The Textile Exchange (TE) Organic Cotton Sustainability Assessment Tool (OC-SAT) provides a framework for assessing the environmental, economic and social impacts of organic cotton agriculture. While the tool has been developed for the organic cotton sector, it draws on the latest work in sustainability assessment in agriculture and commodities more generally.

The current release of this tool covers Africa, China, India and Turkey (approximately 90 percent of the surveyed organic cotton fiber production and 30 percent of the actual fiber production). The remaining countries will be covered in Phase Two.

To access the data, click on the icons / map below, or the content menu on the left.

Assessment for this country is under development and will be released in the next phase.

Our environmental initiative is a company priority, involving changes big and small—from developing eco materials and supporting renewable energy to recycling clothing. It’s a commitment to our belief in honoring the earth and its connection to our well being. By seeking the best practices throughout the lifecycle of our products, we are creating healthier environments for farmers, supply chain workers and future generations.

Website: http://www.eileenfisher.com

ICCO is the interchurch cooperative for development cooperation. We work towards a world in which people can live in dignity and well-being, a world without poverty and injustice.

Website: http://www.icco.nl

TE would like to acknowledge the following organizations for their role in data collection, methodology and overall development of this assessment tool:

OVERVIEW

INTRODUCTION

The TE OC-SAT provides a framework for assessing the environmental, economic and social impacts of organic cotton agriculture. While the Tool has been developed for the organic cotton sector, it draws, more generally, on the latest work in sustainability assessment in agriculture and commodities.

In its development, our assessment framework was influenced by and mapped against leading agricultural and commodity sustainability assessment criteria developed by:

- ISEAL (the global membership association for sustainability standards) - Impacts Code
- The Committee on Sustainability Assessment (COSA) - COSA Indicators
- United Nations (FAO) - Sustainability Assessment of Food and Agriculture systems (SAFA)
- Soil And More Foundation - Sustainability Flower

IFOAMs Sustainable Organic Agriculture Action Network (SOAAN) Best Practice Guideline for Agriculture and Value Chains has been used to inform our definition of the Environment, Economic, and Social dimensions in this assessment tool. And customized to fit the needs and characteristics of the organic cotton sector.

The data was collected through an extensive field survey of organic cotton producer groups and globally covers over 31 percent of organic cotton farmers, 26 percent of organic cotton land cultivated, and 30 percent of organic cotton production and can be considered an accurate representation of the overall situation.

HISTORY

Textile Exchange (called Organic Exchange at that time) began work in sustainability assessment in 2007 by establishing a “scorecard” of key performance indicators (KPIs) and a methodology for facilitating self-assessment exercises in the field. Techniques and methodologies for carrying out assessments were based on participatory learning and action (PLA).

The assessment tool and accompanying scorecard were designed to help farmers explore key issues for their long-term environmental, social and economic sustainability. The scorecards also helped producer groups not only communicate what the main issues were for their long-term sustainable development but also potentially hold conversations about these issues with brands, buyers and other interested stakeholders.

The assessment scorecard was trialed in 2007 in Senegal and Turkey. Then in 2008-09, 64 farm groups used the tool to run assessment exercises. Assessments were carried out in Africa, Latin America and India.

In 2010, TE launched its “Assessing Sustainability” Report offering a bird’s eye view of the scorecard results and exploring the collective environmental, social and economic perceptions made by organic cotton farmers in the three participating regions.
HOW TO USE THIS TOOL

NAVIGATION METHODS

There are four key navigation methods in this tool. Click on the following tabs to learn more about each navigation method.

CHART TYPES

There are four basic types of charts used in this tool. Click on the following tabs to learn more about each type of chart and how it is used in this tool.

In the Home Page, you can access data in two ways:
1. Clicking on the Theme icon of interest, or
2. Clicking on the map, the specific Country of interest.

Trend Charts are used to show the changes of values for a particular variable over a period of time. As shown in the following example, the y-axis shows changes in mt production against the x-axis for the years 2004-05 and 2011-12.
We live in constant change. While this tool reflects our best attempt to accurately define the sustainability characteristics of the organic cotton sector, changes will occur on a yearly basis. Likewise, while the line of questioning in the survey was thoroughly researched and will have “felt right” at the time, there will always be room for improvement and refinement.

The assessment framework is divided into three Dimensions of sustainability (Environmental, Economic and Social). Each Dimension covers a number of Themes and within each Theme sits the specific Indicators. The framework has been mapped against other assessment frameworks currently in use, however sustainability is a holistic concept making it difficult to structure definatively. To reflect and demonstrate this reality our assessment tool interconnects a number of indicators enabling the user to flick between Themes and Indicators.

Our ambition is that this work contributes to the overall understanding of sustainability assessment in general and the organic cotton sector in particular. Going forward, the assessment tool would provide both an approach to ongoing sustainability assessment reporting, and also a pragmatic tool for supply chains to share information, make decisions for action, and communicate their story.

Next steps could involve the development of:

- An agreed set of core indicators to extend to a wider group of producers and/or to be traced through supply chains.
- A streamlined approach to data collection at the farm gate so that alongside sector reporting, partners within specific value chains could track impact.
- A technology solution to efficiently move data and track KPIs potentially using real-time data, tracked with bale ID or transaction certificates.
- Regular monitoring and evaluation. Impacts are best understood when measured over time because indicators of environmental and social change (such as livelihood improvements) can be slow to come through.

Sustainability is a multi-faceted subject and there are many lenses through which to view and evaluate it. Assessing the impact at an organizational level (PG) is one way. Other ways include evaluating impact at a household level, product lifecycle assessment (LCA), and methodologies for environmental (E&P&L) and social (S&P&L) profit and loss (D&P&L). As these approaches evolve they come together to give a more complete view.
**FRAMEWORK**

### BACKGROUND

- **Vital Statistics**
  - Size of Household
- **Household Statistics**
  - Size of Farms
  - PG Organic Cultivation Split
  - Cash Crops
  - Food Crops
- **Farm Statistics**
  - Cotton Species
  - Fiber Staple Length
  - Ginning Outturn
- **Cotton Characteristics**
  - Fiber Micronaire

### CORE FRAMEWORK

#### Dimension | Environmental

**Theme | Water Management**
- **Indicators**
  - Water Source
  - Use of Irrigation by Area
  - Payment for Irrigation Water
  - Water Management Approach
  - Water Conservation Techniques
  - Perception: Water Availability
  - Perception: Water Quality

**Theme | Soil Management**
- **Indicators**
  - Soil Management Approach
  - Soil Fertility & Conservation Techniques
  - Soil Fertility
  - Provided Data on SOM
  - Soil Organic Matter

**Theme | Pest Management**
- **Indicators**
  - Post Management Approach
  - Post Management Techniques
  - Perception: Effectiveness of Organic vs Conventional Pest Control

**Theme | Biodiversity**
- **Indicator**
  - Crop Diversity
  - Types of Crops (Own Use)
  - Types of Crops (Cash)
  - Perception: Biodiversity Levels on Organic Farms
  - Perception: Areas of Increased Biodiversity

**Theme | Climate Change**
- **Indicators**
  - Use of Farm Animals
  - Use of Farm Machinery
  - Types of Machinery
  - Types of Fuel
  - Carbon Emission Reduction
  - Alternative Energy Technology Used
  - Adaptation to Climate Change
  - Changes Made
  - Perception: Has Extreme Weather Affected Crops?
  - Perception: Types of Extreme Weather Affected Crops

#### Dimension | Economic

**Theme | Livelihoods**
- **Indicators**
  - Land Use
  - Productivity
  - Organic Cotton Yield Trend
  - Production Costs
  - Income Sources
  - Pricing Differentiation (Organic > Conventional)
  - Perception: Cost of Organic vs Conventional Farming

**Theme | Producer Organization**
- **Indicators**
  - Organizational Structure
  - Number of Farmers
  - Organizational Capacity Building
  - Timeliness of Payments
  - Trading Partners
  - Types of Contract
  - Long Term Contract
  - Benefits of Long Term Contract

**Theme | Sustainability Standards**
- **Indicators**
  - Voluntary Sustainability Standards
  - Certified Organic
  - Organic Standards
  - Certified Fairtrade
  - Fairtrade Standards
  - Further Processing Standards

**Theme | Risk Management**
- **Indicators**
  - Cash Crops
  - Number of Cash Crops
  - Types of Crops
  - Markets for Crops
  - Livestock
  - Type

**Theme | Business Investment**
- **Indicators**
  - Investment Priorities
  - Investment Over Last 2 Years
  - Perception: What Influences Farm Practice?

