights and secondary literature is incorporated to give a 360-degree understanding of the results obtained. The results are compared at various levels including control farmers, previous year results as well as secondary data from government sources. This gives a deeper understanding of the scenario.



## Verification

The verification process ensures adherence of programme activities to all the REEL Code criteria as defined in the Code of Conduct (CoC). The process is carried out by internal teams and external experts.



### INTERNAL VERIFICATION SYSTEM

#### – First-Party and Second-Party Verification

The first-party verification, also known as self-assessment, is conducted by the local partner where they audit a process or set of processes in the quality management and implementation of the programme to ensure it meets the requirements of the REEL CoC. The ME&L team of CottonConnect does the second-party verification to ensure the programme meets the REEL CoC requirements. The assessment covers the implementation body, including CottonConnect's farm team and the local partner, farmers being trained under the programme, and ginners participating in the programme.



### EXTERNAL VERIFICATION

#### – Third-Party Verification

CottonConnect works with FLOCERT for the third-party verification of the REEL Cotton Programme. FLOCERT conducts the verification in the second year of a three-year programme. FLOCERT conducts the third-party verification where it cross-checks implementation, documentation, and system via data collected by auditors in correlation to REEL Cotton CoC.



The verification by FLOCERT is completed at two levels:

- Type A: relevant verification at the implementation body level (local partner and CottonConnect)
- Type B: relevant verification of farmers and gins.

Under the verification of implementing body, validation of documents related to the internal management system (agreements, etc.), training materials, registers and other documentation required under REEL CoC are cross-verified through the interviews of local partner staff to assess the overall programme knowledge and broader discussions with CottonConnect's local team.

Farmers are verified by onsite farm and demo plot visits, farmer interviews, Farmer Field Book data cross-verification and documents maintained at the farmer group level. Verification of gins is carried out via onsite visit to the ginning units, interaction with the ginner and managers/supervisors for overall programme knowledge assessment, relevant documentation checks related to traceability and HSSE, general observations, and interaction with the workers.

FLOCERT shares the verified data with remarks/observations against each criteria of the REEL CoC, a narrative summary of observations/critical findings and an overall score of the programme.

This multi-level methodology monitors the programme against the sustainability criteria of the REEL CoC. The verification process is further explained in the [Monitoring and Evaluation Processes and Verification Mechanisms document](#), available at [cottonconnect.org](http://cottonconnect.org).



*“ Mark’s has partnered with CottonConnect since 2011 and we have seen how educating cotton farmers on sustainable farming methods can reduce the impact on the environment and enhance their livelihoods by growing high-quality cotton. For example, farmers who participated in the drip irrigation programme in India in 2021 saw a 10.5% increase in yield while achieving a 13.2% reduction in water usage, 20.8% reduction in chemical fertiliser usage and 5.3% reduction in input costs, compared to a control group.”*

**IAIN SUMMERS**, VP PRODUCT DEVELOPMENT INNOVATION & TECHNOLOGY, MARK’S

# Organic Cotton

## ORGANIC COTTON FARMER TRAINING PROGRAMME RESULTS 2021-22

CottonConnect's Organic Cotton Farmer Training Program supports farmers on a three to four year transition from conventional cotton growing to organic cotton practices. The detailed farmer training modules cover all the aspects of organic cotton cultivation, the certification process, health and safety of the farmers, organic integrity and ICS (Internal Control System) documentation.

Preparing and using farm bio-inputs instead of chemical pesticides and fertilisers reduces expenditure and brings benefits for soil health and biodiversity.

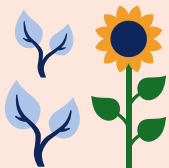


# -35.7%

Input costs reduction

The adoption of agricultural practices such as preparing bio-pesticides and bio-fertilisers resulted in a reduction in input costs by 35.7%, as an aggregated result across Organic Cotton Farmer Training Programmes in 2021-22.

Farmers taking part in the programme adopted sustainable practices from the training, including:



intercropping

# 98%



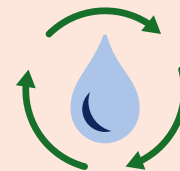
pest management

# 100%



soil fertility management

# 100%



water efficiency practices

# 55%

## ORGANIC INTEGRITY

Organic integrity is the core of any organic programme. Over the past 10 years, CottonConnect has developed a number of systems and critical control points working closely with all parties in the supply chain. This provides brands with confidence in the organic supply chain, while giving farmers and ginners access to market and premiums.

CottonConnect's approach towards organic cotton goes through a rigorous process which starts even before sowing, where non-Bt seeds are carefully sourced from the suppliers. Regular GMO and pesticide residue tests are conducted throughout the season, covering at least five stages of the crop. CottonConnect also collects and validates the scope certificates and appropriate training is given to ensure that the cotton is grown and harvested according to relevant organic certification standards.

## Traceability of organic cotton

CottonConnect ensures mapping of the farmer group to a GOTS or OCS certified ginning unit. It verifies the GOTS scope certificate from the ginning unit when cotton is sold, after which the brand's supply chain takes over. The issue of traceability is taken care of by CottonConnect's proprietary traceability software, TraceBale, through which organic cotton can be tracked throughout the supply chain. Regular data is collected from the farms and is updated in TraceBale for effective tracking.

### SUPPLY CHAIN LINKAGES FOR ORGANIC CUSTOMERS

CottonConnect helps identify and enrol the organic-certified farm groups and ginners into respective programmes based on the required cotton qualities and regions. The allotment of the required quantities with respective farm groups is planned before the start of the season and eventually the lint is linked to the respective spinners advised by the brands. The necessary requirements of documents/certifications are ensured and in cases where premium validations are a part of the programme, this exercise is carried out.

Traceability in the textile supply chain encompasses collecting of transactional and process requirements in the whole value chain, validating their integrity, and arresting any leakages. CottonConnect captures all the data from farm groups and adds processors up to the ginner level. When the lint is linked to a spinner, and further up the supply chain, the respective details will be added in TraceBale and the process flow would be captured.

Additionally, premium validation is a necessary step to ensure that the premium has reached the farmer level. The premium from the brand travels through the supply chain to the farmer level. CottonConnect validates the premium receipt by the farmer by physical and digital verification.