**Theme | Seed Security**
- **Indicators**
  - Seed Requirements
  - Cultivars in Use
  - Seed Source
  - Changes Over Past 3 Years
  - Seed Breeding & Trials
  - Perception: Difficulty in Sourcing Seed
  - Perception: Degree of Difficulty

#### Dimension | Social

**Theme | Food Security**
- **Indicators**
  - Grow Food for Own Use
  - Number of Food Crops
  - Food Crop Types
  - Perception: Effectiveness of Organic vs Conventional Pest Management Approach

**Theme | Decent Work**
- **Indicators**
  - Labour Standards & Policies
  - Policy Coverage
  - Workers Risk Assessment
  - Precautions Taken
  - Temporary Workers
  - Sourcing of Temporary Workers

**Theme | Equality**
- **Indicators**
  - Women Farmers
  - PGs Employing Women Farmers
  - Encourage Female Participation
  - Support Women with Extra Assistance
  - Farmers Identified as Indigenous
  - PGs Employing Indigenous Farmers
  - Perception: Impact of Traditional Knowledge on Farm Practices

**Theme | Rural Development**
- **Indicators**
  - Community Benefits
  - Types of Benefits
  - Investment Partnerships
  - Types of Partners

**Theme | Business Investment**
- **Indicators**
  - Investment Priorities
  - Investment Over Last 2 Years
  - Perception: What Influences Farm Practice?
OVERVIEW

Organic cotton production currently takes place in six countries in Africa, clustered in Western and Eastern Africa.

Africa, as a region, produces approximately 8 percent of the global supply of organic cotton fiber. Tanzania is the biggest producer by volume in the region (producing over 75 percent of Africa’s organic fiber).

This assessment captures production in all countries with the exception of Uganda.

African organic cotton farmers tend to be small-scale landholders (average size farm reported to be around 8ha) and 100 percent rainfed. Farmers tend to be organized as producer associations, many (50 percent of survey group) are supported by an NGO.

In the survey, organic cotton farmers on average dedicate around half of their land to cash crops and the remaining half to food security. The average number of non-cotton cash crops (primarily for the local market) was 3, while an average of 8 food crops are grown for own use. Interestingly, 48 percent of income is from the cotton, leaving the remaining 52 percent of income from other sources.

All African organic cotton PGs surveyed had labor policies, either formal or informal. Two-thirds (67 percent) were Fairtrade certified as well as organic. Of this, 17 percent were partially certified Fairtrade.

Two-thirds (67 percent) of producer groups surveyed were concerned about climate change and are noticing droughts, flooding, and changes in onset of rains happening more frequently.
African organic followed the global organic cotton trends with a steep climb from 2004-05 to 2008-09 and a decline in volumes over the next couple of years. Alongside steady expansion, recent growth has been buoyed due to favorable weather conditions for the past couple of seasons.

The majority of Africa’s organic cotton is grown in East Africa (over 80 percent) with considerably lower volumes coming from the West of Africa (Benin, Burkina Faso, Mali, Sénégal). However, due to smaller farm sizes and relatively lower yields (on average), the reverse is true in terms of numbers of farmers.

The country breakdowns show the significant decline in organic from Burkina Faso and Uganda, and the variable yet overall growth in production from Tanzania.

New projects are emerging in countries beyond the currently well-established countries, and will potentially include Madagascar, Zambia, and Ethiopia.

### Sample Size & Distribution

The survey sample for Africa covered almost half (46 percent) of Africa’s overall organic cotton production (benchmarked against data for 2011-12), 77 percent of farmers, and 60 percent of the land certified as growing organic cotton.

The dominant countries, by volume of production, are Tanzania followed by Mali. As you can see from the double donut, the assessment results will be slightly skewed by the fact that Uganda is missing from our sample set.
## AFRICA | COUNTRY PROFILE

### HOUSEHOLD STATISTICS

<table>
<thead>
<tr>
<th>SIZE OF HOUSEHOLD</th>
<th>Average 7 persons (Range: 5-10)</th>
</tr>
</thead>
</table>

### FARM STATISTICS

<table>
<thead>
<tr>
<th>SIZE OF FARMS</th>
<th>Average 8 ha (Range: 0.7-32, Median: 2)</th>
</tr>
</thead>
</table>

### PG ORGANIC CULTIVATION SPLIT

<table>
<thead>
<tr>
<th></th>
<th>Organic</th>
<th>Organic In-Conversion</th>
<th>Conventional</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>50%</td>
<td>30%</td>
<td>10%</td>
</tr>
</tbody>
</table>

### CASH CROPS

<table>
<thead>
<tr>
<th>Average 3 crops excluding cotton (Range: 2-4)</th>
</tr>
</thead>
</table>

### FOOD CROPS

<table>
<thead>
<tr>
<th>Average 8 crops excluding cotton (Range: 3-11)</th>
</tr>
</thead>
</table>

### COTTON CHARACTERISTICS

<table>
<thead>
<tr>
<th>COTTON SPECIES</th>
<th>G. Hirsutum</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>FIBER STAPLE LENGTHS</th>
<th>9</th>
<th>33</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short staple: &lt;25 mm</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium staple: 25-30 mm</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long staple: 30-37 mm</td>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### GINNING OUTFURN

- Average 39%

### FIBER MICRONAIRE

- Average 4mm (Range: 3.91-4.07mm)

## SIZE OF HOUSEHOLD

Households averaged 7 people per household. Farming is a family affair with both men and women working together.

## SIZE OF FARMS

Average farm size was 8ha. The median farm size being 2ha.

## LAND UNDER ORGANIC CULTIVATION

Two PGs (one in Burkina Faso the other in Tanzania) grow cotton conventionally as well as organically. The majority of PGs certify their organic to Fairtrade (FT) standards as well, or work to FT criteria and are audited for their own purposes (even if not trading as FT).

The average number of non-cotton crops grown by African PGs was 9 (cash crops and food crops), with a maximum of 11 crops recorded. All PGs reportedly grew crops for their own food needs, and many provided food products to local markets. In West Africa the average was 5 – the most popular crops being Cowpea, Groundnut, Maize, Millet, Sorghum and Seasonal Vegetables. In East Africa the average was 3 – Maize and Sorghum were common.

## COTTON SPECIES

The species of cotton grown by survey respondents was Gossypium Hirsutum. Mainly medium and short staple fiber, plus some amount of long staple.

## GINNING OUTTURN

Ginning outturn averages 39 percent.

## FIBER MICRONAIRE

Fiber micronaire averages 4mm.
WATER SOURCE
All African PGs are farming under rainfed conditions, and no associated costs.

“This cotton is 100 percent rainfed. If the rain is poor than the cotton will not perform well.” - PG, Tanzania

WATER MANAGEMENT & CONSERVATION TECHNIQUES
Although 50 percent of PGs left water management up to their farmers (to manage independently), a considerable number worked collectively. For example, the 67 percent of farmers harvesting rainwater are likely to be doing this collectively.

“Water for human consumption is collective Water for agriculture is individual.” - PG, Mali

The use of cover crops was also popular. A smaller number of farmers are employing techniques such as crop selection, minimizing tillage and bunding their plots to improve water efficiency.

“[Our PG] constructs shallow wells (for human use) - looked after and managed by water user groups formed by farmers community” - PG, Tanzania

PERCEPTION: WATER AVAILABILITY AND WATER QUALITY
Not surprisingly, all PGs (100 percent) reported an issue with water availability but were unconcerned about the quality. 100 percent stating that water quality was “no issue”.

“There are during seasons periods of rain scarcity that affect the healthy development of cotton plant” - PG, Benin

“A lot of people are drinking unfiltered or unboiled water.” - PG, Tanzania
SOIL FERTILITY MANAGEMENT & CONSERVATION TECHNIQUES

Soil fertility management is mainly carried out independently, although PGs reportedly combine forces for some activities.

“Soil fertility testing is carried out by a number of PGs and Soil Organic Matter (SOM) data is collected. It was evident that PGs recognize the importance of scientific insights into soil fertility.

“We need actually to do systematically soil analysis in order to identify in case by case basis the nutrient that is deficient and work specifically for that. For this reason, we will need to collaborate more with research institutes.” – PG, Senegal

All farmers were composting and growing rotation crops to support soil fertility. Additional nutrients from farmyard manure and biomass were also popular. Most farmers intercropped and a few PGs supported their farmers to use vermicompost. Reduced tillage was employed by 17 percent of PGs to help conserve soils.

“Liquid manure is made by farmers with cow dung and special plant leaves” – PG, Senegal

“We have anti-erosion program that helps farmers to make stone barriers” – PG, Burkina Faso

SOIL FERTILITY TESTING

Soil fertility testing is carried out by a number of PGs and Soil Organic Matter (SOM) data is collected. It was evident that PGs recognize the importance of scientific insights into soil fertility.

“We need actually to do systematically soil analysis in order to identify in case by case basis the nutrient that is deficient and work specifically for that. For this reason, we will need to collaborate more with research institutes.” – PG, Senegal

SOIL FERTILITY MANAGEMENT APPROACH

SOIL FERTILITY & CONSERVATION TECHNIQUES

Crop Rotation

Cover Crops

Composting

Farmyard Manure

Green Manure

Intercropping

Minimizing Tillage

Vermiculture & Liquid Manure

SOIL FERTILITY MANAGEMENT APPROACH

SOIL FERTILITY & CONSERVATION TECHNIQUES

0% 50% 100%

Independently
Collectively
Depends on Task
Undetermined

SOIL FERTILITY

Provided Data on SOM

0% 50% 100%

Yes
No
Undetermined
PEST MANAGEMENT APPROACH

All farmers carry out pest management independently. However there are some activities which are managed collectively.