## Regenerative Organic pilot programme

Many of the sustainable agricultural practices that CottonConnect promotes through its REEL Cotton and Organic programmes already support regenerative agriculture, such as intercropping and crop rotation, use of bio-compost, farm yard manure, homemade bio-pesticides, producing own seeds, and water saving techniques.

To further investigate the benefit and opportunities for regenerative agriculture in cotton farming, for the 2020-21 growing season, CottonConnect started a Regenerative Agriculture and Carbon Sequestration Pilot Project with 100 organic farmers in Madhya Pradesh, India.

The farmers receive training in groups of five to ten, in three villages throughout the project area, via a local partner trained by CottonConnect. Each farmer has their own compost bed and is trained on making compost, green manure and mulching. Farmers are trained to follow regenerative practices such as minimal or no tillage, agroforestry, silvopasture, cover cropping and rotational grazing. Farmers practice animal husbandry and are trained to let their cattle graze on the farm land.

According to regenerative practices, farmers will grow seven different type of crops on the field during the year, and GMO free seed is being promoted for a regenerative cotton crop. Border cropping and intercropping, already part of CottonConnect's programmes, are included in the pilot.

Some of the practices are in fact ancestral farming practices which appeals to the farmers. However, some practices such as cover cropping and rotational grazing, are not very common among these farmers and can be difficult to implement.

For the carbon sequestration element of the pilot, CottonConnect worked with Tamil Nadu Agricultural University to identify the most suitable plants for maximum carbon sequestration in the project location. In total, 2,200 plants were produced and sown around the farmers' houses and community area. The aim is to increase the soil organic carbon over a period of time. Comparison of the soil with control soil tests will identify improvements in soil texture and composition.

The 2021-22 results, compared with the baseline assessment in 2020-21, show the increase in adoption of regenerative agriculture practices.

### REGENERATIVE PRACTICES ADOPTED BY FARMERS IN THE PILOT PROGRAMME



Preparation or application of biodynamics input **increased** from 0% to

**100%**



ROC (Regenerative Organic Certified)/ Other soil health test **increased** from 0% to

**100%**



Low or shallow tillage **increased** from 0% to

**60%**



Cover crops **increased** from 5% to

**28%**



Mulching **increased** from 0% to

**28%**





NAME:  
**RUPSINGH MALSINGH**

LOCATION:  
**CHOTIYAKHEDI, MADHYA  
PRADESH, INDIA**

## REGENERATIVE AGRICULTURE PRACTICES INCREASE SOIL MOISTURE AND IMPROVE YIELD AND INCOME

Rupsingh Malsingh, a resident of Chotiyakhedi village in Madhya Pradesh, India, has been a farmer for over 40 years. He cultivates cotton on his 1.3 ha of ancestral farmland.

As a conventional cotton farmer, he relied on chemical fertilisers and pesticides with the belief that the more he used these the better his yield would be, until one day he realised that this was only increasing his costs and affecting his yield. When Rupsingh attended a meeting organised by CottonConnect's local partner, he decided to switch to organic farming. He became a certified organic farmer in 2010-11 and has been a part of CottonConnect's Organic Regenerative Programme since the cotton season of 2020. He uses one acre of his farmland for regenerative and the rest for organic farming.

The regenerative training has helped Rupsingh learn and apply many farming practices which have been very beneficial. In the trainings he learned about soil management practices such as intercropping, mixed cropping, crop rotation, and reduced tillage to improve soil health. The training also focuses on cattle management and agroforestry as a key practice and encourages farmers to grow trees in and around farm areas.

Adopting the practice of intercropping helped Rupsingh to keep the soil covered and maintain good levels of moisture which reduced the frequency of irrigation and resulted in fewer weeds in the field. As a result, this year his cotton yield was five quintals per acre, 20% more than last year. He also had a yield of 75 kg per acre of mung beans, and two quintals of maize, which provided an additional income. The reduction in his use of water, pesticides and fertilisers plus additional produce from intercropping helped Rupsingh to earn more this year.

*"I now understand that soil is the key to the sustenance of all living organisms including human beings. However, due to the excessive use of fertilisers and mismanagement of farming systems, we have lost healthy soil. The regenerative programme by CottonConnect educated us on the importance of keeping soil healthy by reduced tillage operations, and continuous cover of the land by cover cropping."*

## CottonConnect's health and safety programme for ginners

One of the most critical challenges being faced by the cotton industry, particularly in the cotton gins, is the lack of standardised or statutory health and safety measures and practices. This leads to occupational hazards including major accidents, which can cause permanent disability due to loss of limbs, and even be life threatening. Lung and pulmonary diseases such as Byssinosis are also common amongst gin workers.

CottonConnect first conducted a pilot programme to improve the health and safety of ginners in 2016. CottonConnect further developed the programme in 2019-20 expanding into India, China and Pakistan. The programme covered 45 cotton ginning factories and reached over 1,650 people in total, training both managers and gin workers.

The HSSE programme for gins covers: Health and safety guidelines and precautionary measures; Machine safety; Fire and electrical safety; Basic plant safety philosophy; Importance of PPE; Housekeeping; First aid training by a doctor; Availability and awareness of usage of protective gear; Statutory guidelines and employee protection and welfare acts.

*"Ginning is often a forgotten step in the cotton supply chain, and yet it needs critical attention. We've taken a holistic view of the supply chain, paying attention to the links which most need support. By introducing the ginner programme, we aim to help improve the living and working conditions, and general health, of workers in cotton gins."*

Alison Ward, CEO, CottonConnect

In 2019-20, CottonConnect conducted a further pilot programme in Madhya Pradesh in India, including additional relevant training for ginners. The pilot programme demonstrated the benefits of HSSE training in gins, in order to improve awareness and change behaviour towards a safer working environment.

The aggregated results from all HSSE Gin programmes in India, Pakistan, Bangladesh and China in 2021-22 show an improvement in health and safety indicators.

The HSSE programme is now being developed into a broader Code of Conduct for gins which covers management, social, environmental and economic dimensions.

### HSSE PROGRAMME RESULTS

Aggregated results from HSSE Gin programmes in India, Pakistan, Bangladesh and China in 2021-22



Compliance with safety aspects **increased** from 67.3% to

**88.7%**



Usage of Personal Protective Equipment (PPE) by gin workers **increased** from 36.2% to

**93.3%**

Baseline is aggregate of baseline measurements recorded from HSSE programmes in 2019-20 and 2021-22.



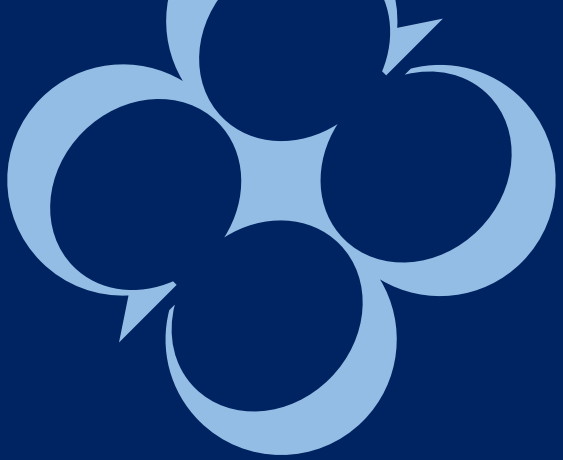
Adoption of precautionary measures **increased** from 51.0% to

**100%**



Availability of proper WASH facilities for gin workers **increased** from 95.0% to

**97.6%**



# Impact on environment and climate





## REEL Cotton LCA study results

### ASSESSING HOW THE REEL COTTON PROGRAMME REDUCES IMPACT ON THE ENVIRONMENT AND CLIMATE

A goal of improving the sustainability of cotton production is to reduce the negative impact on the environment and climate. In order to assess how the positive outcomes of the REEL Cotton Programme – reducing the use of water, chemical fertilisers and chemical pesticides, and increasing the adoption of soil health, water efficiency and pest management practices – potentially reduce the impact on the environment, CottonConnect commissioned a Life Cycle Assessment (LCA) study.

The LCA study assessed the potential reduction in environmental impact of cotton farmed and ginned by smallholder farmers enrolled in the REEL Cotton Programme, compared with a benchmark. The study, completed in July 2022, was conducted by Sphera Solutions, Inc, according to the requirements of the ISO 14044 standard, and reviewed by an external review panel.

CottonConnect will use the findings to enable a further improvement of the environmental potentials of cotton cultivation under the REEL Cotton Programme. This understanding of the LCA data for cotton production can also support brands in conducting LCAs of their products.

The summary is not intended for comparison purposes against another LCA study as comparisons are best achieved by LCA specialists reviewing the full set of data. Methodology and limitations of the study can be found in the appendix.













## Summary of LCA study results

The results of this study show a clear improvement across the majority of indicators for the REEL Cotton Programme. This demonstrates the benefits of the sustainable practices outlined by REEL Cotton Code of Conduct 3.0 in reducing the negative impact of cotton cultivation on the environment.

The following impact categories were assessed in the study. Definitions of the indicator terms can be found in the appendix.

	 Climate change	 Eutrophication	 Acidification
Impact category	Climate change	Eutrophication	Acidification
Main influencing factors	Field emissions, irrigation and provision of fertiliser	Field emissions due to application of fertiliser	Field emissions, irrigation and provision of fertiliser
LCA study results	<p><b>36%</b>  saving potential in <b>CO<sub>2</sub> eq.</b></p> <p>Impact of the global average for the REEL Cotton Programme is 1.95 kg CO<sub>2</sub> eq. per kg of fibre, in comparison with 3.04 kg CO<sub>2</sub> eq. per kg of fibre for the control group.</p> <p><b>This shows a saving potential of 1.1 kg CO<sub>2</sub> eq. or 35.9% per kg fibre.</b></p> <p>CO<sub>2</sub> eq. is carbon dioxide equivalent</p>	<p><b>50%</b>  saving potential in <b>phosphate</b></p> <p>Impact of the global average for the REEL Cotton Programme is 22.3 g Phosphate (PO<sub>4</sub>) eq. per kg of fibre, in comparison with 44.8 g Phosphate eq. per kg of fibre.</p> <p><b>This shows a saving potential of 22.5 g Phosphate eq. or 50.3% per kg of fibre.</b></p> <p>Phosphate eq. = phosphate equivalent</p>	<p><b>33%</b>  saving potential in <b>mol H<sup>+</sup> eq.</b></p> <p>Impact of the global average for the REEL Cotton Programme is 0.028 mol H<sup>+</sup> eq. per kg of fibre, in comparison with 0.041 mol H<sup>+</sup> eq. per kg of fibre.</p> <p><b>This shows a saving potential of 0.014 mol H<sup>+</sup> or 33.3% per kg of fibre.</b></p> <p>mol H<sup>+</sup> eq. = molecule's capacity to increase the hydrogen ion (H<sup>+</sup>) concentration in the presence of water</p>

Impact category	 <b>Water consumption</b>	 <b>Water use</b>	 <b>Abiotic depletion, fossil</b>	 <b>Ecotoxicity</b>
<b>Main influencing factors</b>	Water use for irrigation on the field	Water use for irrigation on the field	Use of fossil-based resources in the provision of fertiliser, irrigation and field work.	Crop protection substances
<b>LCA study results</b>	<p><b>40%</b>                       saving potential in <b>water consumption</b></p> <p>Water consumption for the REEL Cotton Programme is 3,450 kg water per kg fibre, in comparison with 5,781 kg water per kg fibre for the control group.</p> <p><b>This leads to a saving potential of 2,331 kg or 40.3% per kg cotton fibre.</b></p>	<p><b>36%</b>                       saving potential in <b>water use</b></p> <p>Water use for the REEL Cotton Programme is 155.46 m<sup>3</sup> world eq. per kg fibre, in comparison with water use for global average control is 244.48 m<sup>3</sup> world eq. per kg fibre.</p> <p><b>This leads to a saving potential of 89 m<sup>3</sup> or 36.4% per kg fibre.</b></p>	<p><b>39%</b>                       saving potential in <b>MJ</b></p> <p>Impact of the global average for the REEL Cotton Programme is 16.9 MJ per kg of fibre, in comparison with 27.7 MJ per kg of fibre.</p> <p><b>This shows a saving potential of 10.7 MJ or 39% per kg fibre.</b></p> <p>MJ = megajoule</p>	<p>Increase of <b>2%</b>   <b>CTUe</b></p> <p>Impact of the global average for the REEL Cotton Programme is 342.06 CTUe per kg of fibre, in comparison with 336.13 CTUe per kg of fibre.</p> <p><b>This shows an increase of 5.9 CTUe or 1.8% per kg cotton fibre over Average Control.</b></p> <p>CTUe = comparative toxic unit for aquatic ecotoxicity</p>