"Farmers are assisted by our field staff before spraying botanicals. A field staff together with the farmer will establish the need of spraying. Spraying will be done in presence of field staff." – PG, Tanzania

PEST MANAGEMENT TECHNIQUES

The threat of pest problems can deter farmers from including cotton in their mix of crops. Particularly when other high-value crops offer a cash incentive.

"Some farmers, because they have anticipated pest outbreak, they do not plant cotton." – PG, Senegal

All farmers scouted for pests before acting, used botanical products, and rotated their crops. Trap crops were popular, as was the technique of removing bugs manually, and using physical traps.

"[We] use neem seed, oil of CARAPA PROCERA (local plant), Leaves of PHISALIS SP." – PG, Mali

PERCEPTION: EFFECTIVENESS OF ORGANIC VS CHEMICAL PEST CONTROL

The majority (66 percent) of PGs doubted that their organic techniques were as effective as chemicals. Although 34 percent thought organic methods were as good or better than conventional practices.
**CROP DIVERSITY**

For the purposes of this survey, PGs were asked to comment on biodiversity levels on organic farms compared to non-organic farms. They were also asked to identify where they observed the greatest extent of biodiversity to be.

**PERCEPTION: BIODIVERSITY LEVELS ON ORGANIC FARMS**

The majority (83 percent) reported a noticeable difference on their organic farms compared to non-organic.

"Farmers put it this way "we see more and more birds on our fields." - PG, Tanzania

"Natural enemies are present in the farm in a balanced population." - PG, Mali

The most common observations were levels of soil microorganisms and increased birdlife.
**USE OF FARM ANIMALS**
PGs use both animals and vehicles for farm work and transportation.

“Only a few farmers have a motorbike.” – PG, Tanzania

**USE OF FARM MACHINERY**
Of the 67 percent of PGs who are using farm machinery, motorbikes and utility vehicles were the most common.

**CARBON EMISSION REDUCTION**
While there were no reports of explicitly reducing carbon emissions on the farm, there was some investment (17 percent) into reducing carbon within the communities, e.g. smokeless stoves and use of solar panels, with varying degrees of success.

“There are some civil society organizations that train in some area on smoke-free stoves. But the adoption rate of this technology is still very low.” – PG, Benin

“[We] have started adopting Chinese solar panels in the villages.” – PG, Mali

“[We have] provided more efficient stoves.” – PG, Tanzania

**ADAPTATION TO CLIMATE CHANGE**
Half of all PGs are recognizing the need to adapt to climate change. The way they farm, the seed they use, and the way they need to manage pests are changing as a result of a changing climate.

“Our farmers use an early crop variety and they plow with the row perpendicular to the slope.” – PG, Mali

**PERCEPTION: HAS EXTREME WEATHER AFFECTED CROPS**
The majority of PGs (67 percent) were concerned about extreme weather events. Droughts, floods, and unpredictable rainy seasons are all perceived to be getting worse.

Climate Change - Flooding

“This is a cyclic event and when it happens everybody is affected. In one of our zones named Colibatan, in 2005 all their crops were lost due to inundation.” – PG, Sénégal

“This happen each year for cotton, even this year the cotton is sowed late, and that will affect the yield if the rain does not continue till end September.” – PG, Sénégal

“In some places, farmers suffer overflooding.” – PG, Burkina Faso

Climate Change - Drought

“Sometimes rains stop for long time (2 weeks or a month) during the growing season. This affects the production.” – PG, Burkina Faso

Climate Change - General

“We do not have a solution yet for these extreme situations.” – PG, Burkina Faso
AFRICA | LIVELIHOOD

PERCEPTION: COST OF ORGANIC VERSUS CONVENTIONAL FARMING

LAND USE
Farmers tend to allocate 57 percent of their land to securing food and 43 percent to cotton and possibly other high-value cash crops (such as sesame, bissap).

PRODUCTIVITY
The aggregated average yield was 175 kg of organic cotton fiber per ha. This yield average is low against the aggregated yield average of 352 kg/ha fiber for conventional cotton grown in these countries.

INCOME SOURCES
Organic cotton is the main source of income, however, this averages only 48 percent of total income – with a household receiving 52 percent of their income from other crops, livestock, and off-farm activities. Other crops, generally sold into the local market, provide an income share of up to 30 percent of household income. Less significant, but important, are income from livestock (12 percent) and income generated away from the farm (10 percent) e.g. from contracted laboring.

PRICE DIFFERENTIATION
Half of the PGs identified the purchase price of their organic cotton as between 21 to 30 percent above conventional prices. One reason for the higher expected value-add is the combined FT and organic certification.

"We give farmers a five-year guarantee to purchase 80% of their harvest. We make the payment on the spot at the purchase center for the average purchase price of the day and an additional 15% premium for every kilo purchased." – PG, Tanzania

ORGANIC COTTON SUSTAINABILITY ASSESSMENT TOOL

<table>
<thead>
<tr>
<th>Country</th>
<th>Organic (average kg/ha)</th>
<th>Conventional* (average kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benin</td>
<td>229</td>
<td>403</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>180</td>
<td>424</td>
</tr>
<tr>
<td>Mali</td>
<td>170</td>
<td>383</td>
</tr>
<tr>
<td>Sénégal</td>
<td>118</td>
<td>384</td>
</tr>
<tr>
<td>Tanzania</td>
<td>173</td>
<td>201</td>
</tr>
</tbody>
</table>

* Source: Mundi Index

"Finger Millet forms an important & traditional food source for the farmers of the region. This is the second important source of income." – PG, Tamil Nadu

PRICE DIFFERENTIATION
One-third of respondents perceived the cost of production to be less than conventional, a further third said it was about the same. Of the remainder 17 percent thought it was more expensive and there was a 17 percent no-response rate.

"[Organic is] more expensive than conventional because conventional inputs are subsidized and organic cotton is labor intensive that increases production cost (of organic)" – PG, Mali
**ORGANIZATIONAL STRUCTURES**

For the purposes of the survey “PGs” are any organized group of farmers working independently or under contract.

Half of the PGs in the study are cooperatives, a third are operating under contract farm arrangements, and there are a smaller number of independently operated groups. One PG in Burkina Faso is supported by a Growers’ Association growing conventional cotton alongside their organic/Fairtrade.

**ORGANIZATIONAL CAPACITY BUILDING**

All PGs provide training to farmers. In addition, 67 percent are providing financial support (by way of pre-financing for inputs, etc.) and 50 percent take care of certification for all farmers.

> “We have registered contract farmers in 15 villages. We have offices in each of these villages and supervisors and field extensionists available to provide their technical know-how to these farmers. Farmers are regularly monitored, trained and assisted” – PG, Tanzania

> “We provide other financial support such as pre-financing, price premiums, crop insurance etc.” – PG, Tanzania

33 percent offer further support for sales of the cotton and providing additional support for women farmers.

> “We support women by providing extra assistance such as special training, easier work during pregnancy and after birth, etc.” – PG, Burkina Faso

**TIMELINESS OF PAYMENTS**

While approximately 51 percent of PGs are paid within the month (sometimes immediately), 33 percent of respondents reported a lag time of up to 2 to 3 months before payment.

> “Farmers get directly paid at the point of purchase -> 0 Days.” – PG, Tanzania

> “Farmers get directly paid at the point of purchase.” – PG, Tanzania

33 percent offer further support for sales of the cotton and providing additional support for women farmers.

**TRADING PARTNERS**

One-third of PGs hold relationships directly with brands or retailers. This is due to the organizational set-up with partner international NGOs and/or FT status. A further third are working directly with a known partner (either a ginner or spinner) and the remaining third are operating through a trader.

**LONG TERM CONTRACTS**

Although long-term contracts are 50:50 with seasonal sales, two-thirds of the PGs are in long-term business relationships, which provide security in terms of agreed prices, timely trading and overall business security. Pre-financing is also a benefit experienced by 25 percent of the groups. Most PGs agreed long-term business security is critical to their success.

> “We give interest free loans to our farmers and (our value chain partner) pays the premium on organic cotton.” – PG, Tanzania

> “We are still vulnerable in terms of business relationships. We need more secure contracts for long term planning.” – PG, Mali
Two-thirds of PGs surveyed reported certifying to FT Standards as well as Organic.

**CERTIFIED ORGANIC**

All are certified according to European requirements, while a third of these PGs are also certified to the U.S. (National Organic Program) requirements.

**CERTIFIED FAIRTRADE**

50 percent of PGs are fully certified FT with a further 17 percent having some FT coverage. 33 percent have no formal FT certification but may be following FT criteria. The majority of PGs certified FT do so under the Fairtrade International (FLO) Standard, while the remaining 17 percent follow the French Bio Equitable program.

**FURTHER PROCESSING STANDARDS**

Where there is integration with the value chain, the manufacturer are working to the Global Organic Textile Standard (GOTS).
CASH CROPS
All African organic cotton farmers are diversifying their products for market or exchange within their local communities. On average, each PG grows 3 types of cash crops.

Although cotton is the predominant cash crop there is occasionally an additional high-value cash crop produced such as sesame or bissap. However, as the results indicate, formalized markets are the exception rather than the rule and the majority of secondary cash crops are traded informally in the local market or bartered within the community.