## Summary of LCA study results continued

The study measured a number of categories relating to the impact on the environment and climate. The impact categories represent impact potentials, i.e., they are approximations of environmental impacts that could occur if the emissions would (a) actually follow the underlying impact pathway and (b) meet certain conditions in the receiving environment while doing so. In addition, the inventory only captures that fraction of the total environmental load that corresponds to the functional unit (relative approach). LCA results are therefore relative expressions only and do not predict actual impacts, the exceeding of thresholds, safety margins, or risks.

The inventory data shows the REEL Cotton Programme to achieve higher yields, lower water consumption and an increased nitrogen use efficiency. As expected, this translates to the impact results, showing a clear benefit by implementation of the REEL Cotton Programme in the areas under study.

### RESULTS

- For all impact categories apart from ecotoxicity, the REEL Cotton Programme results show a clear improvement (>30% saving potential) versus the control results.
- Climate change potential is dominated by field emissions with a large contribution from irrigation and the provision (production) of fertiliser.
- Acidification potential follows a similar pattern. However, eutrophication potential is dominated solely by the impact of field emissions due to the application of the fertiliser.
- Water consumption and water use (scarcity) are dominated by the water used for irrigation on the field. Abiotic depletion potential is dominated by the utilisation of fossil-based resources which occurs most heavily in the provision of fertiliser, irrigation, and field work.
- Land use change only had a small contribution to the results in this study.
- Ecotoxicity results were dominated by a single substance, and the assessed increase (<2%) in the project vs. the control is considered to be of low relevance, but further investigation is recommended. The ecotoxicity results are influenced by a few key crop protection substances that have high toxicity characterisation factors. This might require an in-depth investigation on robustness of toxicity factors, substances of high concern and verification of application rates and fraction of farmers applying these.

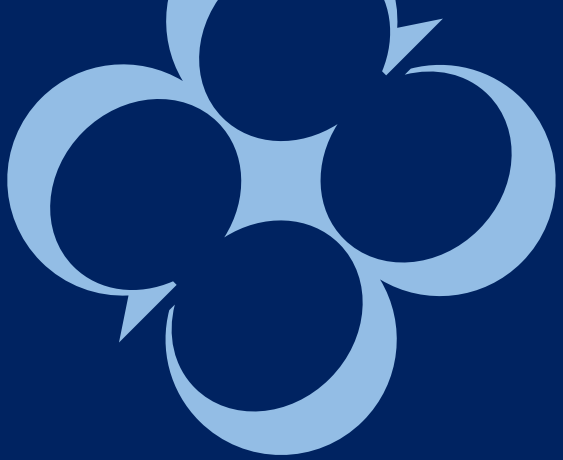


## Interpretation and learnings from LCA study

- The sustainable practices outlined by REEL Cotton Code of Conduct 3.0 are effective in reducing the impact on climate change, eutrophication, acidification, water consumption, water use, and abiotic depletion potential.
- The nitrogen balance indicates that there may still be opportunity for an improved fertiliser use efficiency even in the REEL Cotton systems which would benefit climate change results through reduced field emissions and reduced upstream impact from fertiliser production.
- Irrigation is a significant contributor to the results. Improvements to irrigation practices could lead to a lesser contribution to water scarcity in the project regions, as well as a reduction in climate change impact due to the diesel consumption required for irrigation. Cleaner sources of fuel could also be investigated (versus diesel).
- Ecotoxicity potential shows no significant difference for the REEL Cotton Programme. In general, pesticide use is lower in the programme compared with the control. However, a slightly higher application rate of a single substance (and a slightly increased fraction of farmers applying it in the project group in Pakistan due to pest attacks) led to higher results for the average project vs control, because the substance has a high toxicity factor. As a result, the use of this specific substance will be monitored in future.

The full LCA study report, including limitations and conclusions, is available at [cottonconnect.org](http://cottonconnect.org).





# Impact on livelihoods and gender



## REEL Women in Cotton programme

Women are a crucial but frequently ignored stakeholder in global cotton production. In many growing communities, women play key roles in planting and harvesting that determine the quantity, quality, and sustainability of cotton farming. However, because their contributions go unacknowledged, they do not receive the same training or support as men.

CottonConnect's research found that without specific outreach efforts just 4% of women join any form of training programme that can assist them in their roles as farmers and champions within their communities<sup>1</sup>. In addition, low levels of knowledge in literacy, health, and rights reduce productivity and undermine family well-being.

CottonConnect's Women in Cotton programme has identified ways to improve farmer well-being and livelihoods and to drive sustainable and efficient cotton production. The programme builds knowledge, strengthens livelihoods, and connects markets. It provides the background in literacy, numeracy, rights and health to enable women to take advantage of increased livelihood opportunities, both within cotton and through supplemental income running their own enterprises.

Through the programme, the women learn skills that improve their financial condition and living standards and give their children better opportunities, especially in education and health.

The programme can be adapted to include different topics tailored to the needs of the women farmers. For example, a REEL Women in Cotton programme in Pakistan in 2021-22 focused on training women farmers on correct cotton picking techniques and HSSE activities, and providing them with a supplementary source of income so they are not totally reliant on the cotton crop for their livelihood.

1. Planting the Seed: A Journey to Gender Equality in the Cotton Industry, CottonConnect



## REEL Women in Cotton programme continued

### REDUCING THE HEALTH RISKS FROM PESTICIDES

Women can come in contact with pesticides when in the field sowing, thinning, hoeing, weeding, picking and harvesting, or when actually mixing and applying pesticides and handling empty containers. They can also be in contact with pesticides at home when washing clothes of male partners or when carrying meals to the field.