“Green beans (mung beans) have lately become an attractive option among many farmers but the quantity is still very low compared to income from cotton.” – PG, Tanzania

LIVESTOCK
It is common for PGs to own or have access to livestock. All the PGs surveyed own livestock of one kind or another. Animals play an important role in remote rural communities where relative self-sufficiency is a way of life. Animals are used for work, transportation, food, and as a status symbol (and investment/insurance in hard times).

“Livestock is a security, only during very hard times that the farmer sells his/her cattle. Normally farmers invest in livestock every year.” – PG, Tanzania
INVESTMENT PRIORITIES

The majority of PGs are interested in investments in farm facilities and technology, including IT (such as mobile phones, laptops and farm software). Machinery and infrastructure is also a high priority.

“Improving and adding housing facilities, investing in motorbikes, almost all farmers have mobile phones.” – PG, Tanzania

INVESTMENTS OVER THE LAST TWO YEARS

Over the previous two years African PGs have poured most of their investment into better machinery and equipment. They have also prioritized training and capacity building through investment in farmer field schools.

“We use farmers’ field school approach which is a very powerful method for technologies diffusion.” – PE, Benin.

“Farmers bought farm material (draught animals and equipment).” – PG, Mali

PERCEPTION: WHAT INFLUENCES FARM PRACTICE?

PGs perceive farmers to be influenced by local or traditional knowledge, PG policy and practices (such as their own research and trials), and external influences (R&D, academic papers, consultants) almost in equal proportion.
The majority (67 percent) of farmers are solely organic. 17 percent is growing in-conversion. A smaller number of PGs are also growing cotton conventionally.

Only Burkina Faso has to date introduced GMO (Bt) cotton, although there is a concern about contamination amongst neighboring countries, particularly when gins are shared across borders. The pressure to introduce GMO cotton to other African countries, such as Tanzania and Uganda, is high.

**SEED REQUIREMENT**

Farmers reportedly require an average of 40,053kg per farmer, per year. This appears to be significantly higher than other countries and could in part be explained by the need to re-sow or patch-fill if seed does not germinate the first time. At 100,000kg per farmer, Tanzania has significantly higher seed requirement than other countries (less than 50kg per farmer).

**SEED SOURCE**

The majority (83 percent) of PGs re-use their seeds; 50 percent of PGs save seed for their farmers and 33 percent farmers save themselves for re-use. The remainder is provided by seed research institutes.

> “After ginning we retain quantity [of seed] needed for redistribution to our registered farmers” – PG, Tanzania

**CHANGES OVER PAST 3 YEARS**

Only a small minority of farmers have actually changed seed varieties recently – and those who had did this for reasons of quality.

**SEED BREEDING & TRIALS**

A number of PGs are involved in seed research programs and others are contemplating getting further involved in seed improvement research.

> “Not yet but are contemplating to produce our own seeds/members of TANZANIA ALLIANCE FOR BIODIVERSITY” – PG, Tanzania

**PERCEPTION: DIFFICULTY IN SOURCING SEED**

Availability of seed does not appear to be an issue for the majority of organic cotton farmers. For the small minority who perceive a problem they only scored it as “moderate” difficulty.
GROW CROPS FOR OWN USE

All PGs grow food for their own needs. With 57 percent of farm plot dedicated to food, land allocation for food security is high. On average, each PG grows 8 types of crops for their own use. Cereals and grains, nuts and oil seeds followed by legumes and pulses, vegetables (both seasonal and tuber) are the most common non-cotton crops grown.

PERCEPTION: FACTORS AFFECTING FOOD SECURITY

Weather events are the major challenge to food security perceived by PGs.

PERCEPTION: FOOD SECURITY ORGANIC VS CONVENTIONAL

The majority of PGs (67 percent) did not differentiate between organic and non-organic, while 17 percent perceived better food security and the same number perceived less.

"Since the organic farmers practice crop rotation, they have the ability to have better yields. But this is not so phenomenal."

– PG, Tanzania
LABOR STANDARDS & POLICIES

All African PGs in this study have some form of policies to guide labor and socio-economic security and benefits for farmers. Two thirds of PGs are FT certified. Of the 33 percent that are not FT, half have developed formal policies whilst the other half have informal policies. All PGs with formal policies covered key issues such as air treatment, freedom of association, child labor, discrimination and forced labor. Overall, 83 percent of PGs have either FT or formal policies on decent work.

WORKER RISK ASSESSMENT

In terms of safety, all PGs carry out worker risk assessments and farmers receive training on precaution methods.

“[We] provide training on precautions when using botanicals, storage etc.” – PG, Mali

TEMPORARY LABOR

“The farmers help each other for land preparation, weeding, and harvesting” – PG, Tanzania
The number of independently recognized women farmers is at 23 percent. It is well known that women (wives and other family members) take part in farm duties since farming is generally a household affair. 83.5 percent of PGs either formally or informally encourage women to participate in farming and 33 percent offer extra assistance.

“[W]e facilitate access to credit for them. Quota of 30 percent of women should participate to all trading programs. Promotion of women-specific crops like Sesames and Shea nut.” – PG, Mali

“Whenever a woman farmer wishes to join us we encourage them and if they are in need of any maternal support we provide them, such as interest-free loans for land preparation, weeding and harvesting.” – PG, Tanzania

FARMERS IDENTIFIED AS INDIGENOUS
29 percent of all farmers (5,744 farmers) associate with being indigenous/tribal. Traditional techniques are fully integrated into farming practices.

PGS EMPLOYING INDIGENOUS FARMERS
Note: The survey was not sensitive enough to distinguish “tribal” farmers from “indigenous”.

PERCEPTION: WHAT INFLUENCES FARM PRACTICE?
Drawing on the perception question in Business Investment (in the Economic Dimension), 32.5 percent of PGs perceive traditional knowledge to be a key factor in farmers’ business decisions (including farm practice).
**COMMUNITY BENEFITS**

All PGs agree that local communities benefit from organic cotton (83 percent definitely and 17 percent probably). The most common benefits were access to drinking water and improved educational facilities. These benefits scored higher than "employment".

**INVESTMENT PARTNERSHIPS**

The majority, 83 percent, of PGs reported working in partnership with other organizations for rural development. Partnerships were with both corporations and NGOs.

"We are active in supporting social development within the community. In collaboration with our Foundation, recent activities include: Providing sewing machines and workshops for women in villages where we work; Water wells built and/or renovated; Houses built for teachers at the primary school; Building smokeless stoves (CO2 project); Completed water tank at primary school." – PG, Tanzania
CHINA

OVERVIEW

The Xinjiang Province in China is currently the second largest producer of organic cotton, contributing 9 percent of the global supply of organic cotton fiber.

This assessment reflects the situation in Kashi, one of the districts within the Xinjiang Province where organic cotton is grown. Although the majority (71 percent) of organic cotton is grown in Hefeng, the situation in Kashi is considered fairly representative.

Chinese organic cotton farmers tend to be “mid-scale” landholders (average size farm reported to be around 13ha) and 95 percent irrigated (this organic cotton production area is entirely drip irrigated with reports of significant water savings). Farmers tend to be contracted, often by a textile manufacturing company, as is the case in Kashi.

In the survey, organic cotton farmers on average dedicate almost all of their land to growing organic cotton for market. However, crops are grown in rotation for soil fertility (the average number of non-cotton crops was 3) and some crops are sold in the local market. Food crops are not grown (on the cotton farms) for own use. Food security is reported to be achieved through good prices and long-term business security for the sale of their organic cotton.

Kashi organic cotton farmers reported socio-economic benefits beyond the ecological ones associated with organic agriculture. For example, farmers reportedly benefit from investment in capacity building and the formation of labor policies.

Adverse weather events were not perceived to be a concern affecting cropping patterns, although crop choices were reported to be changing in response to climate change.
PRODUCTION TREND (ACTUAL) 2004-05 TO 2011-12

The fiber production trend in China has fluctuated significantly over recent years but, overall, there has been a clear growth in production. Between the 2004-05 and 2007-08 growing seasons, growth was exponential; however, this was followed by a fall in production for two seasons and then a spike in 2010-11 (in part due to improved data collection), before production fell again in 2011-12.

China's position in the leader board of organic cotton producing countries has mirrored this pattern, with it fluctuating but rising overall from fifth place in the 2004-05 season to third place in 2011-12.

Organic cotton production in China faces a number of inter-related challenges, ranging from a lack of investment in small-scale farming and uncertain market demand to subsidized conventional cotton production and the challenge of finding high-quality non-GMO seed in a GMO-dominated seed market.

Production in China is very much market-driven—primarily due to the relationships between farmers and manufacturers, with farmers commonly being sub-contracted to grow organic cotton. The amount of land under organic cotton is directly linked to demand from the textile manufacturers.

The profitability of growing organic cotton in China varies greatly from year to year. This is because organic cotton prices are market-based, whereas conventional cotton prices are controlled by the government through its reserves. Therefore, when conventional cotton prices are driven upwards, the price premium farmers receive for growing organic compared to conventional decreases, making it relatively less profitable. This drives farmers away from organic since it is perceived as 'more risky'.

Production of organic cotton is also influenced by food prices for similar reasons—it demand for organic cotton is weak farmers sell crops become more profitable and they will often switch without too much hesitation.

One more point to consider regarding the variable nature of China's organic cotton production trend is that difficulties with data collection may distort figures. For example, the peak in 2010-11 was partly attributed to improved data collection that year.

SAMPLE SIZE & DISTRIBUTION

Virtually all organic cotton in China is grown in Xinjiang province in the north-west. As evident in the graphic opposite, within Xinjiang province, 71 percent of this production takes place in Hefeng, 15 percent in Kultan, 10 percent in Tacheng and 4 percent in Kashki.

In this assessment of organic cotton production in China, only one PG was surveyed and they are based in Kashki. However, it is believed that this PG is fairly representative of organic cotton production in China since they are a large group which has produced organic cotton for many years and is well known in the Chinese organic cotton market. It should be taken into account that since 100 percent of data is from one PG in one county, it may skew assessment results. The PG in question comprises of 80 growers farming a total land area of 149ha.
HOUSEHOLD STATISTICS

SIZE OF HOUSEHOLD
Average 10 persons

FARM STATISTICS

SIZE OF FARMS
Average 13 ha

COTTON CHARACTERISTICS

COTTON SPECIES
G. Barbadense
G. Hirsutum

FIBER STAPLE LENGTHS
Medium staple: 25-30 mm
Long staple: 30-37 mm
Extra Long staple >37 mm

GINNING OUTTURN
Average 43%

FIBER MICRONAIRE
Average 3.9mm (Range: 3.5-4.3mm)

CHINA | COUNTRY PROFILE

SIZE OF HOUSEHOLD
Households averaged 10 people per household.

SIZE OF FARMS
Average farm size was 13.3ha. This is a significantly larger average farm size than many other organic cotton producing regions (such as India and Africa), where farming is smaller-scale and tends to be in the region of 2 to 3ha. It is common for Chinese organic cotton farmers to sub-contract the land and grow directly for a textile manufacturing company.

LAND UNDER ORGANIC CULTIVATION
The PG surveyed for this assessment contracts all of its cotton farmers. The PG grows not only organic but also some conventional cotton. At the time of the survey there was no cotton “in-conversion” to organic which indicates that no expansion plans are in place. This may not be indicative of production outside the sample group although wider inquiry by the researchers reveals that, in general, minimal expansion is indeed occurring.

CASH CROPS
The average number of non-cotton crops grown by this PG was 3, all of which were grown for soil fertility (and other needs of organic agriculture such as trap crops) and some sold in the local market. These crops were generally sunflower, wheat and pulses. Non-cotton crops are commonly rotated with the cotton. Survey results indicated that organic cotton in China is mainly grown by contract and it was not common for farmers to use this land for their own food supply needs. The PG restricts the amount of land devoted to non-cotton crops for own-use since it believes there is sufficient food supply in the area already.

COTTON SPECIES
The PG grows both Gossypium Hirsutum and Gossypium Barbadense (also known as “Chinese Xinjiang”). Varieties have not changed for at least three years.

FIBER STAPLE LENGTHS
In terms of fiber lengths, 70 percent of cotton grown is medium staple, 20 percent is long staple and 10 percent is extra-long staple.

GINNING OUTTURN
Ginning outturn was 43 percent.

FIBER MICRONAIRE
Fiber micronaire ranged from 3.5 to 4.3mm, with an average of 3.9m.
95 percent of the area under organic cotton is irrigated with only 5 percent rainfed. Farmers in this survey currently irrigating their land have invested in the more water-efficient “drip” technique.

This PG claims to have access to good water facilities and reveals no issues regarding water quality or availability. The area receives an average of 182mm rainfall.

“Average water usage per ha per year is 12,000 m³ in this area. We use drip irrigation which uses significantly less at only 150m³/ha. Irrigation is paid for at a cost of 0.6 RMB/m³.”

– PG, Xinjiang province

WATER MANAGEMENT APPROACH

Farmers manage their water needs independently, although catchment management techniques (including soil erosion protection measures) suggest some degree of collaboration.

PERCEPTION: WATER AVAILABILITY AND WATER QUALITY

Although water is an area of growing concern in the cotton growing regions of China, farmers are not currently perceiving any problems with its supply and quality.
SOIL MANAGEMENT APPROACH
Soil fertility management is carried out independently, although catchment management techniques (such as erosion protection and soil fertility measures) suggest some degree of collaboration for soil conservation.

SOIL FERTILITY & CONSERVATION TECHNIQUES
Soil fertility techniques practiced by farmers in this PG include:
- Crop rotation with legumes
- The application of farmyard manure and bio-fertilizers (6000 kg/ha in total) - of these:
  - 30 percent is cottonseed meal
  - 20 percent is waterlogged compost
  - 50 percent is digestate (anaerobic digestate is a by-product of biogas production and a rich source of macronutrients such as Nitrogen, Phosphorus, and Potassium).

*Animal manure is used as an organic fertilizer since, in the Xinjiang Province, animal grazing is common and there is a large amount of manure available. On average, 2,000 kg/ha is applied.” – PG, Xinjiang province

*”They buy manure from herdsman. You know in Xinjiang Province, there are lot of people grazing animals, they have a large number of barnyard manure, it's very good for organic cotton planting.” – Survey Administrator, China

SOIL FERTILITY
There was no test data available on soil fertility levels.
The farmers carry out pest management independently.

**PEST MANAGEMENT TECHNIQUES**

The main techniques used for pest control are:
- Crop rotation
- Physical traps
- Trap crops

**PERCEPTION: EFFECTIVENESS OF ORGANIC VS CHEMICAL PEST CONTROL**

In terms of effectiveness of these techniques in comparison to chemical control methods, farmers perceived them to be equally as effective.
PERCEPTION: BIODIVERSITY LEVELS ON ORGANIC FARMS

The PG claimed to see no noticeable difference in biodiversity levels on organic farms compared to non-organic farms.
USE OF FARM MACHINERY

Farmers in this PG did not have their own livestock but they did use tractors for farming. Over half (approximately 60 percent) owned their own tractors, the rest rented or borrowed for their use.

The tractors used fossil diesel.

CARBON EMISSION REDUCTION

No carbon emission reduction strategies were reported by this PG.

ADAPTATION TO CLIMATE CHANGE

Despite claiming that extreme weather is not a big problem, the PG says that they do take precautions through their crop selection.

PERCEPTION: HAS EXTREME WEATHER AFFECTED CROPS?

The PG claimed to not have been affected by extreme weather conditions linked to climate change.
LAND USE
All land area is used to farm cotton and other cash crops and none is used to grow food for own consumption.

PRODUCTIVITY
Average organic cotton fiber yield for this PG was 2,181 kg/ha. This yield is well above the Chinese conventional cotton yield which is reported on the Mundi Index as being 1,477 kg/ha.

Production Costs
Labor is reportedly the biggest cost for organic cotton farmers, accounting for around half of the total costs. “Other” in the case of this PG includes irrigation water at 6 percent. Average cost of production was reported to be RMB22,500/ha (approximately USD3,600/ha).

“Due to hand-picked for Xinjiang organic upland and the high labor cost, labor percentage takes up a notable 35 percent” – Survey Administrator, Kashi

INCOME SOURCES
In terms of income sources, 95 percent of income is from organic cotton whilst the remaining 5 percent is from food crops including wheat, sunflower and pulses.

PRICE DIFFERENTIATION
The PG claims that the average price they receive for their organic cotton is less than 5 percent above that of conventional cotton.

PERCEPTION: COST OF ORGANIC VS CONVENTIONAL FARMING
The PG perceived that the costs of organic cotton farming were the same as those for conventional cotton farming.
ORGANIZATIONAL STRUCTURES
- The PG is made up of 80 contract farmers.

ORGANIZATIONAL CAPACITY BUILDING
- This PG is fairly established and independently:
  - Carries out farmer training
  - Has its own market department
  - Has ownership of organic certification
  - Provides free or cheaper farmer inputs
  - Owns or shares a gin
  - Supports women with extra assistance
  - Makes investment further in the supply chain

TIMELINESS OF PAYMENTS
- The PG usually pays the farmers within 8 to 14 days and the PG is usually paid by the buyer within the same time frame.

TRADING PARTNERS
- This PG works largely within a vertically integrated chain and so processes the fiber itself, improving business security for the farmers. However, it also sells a small amount of cotton to external buyers.
China does not qualify for Fairtrade certification. For insights into the socio-economic benefits provided by this PG see:

- Producer Organization Theme: Organizational Capacity Building Indicator
- Decent Work Theme: Labor Standards & Policies Indicator

CERTIFIED ORGANIC

This PG is certified to export standards set by the European Union and the U.S. National Organic Program.

FURTHER PROCESSING STANDARDS

This PG is integrated into a supply chain certified to the GOTS.
Farmers in this PG do diversify by growing other cash crops besides cotton, however, this is reported to be limited to 3 main crops (wheat, pulses and sunflower), which together only make up 5 percent of total farm income. Non-cotton cash crops are sold direct to the local market.

**LIVESTOCK**
Farmers do not keep livestock.
INVESTMENT PRIORITIES

This PG has prioritized investment in farmers’ access to technology (in particular, cell phones), and better IT support. In addition, the PG has invested in its farmers.