Before the training, 49% of women reported facing health issues during pesticides spraying. This reduced to 30% after training, with the adoption of relevant spraying techniques helping women to face fewer health and skin-related issues during farm work. The training also included how to reduce the risk while handling pesticides as well as recognising the benefits and harmful effects of different plant medicines and pesticides.

### CLEAN AND SAFE COTTON PICKING

To ensure contamination-free cotton picking and improve health and safety while picking, the programme trained women on clean picking techniques.

Following the training, 93% of women used cotton fabric for cotton picking (to avoid fibre contamination), 91% adopted the practice of picking seed cotton from the bottom upwards (to minimise dirt and debris contaminating the cotton) and 100% picked cotton at the optimum time in the morning, after the disappearance of the dew but before humidity rises again as too much moisture is bad for the picking process.

	Baseline	Endline	
<b>Training attended on cotton picking</b>			
Yes (recommended)	16%	<b>100%</b>	↑
No	84%	0%	
<b>Fabric used for cotton picking</b>			
Cotton fabric (recommended)	36%	<b>93%</b>	↑
Silk fabric	48%	0%	
Fertiliser bag	22%	7%	
<b>Method of Cotton Picking</b>			
Picking from bottom (recommended)	46%	<b>91%</b>	↑
Picking from middle	22%	9%	
Picking from top	33%	0%	
<b>Suitable time for Cotton Picking</b>			
Morning (recommended)	89%	<b>100%</b>	↑
Noon	11%	0%	
Evening	12%	0%	





NAME:  
**KHADIJA BIBI**

LOCATION:  
**PUNJAB, PAKISTAN**

## ENTREPRENEURSHIP TRAINING LEADS TO BUSINESS SUCCESS AND INCREASED INCOME

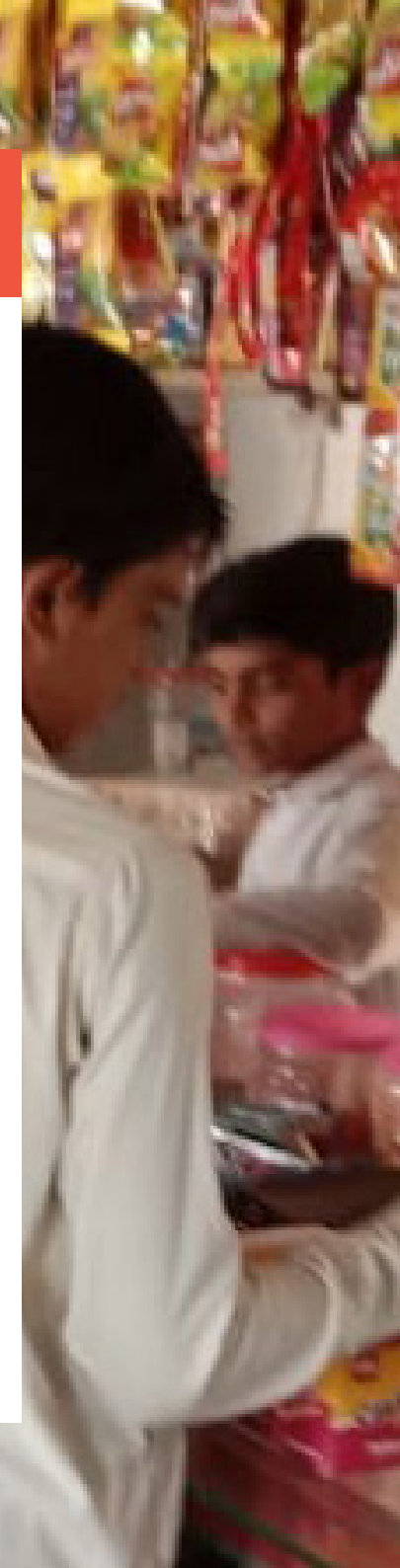
Khadija Bibi, owner of the Ahmad Stitching and Karyana Store in Punjab, Pakistan, is an inspiration to many women in her community. According to her, persistence, determination and hard work have played a vital role in her success.

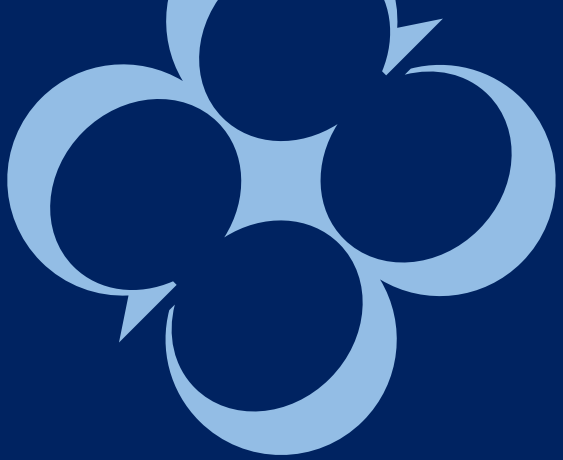
Khadija is married and has four school-going children. She and her husband worked in the cotton fields as farm labourers to make ends meet and pay for their children's education. In 2021-22 Khadija registered herself as a cotton picker and was a part of a group of women pickers trained on safe and clean picking practices for the REEL Cotton Programme. As part of the programme, the Women in Cotton training enables women to take advantage of increased livelihood opportunities, both within cotton farming and through supplemental income from running their own enterprise.

During one such training Khadija was introduced to the entrepreneurship program women. Keen to start her own business, Khadija enrolled for the stitching training course and later availed a loan of PKR 35,000/GBP 125. She used the money to buy a sewing and overlocking machine and set up her own stitching centre.

Khadija's stitching centre was a success and she managed to contribute to her family income. She shared that on most days she would earn between PKR 1200/GBP 4 to PKR 1500/GBP 5. She used the profit from the first couple of months to purchase and sell regularly used stationery items such as pens, pencils, notebooks and registers at her centre. Seeing that these items were in demand, she decided to use her earnings and set up a fully-fledged karyana/daily needs store. She also purchased a deep freezer for the shop and now her customers can purchase chilled cold drinks and juices.