INVESTMENTS OVER THE LAST TWO YEARS

Over the previous two years the PG has invested in farmer training.

PERCEPTION: WHAT INFLUENCES FARM PRACTICES?

In terms of what the PG perceives to influence farm practice, the following weightings were given: 50 percent traditional knowledge; 20 percent for external influences; 20 percent for internal policies and practices; and 10 percent for ‘other’ influences.

Demand from the textile industry (especially manufacturing partners) is a major influence on farmers. It was mentioned specifically that expected income was an influencing factor and the market therefore drives crop choices.
The use of genetic engineering, or genetically modified organisms (GMOs), is prohibited in organic products. This means an organic cotton farmer cannot plant GMO seeds.

**SEED REQUIREMENT**

Farmers require an average of 8,000kg of seed per farmer per year for their cotton production. The PG uses cultivars from both the use both the *Gossypium Hirsutum* and *Gossypium Barbadense* species.

**SEED SOURCE**

Farmers save or grow their own seed and have not changed varieties for at least three years.

**PERCEPTION: DIFFICULTY IN SOURCING SEED**

The PG claims to be experiencing ‘moderate’ difficulty in sourcing seed. It is not currently involved in any seed breeding projects or trials.
**CHINA | FOOD SECURITY**

**GROW CROPS FOR OWN USE**
The PG claims that farmers do not tend to grow food crops for their own consumption on the land contracted for cash crops. It claims that farmers want to maximize their cash crop yields as a way to improve food security. If production is down there is less income.

**PERCEPTION: FOOD SECURITY ORGANIC VS CONVENTIONAL**
The PG claims that organic production is better in terms of food security than conventional, since organic farmers generally get a better income so can buy more/better food.

Note, farmers are not experiencing low yields from their organic cotton cultivation (See Livelihood Theme: Productivity Indicator). The perceived fear is that if yields were to suffer their income would be reduced and that would have an affect on food security.
LABOR STANDARDS & POLICIES

The PG has identified its own labor standards/policies, which means that they:

- Agree price (for organic cotton)
- Ensure that minimum wages are complied with (to laborers)
- Farmers are free to associate and bargain collectively
- No child labor is used
- No discrimination and equal pay for equal work
- No forced labor
- Provide a ‘living wage’
- Seasonal workers, contractors and undocumented workers are treated fairly
- Working conditions are safe and hygienic
- Working hours are not excessive

WORKER RISK ASSESSMENT

In terms of safety, the PG carries out worker risk assessments and farmers receive training on precaution methods and use of protective equipment.

TEMPORARY LABOR

The PG surveyed hires local residents as temporary workers. On average, 200 temporary workers are hired per year, 88 percent of those hired are local residents.
WOMEN FARMERS
The number of female farmers in this PG was 24 or 30 percent of all members of the PG.

ENCOURAGE FEMALE PARTICIPATION
Female participation is encouraged and women are supported and given extra assistance.

FARMERS IDENTIFIED AS INDIGENOUS
All farmers in this PG are indigenous.

PGS EMPLOYING INDIGENOUS FARMERS
This PG employs indigenous farmers.
Note: The survey was not sensitive enough to distinguish “tribal” farmers from “indigenous”.

PERCEPTION: WHAT INFLUENCES FARM PRACTICE?
It is evident from the response that the PG perceived “traditional knowledge” to have a significant impact on farmers’ decision-making and farm practices.
The PG answered ‘yes, possibly’ in regards to whether the community had benefitted from organic cotton production. The types of benefits they claim to have experienced as a result of organic cotton production include local employment, as a result of hiring temporary workers for the cotton harvest, and improved health services in the form of a clinic for local people.

INVESTMENT PARTNERSHIPS
The PG did not list any investment programs or partners external to their own organization.
India produces the bulk of organic cotton (approximately 75 percent of global supply), and has so for the past five years, overtaking Turkey in 2007-08.

Organic cotton production currently takes place in nine States in India, the majority, by volume, is cultivated in Madhya Pradesh and Maharashtra.

This assessment captures production in seven of the States, with the exception of the small volumes cultivated in Haryana and Karnataka.

Indian organic cotton farmers tend to be small-scale landholders (average size farm reported to be around 2ha) and most of the land under cultivation (71 percent) is rainfed. PGs in this survey tend to be either organized through contract farming (often connected to a gin or mill), or independent producer associations, with the exception of one fully licensed cooperative working within three States.

In the survey, organic cotton farmers on average dedicate around 66 percent of their land to cash crops and the remaining portion to food security. The average number of non-cotton cash crops produced at a commercial scale and primarily for the local market was 2, while an average of 7 food crops are grown for own use.

47 percent of organic cotton PGs surveyed were certified to FT as well as organic standards. All (100 percent) PGs reported to either have FT certification or have developed their own policies in terms of labor and social criteria.

Almost all (94 percent) producer groups surveyed were concerned about climate change and are noticing severe droughts, flooding, and changes in onset of monsoon.
INDIA | COUNTRY PROFILE

PRODUCTION TREND (ACTUAL) 2004-05 TO 2011-12

The fiber production trend in India shows a gradual increase over the three years from 2004-05 to 2006-07. This was followed by extremely strong growth for the next three seasons.

In 2007-08, India overtook production in Turkey to become the world’s biggest producer of organic cotton. Production peaked in 2009-10 with India producing 81 percent of the world’s organic cotton.

The dramatic drop in global production in 2010-11 was due to the decline in production (of 48 percent) in India. The main reasons for the decline were:

- The growing scarcity of seed suitable for organic cotton agriculture, a result of an increasing dominance of genetically modified (GM) cotton;
- Continued economic uncertainty, driving prices down, endangering viability for organic cotton farming;
- More stringent registration and tracking requirements (Tracenet) introduced by APEDA - the Indian Government’s organic regulation office;
- A shift by some companies from established programs such as organic and FT, to newer entry level initiatives, e.g. Better Cotton Initiative (BCI).

SAMPLE SIZE & DISTRIBUTION

Ten Indian organic cotton PGs participated in the survey, resulting in 17 surveys being completed. (A number of producer groups had clusters of farmers in multiple locations.)

The breakdown of surveys by state is:

- Maharashtra: 24%
- Gujarat: 18%
- Madhya Pradesh: 18%
- Odisha: 18%
- Rajasthan: 12%
- Andhra Pradesh: 6%
- Tamil Nadu: 6%

The survey sample size for India covers approximately 26 percent of India’s overall organic cotton production (benchmarked against data for 2011-12), 25 percent of farmers, and 20 percent of the land certified as growing organic cotton.

The dominant states, by volume of production, are Madhya Pradesh and Maharashtra. As you can see from the inner donut, the assessment results will be slightly skewed by a larger sample size (compared to actual) from Gujarat and Odisha.
**INDIA | COUNTRY PROFILE**

### HOUSEHOLD STATISTICS

**SIZE OF HOUSEHOLD**
Households averaged 6 people per household (with a range of 4 to 10).

### FARM STATISTICS

**SIZE OF FARMS**
Farm sizes averaged 2ha (ranging from 1 to 4ha).

**PG ORGANIC CULTIVATION SPLIT**
While the majority of PGs were only cultivating organic cotton (plus cotton in-conversion), 39 percent of land is under conventional production.

**COTTON SPECIES**
Both *Gossypium Herbaceum* (an Indian native “deci” cotton) and the popular *G. Hirsutum* (also known as American Upland) are reported as the most commonly grown cottons in India. Although not as popular these days, the shorter staple *G. Arboreum* is another Indian native and well adapted to local growing conditions. The extra long staple, *G. Barbadense* (originally from South America) is also grown in India by a number of PGs targeting the higher-end fiber market.

**FIBER STAPLE LENGTHS**
PGs mostly (88 percent) cultivate organic cotton of medium length fiber. Longer fibers fetch a higher price and are often favored by the industry. Shorter staples are considered a lower quality but are useful for specific market needs.

### COTTON CHARACTERISTICS

**COTTON SPECIES**

<table>
<thead>
<tr>
<th>Cotton Species</th>
<th>0%</th>
<th>50%</th>
<th>100%</th>
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</thead>
<tbody>
<tr>
<td>G. Arboreum</td>
<td>41</td>
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<td>41</td>
</tr>
<tr>
<td>G. Hirsutum</td>
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<td>12</td>
<td>29</td>
</tr>
<tr>
<td>G. Herbaceum</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>G. Barbadense</td>
<td>53</td>
<td>53</td>
<td>53</td>
</tr>
</tbody>
</table>

**FIBER STAPLE LENGTHS**

<table>
<thead>
<tr>
<th>Staple Length</th>
<th>0%</th>
<th>50%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short staple &lt;25 mm</td>
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<td>15</td>
</tr>
<tr>
<td>Medium staple 25-30 mm</td>
<td>10</td>
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<td>10</td>
</tr>
<tr>
<td>Long staple 30-37 mm</td>
<td>10</td>
<td>10</td>
<td>29</td>
</tr>
</tbody>
</table>

**GINNING OUTTURN**
Average 34%

**FIBER MICRONAIRE**
Average 4mm (Range: 3-4.2mm)
71 percent of the area under organic cotton is rainfed. One PG, spanning three states is 100 percent rainfed. The majority of PGs (82 percent) have partial or “supplementary” irrigation.

“We adopted an integrated watershed approach combined with catchment management with different soil and water conservation measures. Efficient rainwater management acts as insurance for the crop during the rainfall deficit periods. Techniques that increase infiltration and soil-water storage and decrease water runoff, evaporation and evapotranspiration from crop fields are encouraged.”

- PG, Andhra Pradesh

A mix of localized (e.g. drip, trickle) and surface (e.g. furrow, borderstrip) systems was reported. Commentary suggests farmers are moving towards more efficient systems.

“In drip irrigation 70 percent of water is saved compared with flood irrigation, and in sprinkler irrigation 35 percent of water is saved compared with flood irrigation.”

- PG, Maharashtra

65 percent of PGs reported paying for water. Responses reveal they are less likely to be paying directly for water and more likely to be paying for electricity, pumping services and the machinery associated with irrigation.

“For the whole year of crop farmers pay lump-sum amount to irrigation department. Electricity charges are paid as per the units used during the specified time limit/crop period. Farmers do not keep record of such costs.”

- PG, Madhya Pradesh

The majority of farmers (76 percent) are managing water independently. However, some tasks are managed collectively, depending upon the task.

Organic farmers use many techniques to conserve water. Crop selection, field bunding (raised earth around the perimeters of the plot), and rainwater harvesting alongside more efficient irrigation systems were popular interventions.

“Farmers use own selection variety cottonseed so water requirements are less than hybrid. They also grow short duration crops like guava, mung and bajara. If they have more water they grow cumin and fodder crops in the winter.”

- PG, Gujarat

PGs surveyed were concerned about the availability of water. Concern for the quality of the water was less of an issue but still problems such as saline groundwater were reported.

“Water is an issue. We get very little rain and there is insufficient groundwater for irrigation”

- PG, Maharashtra
SOIL FERTILITY & CONSERVATION TECHNIQUES

Methods for improving soil fertility range widely, however all (100 percent) of PGs report using crop rotation and composting. A small number of PGs use mineral powders; this is usually associated with biodynamic organic agriculture.

Responses to the survey reveal that soil conservation methods are quite often integrated with water conservation/management.

“Soil fertility and conservation measures tend to be managed independently by farmers. However, communal activities were reported by some PGs, such as this one from Odisha.

“Preparation of liquid farmyard manure is carried out group wise, it is one of the important activities for farmer groups.” – PG, Odisha

“Farmers are trained in groups for making quality-enriched compost. At present they are doing it independently. We have not yet explored the potential for collective soil management systems.” – PG, Maharashtra

SOIL FERTILITY

Almost half of the sample group reported carrying out soil analysis; 12 percent provided us with records of soil analysis. It was difficult to aggregate quantitative data on soil fertility applications. As an example, an account from one PG in Madhya Pradesh is provided below:

- Composting: 12,500 kg/ha
- Crop Rotation (e.g. with legumes): 75 kg/ha
- Intercropping: 25 kg/ha
- Green Manure (e.g. cover crops): 42 kg/ha
- Animal Manure (FYM): 10,000 kg/ha

One report from Maharashtra showed increased Soil Organic Matter (SOM) over five years from 0.36-0.55 percent and a pH change from 8.11-7.21.
PEST MANAGEMENT APPROACH

PEST MANAGEMENT TECHNIQUES

The most common methods of controlling pests was by the use of botanicals, crop rotation, pest scouting, use of pheromones and parasites (such as parasitic wasps), and trap crops such as sunflower and okra. Improved soil fertility and healthy microbial levels are commonly reported as long term measures to prevent pests and disease from breaking out.

“Soil fertility is enhanced through a basal dose of farmyard manure (FYM) before sowing. Biomass-based nurseries with Cassia, Glyricida are raised at the Cooperative level and distributed to farmers. Seed of Sunhemp is multiplied at the Cooperative level (as well) and distributed to farmers to raise them on farm bunds. These biomass plants are lopped/harvested around 50 percent of their flowering stage and made into compost. Farmers add cow dung and urine to this compost to hasten decomposition, and improve soil biology that protects crops from diseases also. Top dressing with FYM: liquid FYM is carried out in the middle of the season.” – PG, Odisha

Organic farmers report the use of a crop protection mix or “Top Ten” containing 10 local ingredients, and commonly based on the Neem plant. See the below accounts of ingredients used and a recipe for Top Ten.

“Neem based botanicals, Garlic onion chilli paste, Je amrit, Topen with 10 identified plant leaves which work as natural pesticide such as Neem, Karanj, Custard apple, Thorn apple, Babul, Tamesar, Papaya, Oleander, Chaste tree, Castor etc.” – PG, Madhya Pradesh

“Azadirachta indica, Pongamia pinnata, Anona Squamosa, Carica papaya, Neirum indicum, Callotropis procera, Tinosposra cordiflora, Vitex nigundo, Ricinus cummounis, Lantana camera, cow urine and cow dung, custard apple leaves extract (leaves of Custard apple and water and cow urine), NSE 5 percent (Dry Neem seeds: 5kg and 95 liters water).” – PG, Maharashtra

PERCEPTION: EFFECTIVENESS OF ORGANIC VS. CHEMICAL PEST CONTROL

The perception of the effectiveness of organic pest management techniques versus chemical ones was varied. The majority (almost 60 percent) believes the effect to be about the same. A third of PGs believed chemical methods were more effective, however, for some PGs it depended on the timeframe and context (see quote below). Only a small percentage felt organic techniques were more effective than chemical.

“The organic alternatives such as neem oil, neem ark, dasparni ark, are as effective as chemical control.” – PG, Maharashtra

“Organic alternatives are not as effective as chemical but in the long term these alternatives are giving better results. First of all, these alternatives are cheaper than chemical ones and demand for these organic alternatives decreases year by year due to its sustainable and long term effect.” – PG, Gujarat

“Organic is more effective than chemicals as organic builds natural balance in crop-ecosystem and ensures control in the long run.” – PG, Odisha

Comments also revealed how difficult it can be to keep farmers on track when organic methods are proving unsuccessful.

“Organic requires the frequent application and proper use of physical, mechanical, chemical (plant extracts) and biological agents to control. In extreme circumstances, when substances allowed under organic farming do not show proper results, farmers get tempted to use chemical fertilizers and pesticides to get immediate results. When necessary extra trainings are given on the effective use of organic substitutes.” – PG, Madhya Pradesh
ORGANIC COTTON SUSTAINABILITY ASSESSMENT TOOL

ORGANIC COTTON SUSTAINABILITY ASSESSMENT TOOL

All organic farmers grow a variety of crops. The average number of non-cotton crops grown by farmers was 8, with a range of 5 to 16. The average ratio of land use for cash crops and "own use" crops was 66 to 34 respectively (See Economic Dimension: Livelihoods Theme).

TYPES OF CROPS

Cotton tends to be the primary cash crop but other crops are grown for soil fertility, family food security, and secondary market opportunities. Crop diversification is an essential part of organic agriculture.

PERCEPTION: BIODIVERSITY LEVELS ON ORGANIC FARMS

For the purposes of this survey, PGs were asked to comment on biodiversity levels on organic farms compared to non-organic farmers. They were also asked to identify where they observed the greatest extent of biodiversity to be.

The majority, 82 percent, of PGs perceived a greater level of biodiversity on organic farms. 18 percent could detect no obvious difference.

"In our project area many species of flora and fauna are found naturally growing which are not visible in conventional farms." – PG, Gujarat

"Pest incidence levels are coming down over the years. Though pests occur when climatic conditions are favorable, the build up of natural enemy populations is observed to be quick to bring the natural balance back." – PG, Odisha

PERCEPTION: AREAS OF INCREASED BIODIVERSITY

From the 88 percent responding positively, 67 percent of them perceived greater biodiversity to be in microbial/soil, flora and fauna and 33 percent at the species levels such as birds and other natural predators.

"Different kind of flora and fauna are seen flourishing in organic fields. Compost decomposition activity has been seen increased in our organic farms than the other conventional farms." – PG, Odisha

"Increased predators population in the field and low pest intensity. Multiple cropping systems assure fodder availability, legume crops in the field adds fertility to soil and food security to farming community." – PG, Maharashtra

Some PGs are providing trees to encourage the growth of agroforestry. For example, this group in Madhya Pradesh:

"We have distributed nearly 20,000 glyricidea plants to our farmers. All our organic farmers intercrop, use trap crops, and rotate their crops every year. Density of trees per square Km is very high in the organic pocket compared to the conventional." – PG, Madhya Pradesh
USE OF FARM ANIMALS

Animal traction (e.g. by buffalo or oxen) for farm work and transportation is common. (See Risk Management Theme: Livestock Indicator).

USE OF FARM MACHINERY

Responses indicated that farmers did not often own vehicles; they commonly rented or borrowed what they needed either from the PG or from neighbors. The bigger farmers tend to have their own vehicles.

“About 2,000 farmers use motorbikes from within the farm group. About 50 farmers use trucks from outside the farm group on a rental basis. Information on exact numbers is not available.” – PG, Madhya Pradesh

A number of PGs provided data on fuel usage (for tractors, motorbikes, and irrigation motors), but not enough to provide a reliable insight. PGs fuel usage ranged from 50 to 150 litres per ha per crop-cycle.