Khadija's business is now worth about PKR 110,000/GBP 393 and her family is able to live comfortably. Of all the things she has managed to buy and achieve, she is most proud that she will be able to afford a good education for her children and that their future is secure.





# Impact on responsible supply chains



## Impact on responsible supply chains

### 1. INCREASING TRACEABILITY

Traceability is described by ISEAL as the ability to verify the history, location, or application of an item by means of documented recorded identification.<sup>1</sup>

CottonConnect does this via TraceBale, its own traceability software tool. It is an application that can be fed with data from farmers, ginners, spinners, and other processors in the chain. It records farmers' demographic and agronomic data e.g. how much water or fertiliser has been used, inputs and procurement information and other transactions in the supply chain.

Once the data has been captured it can be accessed with a web interface. This gives brands a clear and consistent, near-real-time overview of all stages of their supply chain – from the farmer's field to the finished garment – capturing every transaction flow along the way.

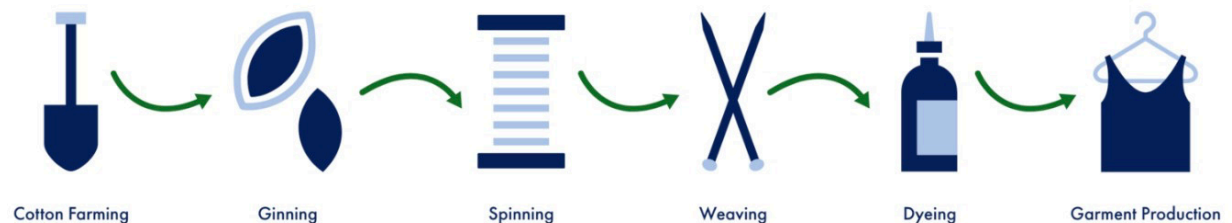
In 2021-22 103,000 MT of cotton was traced using TraceBale. TraceBale ID data is being integrated into existing yarn ID systems to provide a full view of the cotton supply chain.

### 2. LINKING SUSTAINABLE COTTON INTO BRANDS' SUPPLY CHAINS

A key benefit for brands working with CottonConnect on REEL Cotton and Organic sustainable agricultural programmes is the opportunity to purchase the cotton grown by the farmers trained in the programme and feed it directly in the brands' supply chain. This helps to create transparent, traceable and resilient supply chains.

### 3. INCREASING CONSUMPTION OF SUSTAINABLE COTTON

By working with leading global fashion brands CottonConnect contributes to an increase in garments with sustainably sourced raw materials available, making responsible choices more accessible for consumers. A reliable supply of sustainable grown cotton allows brands to use it in their most popular lines, which significantly increases the market share of sustainably produced garments.



1. Chain of custody models and definition, ISEAL, 2016



## Contribution to UN Sustainable Development Goals (SDGs)



CottonConnect's programmes increase income and profit from cotton growing for smallholder farmers. ([see page 14](#))

The Women in Cotton programme teaches women how to generate an income from microenterprises. ([see page 35](#))



The REEL Cotton Code specifically requires equal pay for work of equal value. It prohibits forced and child labour, and supports enrolling of children into schools. CottonConnect's programmes promote decent work and safe working environments and labour rights, with modules teaching about labour rights. ([REEL Cotton Code v3.0](#))



CottonConnect's programmes support income growth of low-income smallholder farmers and workers through increased profit and yield. ([see page 14](#))

The REEL Cotton Code criteria stipulate no discrimination on sex, disability, race, ethnicity, origin, religion or economic or other status. ([REEL Cotton Code v3.0](#))



CottonConnect teaches smallholder farmers on the sustainable management and efficient use of natural resources. e.g. water. ([see page 16](#))

Providing information on cotton production to brands and retailers helps consumers make informed choices to choose cotton more sustainably grown.



CottonConnect's agricultural training addresses the effects of climate change on cotton cultivation through climate change mitigation pilots, including training women climate champions.

The REEL Regenerative Code in particular is designed to increase capacity in climate mitigation practices.

## Challenges in measuring impact

The methodology and technology for measuring the impact of sustainable agricultural practices is advancing each year. However, some challenges remain for organisations seeking to monitor and evaluate the impact of their sustainability programmes.

1. **Varied results due to weather or climate change** – Cotton farming is especially vulnerable to extreme weather events such as monsoons and floods or pest attacks which can decimate a crop. Even with the successful adoption of sustainable agricultural practices, other factors can negatively affect the cotton crop, resulting in varying results from year to year.
2. **Data collection** – Collecting data can be challenging due to the scale of a large programme or the literacy levels of some farmers enrolled in the programme. To achieve accurate data collection in the REEL Cotton Programme, an appropriate amount of farm-level data is collected throughout the season in Farmer Field Books by field executives of the local implementing partners to supplement the year-end impact assessment. The data is then second and third-party verified.
3. **Assessing impact from outcomes** – While the outcome or short-term result of adopting a certain practice can be measured, there is sometimes a challenge in correlating an outcome to an impact or long-term effect. Studies such as the LCA study can help with this, for example by calculating how a reduction in fertiliser use can result in reducing acidification potential and climate change potential.
4. **Commonly recognised indicators of sustainably produced cotton** – Sustainability standards and codes may measure different indicators, meaning the impact results are not comparable. CottonConnect is contributing to collaborative industry efforts to determine the relevant indicators to measure sustainably produced cotton, including the Delta Framework Sustainability Indicators and the work of Sustainable Apparel Coalition's MSI Methodology Cotton Expert Team.

## Partnerships

### IMPLEMENTING PARTNERS

CottonConnect would like to thank its valuable implementing partners:

[Self Employed Women's Association \(SEWA\)](#)

[Shree Ram Fibres India Pvt Ltd](#)

[Hariraj Charitable Trust](#)

for programmes in India

[Rural Education and Economic Development](#)

[Society \(REEDS\)](#)

[Indus Development Program](#)

[Society for Sustainable Agriculture and Friendly](#)

[Environment \(SAFE\)](#)

for programmes in Pakistan

[TMSS](#)

for programmes in Bangladesh

CottonConnect also thanks the Cotton Development Board in Bangladesh for its assistance with farmer training in the REEL Cotton Programme in Bangladesh.

*"We're pleased to partner with CottonConnect on implementing its Organic Cotton Farmer Training Programme because we can provide long-term support for farmers to continue organic cotton farming and become certified. We train farmers to grow cotton without chemical pesticides and fertilisers and introduce practices such as intercropping to maintain soil health. Due to the reduction in input costs plus the additional produce from intercropping, we've seen programme farmers' incomes increase."*

Arpit Khandelwal, Director, Shree Ram Fibres India Pvt. Ltd.

### FARMERS

Smallholder farmers are at the heart of CottonConnect's sustainable cotton programmes, and a trusted partnership has developed over the years working with local implementing partners known to the cotton farming communities.

The REEL Cotton Programme was specifically developed with input from farmers and farmer groups in India, and farmers and implementing partners in several countries continue to be consulted in the revision of the REEL Cotton Code.

2021-22 impact results of the REEL Cotton Programme will be shared with programme farmers using a farmer feedback method first piloted in India and Bangladesh in 2022. In the pilot, the feedback helped programme farmers understand how much profit they made and the potential for cotton farming, the parameters where they can perform better than conventional farmers and which areas to focus on for better profits, cost savings and yield. Farmers are also able to give feedback on information they would like to receive.



## CLIENTS

CottonConnect is pleased to partner with a number of leading brands and companies from across fashion, retail and manufacturing.

*“C&A Europe’s goal is for 100% of our core materials to be more sustainable by 2028. We have been one of the world’s leading buyers of organic cotton for years and understand the importance of ensuring the integrity of organic cotton throughout the supply chain. That’s why we work with CottonConnect as one of our partners in organic cotton and value the team’s in-depth cotton and supply chain expertise.”*

Sharafat Mallik, Sourcing Product Manager, Material Innovation & Sourcing Sustainability, C&A

*“It’s vital for us that the Primark Sustainable Cotton Programme – the largest of its kind from a fashion retailer – consistently delivers positive impact for the farmers being trained in sustainable agricultural practices through the programme. By partnering with CottonConnect we have been able to develop and expand the programme, resulting in increased profits and yields for smallholder farmers in rural communities, while reducing the impact of cotton cultivation on the environment.”*

Sheetal Nischal, Senior Technical Manager, Primark Sustainable Cotton Programme

*“I am delighted to welcome CottonConnect as an ISEAL Community Member. Their novel standards system focusses on improving how training and capacity building is delivered to cotton farmers, to support better sustainability outcomes. This exciting step reflects their commitment to ongoing improvement and deepening their credible practices. I look forward to CottonConnect bringing their knowledge and experience to the ISEAL community.”*

Karin Kreider, Executive Director, ISEAL

## COLLABORATIVE PLATFORMS

CottonConnect is proud to have been a member of these organisations during 2021-22.

### 2025 Sustainable Cotton Challenge

Cool Farm Alliance

Cotton 2040

Sustainable Apparel Coalition

Textile Exchange

CottonConnect became an ISEAL Community Member in 2022.

REEL Cotton is recognised by Textile Exchange as preferred cotton.



**Textile Exchange**

The REEL Cotton Code is approved as a sustainable cotton code by the Partnership for Sustainable Textiles.



**Partnership for Sustainable Textiles**

## Conclusion

1. REEL Cotton programmes continued to deliver positive results in 2021-22, reducing the use of chemical pesticides, chemical fertilisers and water, while increasing farmers' yields and incomes.
2. An LCA study demonstrated the benefits of the REEL Cotton programme in reducing environmental impacts, including CO<sub>2</sub> equivalent which affects climate change.
3. A focus on women in cotton promotes improved livelihoods, even beyond cotton farming.
4. Addressing health and safety in gins helps advance responsible cotton production.
5. Tracing cotton from farm to fashion and connecting REEL Cotton and Organic cotton into supply chains increases responsible consumption of cotton.
6. Collaboration among the textile industry is necessary for a consistent and universally recognised criteria and measurement of sustainable cotton.



## Appendix – REEL Cotton LCA study

### GLOSSARY

**Climate change (global warming potential)** A measure of greenhouse gas emissions, such as CO<sub>2</sub> and methane. These emissions are causing an increase in the absorption of radiation emitted by the earth, increasing the natural greenhouse effect. This may in turn have adverse impacts on ecosystem health, human health and material welfare.

**Eutrophication (terrestrial, freshwater, marine)** Eutrophication covers all potential impacts of excessively high levels of macronutrients, the most important of which nitrogen (N) and phosphorus (P). Nutrient enrichment may cause an undesirable shift in species composition and elevated biomass production in both aquatic and terrestrial ecosystems. In aquatic ecosystems increased biomass production may lead to depressed oxygen levels, because of the additional consumption of oxygen in biomass decomposition.

**Acidification Potential** A measure of emissions that cause acidifying effects to the environment. The acidification potential is a measure of a molecule's capacity to increase the hydrogen ion (H<sup>+</sup>) concentration in the presence of water, thus decreasing the pH value. Potential effects include fish mortality, forest decline and the deterioration of building materials.

**Abiotic Resource Depletion (fossil)** Abiotic Depletion Potential is a measure for the use of non-renewable energy carriers, comparable to the Cumulative Energy Demand (CED) of fossil fuels.

**Blue Water Consumption** A measure of the net intake and release of fresh water across the life of the product system. This is not an indicator of environmental impact without the addition of information about regional water availability (i.e. water use, see below).

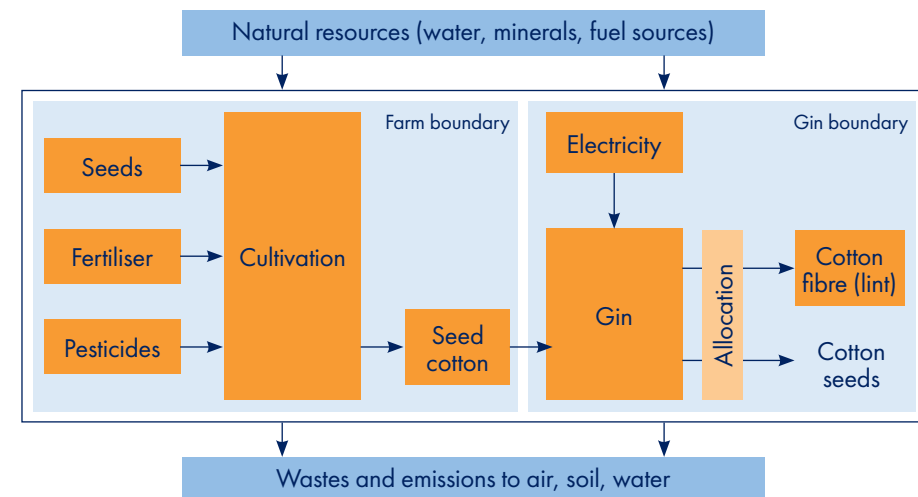
**Water Use** An assessment of water scarcity accounting for the net intake and release of fresh water across the life of the product system considering the availability of water in different regions.

### Ecotoxicity

A measure of toxic emissions which are directly harmful to the health of the environment.

### SYSTEM BOUNDARIES OF THE LCA STUDY

The system boundaries of the life cycle assessment include both the cotton cultivation and the fibre production (ginning) in accordance to the REEL Cotton Code of Conduct.





## DATA ANALYSED FOR THE LCA

The study analysed data from farms operating under the REEL Cotton Programme and control farms in the same region that were not implementing REEL Cotton Programme practices. Data from cotton cultivation in Pakistan (Punjab, Sindh), Bangladesh (Chuadanga, Kushtia), India (Gujarat, Maharashtra, and Madhya Pradesh) and China (Hebei) were combined for a global average.

CottonConnect works with its local partners to collect sample data from farmers and ginners which is then checked by CottonConnect and further third-party verified. The retrieved data represents an average from the cultivation years as shown in the table below:

Country	Region	Years	Number of seasons covered
<b>Pakistan</b>	Punjab	2013-14 to 2014-15 and 2017-18 to 2019-20	4
	Sindh	2013-14 to 2014-15 and 2018-19 to 2019-20	4
<b>Bangladesh</b>	Chuadanga	2019-20	1
	Kushtia	2019-20	1
<b>India</b>	Gujarat	2011-12 to 2019-20	9
	Maharashtra	2013-14 to 2014-15 and 2019-20	3
	Madhya Pradesh	2019-20	1
<b>China</b>	Hebei	2012-13 to 2019-20	7

Inventory data and results are available in the main study on a total average level, weighted utilising production shares for REEL Cotton. Inventory data and results are available on both a regional and country level in the annexes of this study and can be requested for viewing from CottonConnect.

Some data, notably yield increase and water use reduction numbers, are higher in the LCA study inventory than the latest published impact results for REEL Cotton for 2021-22. This is caused by the different temporal reference, where the LCA study uses long-term averages while the impact results refer to a single season.

For the life cycle inventory, the GaBi 10.6 software and databases, as well as Sphera's Lean Ag Model, which is based on the latest version of the IPCC Guidelines for National Greenhouse Gas Inventories, has been used.

Data quality was assessed to be good to very good, but there was uncertainty for some data points and related impact categories hence, improvement of data availability and consistency of collection would bring greater certainty to the environmental profile of cotton produced under the REEL Cotton Programme. The following points are considered to be positive aspects around data quality:

- Primary data was used with a large sample size among farmers participating in the programme
- Control data was also based on primary data collected with the same temporal, geographical and technological scope as the project data
- Multiple year averages were used where available
- Important data points (e.g. yields and fertiliser use) were validated

## LIMITATIONS

In the following, the critical limitations of this study are listed. However, they apply to both project and control, so that the comparison of the two should not be compromised. Absolute values need to be interpreted with care, especially when comparing to results of other studies.

- Data for Bangladesh was only available for 2019-2020. However, both regions in Bangladesh only contribute to 0.39% of the total production values hence, not strongly influencing the LCA results of the study.
- Data were collected for the control values to represent approximately 5-10% of the REEL Cotton production occurring in each region. Greater coverage could be beneficial to strengthen the comparison, however this covers a large value in absolute production value terms and can be taken as an indication of the baseline to compare vs. farms operating under the REEL Cotton Programme.
- Data collection was already conducted by a local/implementing partner on behalf of CottonConnect and verified by a third-party, however there were some gaps in the data required for the LCA study, hence additional sampling was conducted by extension agents during the study. This data was not verified by a third party.
- No systematic assessment of uncertainty could be conducted for this study. The question if the reported differences in yield, fertiliser use and irrigation water use (that cause the differences in environmental performance) between project and control farms is significant could only be answered based on thorough statistical testing. Such testing was not performed neither previous to this study nor in this study. While most LCA studies do not include statistical testing due to the complex data structure, some systematic assessment of uncertainty at least on input data level would help to improve robustness of the results.

- Assumptions were made for irrigation energy use, which was estimated using the GaBi pump model, hence there is uncertainty remaining in relation to quantity of energy required. There is also uncertainty on the energy source (diesel). However, the chosen approaches can be assumed to be conservative estimates.
- It is difficult to assess nitrate emissions as they are influenced by many factors, however the approach taken represents a conservative approach (surplus nitrogen is leached) hence the eutrophication potential may be overestimated.
- Ecotoxicity results were dominated by a single substance. This might require an in-depth investigation on robustness of toxicity factors, substances of high concern and verification of application rates and fraction of farmers applying these. In general, ecotoxicity results can vary over several orders of magnitudes, so absolute results should be interpreted with care.

## CONCLUSIONS

Overall, the inventory data utilised in this study can be considered to be reliable. CottonConnect works with a local partner to collect sample data from farmers and ginners which is then checked by CottonConnect and further third-party verified. Hence, it is considered that the results of this study which show a clear improvement across the majority of indicators for the REEL Cotton Programme, demonstrate the clear benefits of the sustainable practices outlined by REEL Cotton Code of Conduct 3.0. However, since no statistical testing of the significance of differences in the inventory data between project and control farms was made, some “uncertainty about the uncertainty” remains. It is recommended that CottonConnect continues to develop its LCA data collection scheme on a yearly basis. The continuation and expansion of data collection will allow CottonConnect to continuously measure the improvements against the control group but also within the REEL Cotton Programme.