“20,000 hours for 2,000 farmers using tractor for land preparation. Total of 60,000 litres diesel used annually.” – PG, Madhya Pradesh

CARBON EMISSION REDUCTION

35 percent of PGs reported implementing carbon emission reduction innovation such as building biogas plants, using biofuel, erecting solar panels, and installing smoke-free cooking stoves into houses. One PG has set targets to become “carbon positive” (going beyond carbon neutral).

“1,000 farmers have Biogas plants and 2,000 farmers have smoke-free stoves.” – PG, Madhya Pradesh

ADAPTATION TO CLIMATE CHANGE

82 percent of PGs reported making changes to farming practices as a result of climate change. Water, pest, and to some extent soil management practices were reported. Seed and crop choices were subject to a number of influences such as availability and price (respectively) as well as a potential adaptation to a changing climate.

PERCEPTION: HAS EXTREME WEATHER AFFECTED CROPS?

94 percent of PGs indicated a perception of changing weather patterns affecting crop cultivation. Weather concerns ranged from droughts to floods, to changing rainfall patterns and heavy winds.

“Due to severe winds quality of produce decreases and trash percentage increases. In some cases it harms standing crops also.” – PG, Odisha
LAND USE
Farmers tend to allocate two-thirds of their land to cotton and other cash crops and one-third for food, fodder, and soil fertility.

PRODUCTIVITY
PG surveyed averaged a fiber yield of 530 kg/ha, higher than the organic cotton ave of 517 kg/ha reported in the Mundi Index. According to the Cotton Corporation of India, the ave yield for conventional cotton in India in 2011-12 was 493 kg/ha. The line chart (to the left) tracks the productivity trends of survey participants.

PRODUCTION COSTS
Labor is by far the biggest expense for organic cotton PGs (61 percent). Some PGs included the cost of mechanization (associated with sowing, ploughing, and threshing) in this category along with manual labor.

From the data provided, we can assume an average cost of production (in 2011-12) of USD497 ha per annum, with a range of USD332 to USD561. In the example below, for a PG in Maharashtra, the cost of labor more than doubled over the past four years.

INCOME SOURCES
Organic cotton is the main source of income. Other crops, generally sold into the local market, also provide an income. Income from livestock or income generated away from the farm (e.g. from contracted laboring) offered a supplementary income.

PRICE DIFFERENTIATION
Price differentiations ranged from less than 5 percent to 20 percent. Some PGs offered financial rewards for farmers’ cotton in-conversion. Others reported financial relief to farmers via interest-free loans and other benefits.

“...pay a premium to farmers for organic, for in-conversion cotton, and to new conversion farmers.”
– PG, Madhya Pradesh

“...we provide other financial support such as pre-financing, price premiums, crop insurance etc.”
– PG, Andhra Pradesh

PERCEPTION: COST OF ORGANIC VS CONVENTIONAL FARMING
94 percent of PGs said that organic agriculture was less expensive than conventional, but that yields were lower. Net income was often equal. PGs reported the longer-term benefits of organic (such as soil fertility, health, biodiversity, food security) which are difficult to integrate into typical financial accounting.

“The cost of cultivation per acre of organic is less, but at the same time the yield which come out of organic farming is less as compared to conventional. So, on average, the net returns per acre are almost the same. The organic farm, however, is able to maintain soil fertility for a longer period.”
– PG, Madhya Pradesh
ORGANIZATIONAL STRUCTURE

For the purposes of the survey PGs are any organized group of farmers working independently or under contract. In India, 18 percent of PGs were formally registered as a legal entity. The majority (82 percent) have contractual relationships with their farmers. Contracted farmers can still be “organized” and come together for input management, training, certification, and to sell their cotton.

“We are a farmer-owned commodity trading company that works on developing sustainable market linkages for farmer's produce, in national and international markets. Our Company is also involved in training and capacity building of farmer communities on issues such as quality management, local level market development, maintenance of organic standards and certification etc.” – PG, Andhra Pradesh

“We work on a contract farming model in which our company, the farmers, and the Agricultural Department (which assumes the role of facilitator should the need arise) enter a tri-partite agreement. A 15-member team ensures that each farmer's field is visited every 14 days. We guarantee to buy back the cotton from the farmers.” – PG, Maharashtra

ORGANIZATIONAL CAPACITY BUILDING

All PGs provide their farmers with training on a regular basis, with over half providing additional support for women. PGs tend to provide financial support to farmers and free or a reduced cost on inputs. Many PGs have their own marketing department and are in possession of their organic certification (i.e. this is not held outside by a trading partner or NGO). PGs reportedly participate beyond the farm gate.

“We provide financial support to the farmers by linking them to the banks for any credit related issues for farming. It has entered into MoU with the nationalised and private banks at National level to support farmers across India.” – PG, Maharashtra

“We have our own ginning factory as an “Organic and Fair trade park” we produce contamination controlled organic cotton in our ginning unit. We have a team who provide technical guidance to the farmers on a free basis for organic crops and other crops.” – PG, Gujarat

TIMELINESS OF PAYMENTS

Payment - PGs to Farmers

The majority of PGs (85 percent) tend to make payments to their farmers within seven days of stock transaction.

“Normally farmers are calculating number of days from sauda (bargain) and we pay within 7 days from the sauda.” – PG, Gujarat

“The purchased cotton leaves the farm gate and reaches us in a days time. After quality checking of cotton at the gin, we release our payments within 3 days time.” – PG, Tamil Nadu

Payment – Buyers to PGs

35 percent of PGs get paid within the first 7 days, 18 percent between 8 to 14 days and almost half between 15 to 30 days. Taking into account that PGs pay their farmers within 14 days, this means that a percentage of PGs are absorbing the time lag between paying the farmers and being paid.

TRADING PARTNERS

PGs reported holding relationships with ginners, spinners, or vertical manufacturers. 47 percent also reported direct relationships with brands or retailers. Only 24 percent reported selling to traders or middlemen.

TYPES OF CONTRACTS

Many PGs hold long-standing relationships with their “primary” trading partners, yet trade independently as well (41 percent have multiple trading strategies).

“We have our specified long term buyers as well as getting new buyers from market, however, there is no formal contract. We keep doing business with each other considering market forces at times. Seasonal contracts happen only with new customers for security of goods and payment.” – PG, Odisha

LONG TERM CONTRACTS

PGs listed business security and timely payments as key benefits when it comes to long-standing trade and/or value chain relationships. Agreed prices and guaranteed sales were also important benefits.
ORGANIC COTTON SUSTAINABILITY ASSESSMENT TOOL

Not surprisingly, all PGs surveyed are certifying their organic production. Almost half of PGs surveyed are certified to FT Standards (either all of their organic production or some of it).

CERTIFIED ORGANIC

All Indian organic cotton PGs certify to the Indian National Program for Organic Production (NPOP) and the USDA National Organic Program (NOP) to sell to the US market. Following closely behind is certification in accordance with the EC Regulations for the European market. Six percent of PGs are certifying to comply with the Japanese Agricultural Standard (JAS).

CERTIFIED FAIRTRADE

18 percent of PGs reported being fully certified to FT standards, and a further 29 percent were partially.

"We have five project certified under fair trade in different state of India. We are working in Odisha, Andhra Pradesh, Tamil Nadu, Karnataka, and Gujarat." – PG, Gujarat (HQ)

"Our entire organization is certified Fairtrade. We have farmers in Andhra Pradesh, Odisha, and Maharashtra." – PG, Andhra Pradesh (HQ)

PGs also reported developing their own standards (beyond organic) but may not necessarily hold further certifications (See Social Dimension: Decent Work Theme).

FURTHER PROCESSING STANDARDS

Since many PGs are linked to downstream textile processing (as well as cultivation), it was possible for a number of them to report on voluntary processing standards. 71 percent of PGs reported their organic cotton achieving the Global Organic Textile Standard (GOTS) status and 47 percent the Organic Content Standard (formerly OE 100 and OE Blended).
There are a number of ways to reduce risk. In our survey, we focused on farm diversification: other cash crops besides cotton (secondary crops), livestock, and food production (see Social Dimension: Food Security Theme).

In the survey PGs itemized every crop individually. For ease of reporting we have categorized crops into larger groupings. There were 36 different crop varieties reported to be grown on Indian organic cotton farms. PGs grow up to 9 cash crop varieties and 24 percent of PGs grow 4 or more different cash crops.

“The expansion in non-cotton crops has been significant, produce such as cereals, pulses, oilseeds (sesame), spices.” – PG, Maharashtra

Besides cotton, 82 percent of PGs reported they grow other crops for market. Over half of the PGs (57 percent) sell their cash crops directly in the local market. Only 7 percent indicated that their secondary crops went beyond the local market to the domestic market.

At 57 and 50 percent respectively, nuts and oil seeds and legumes/pulses are the most popular crops for local market. By contrast, under Food Security, responses indicate that grains and cereals are most likely to be grown for own consumption.

“Farmers are growing other cash crops like cumin, castor, cluster bean, mung” – PG, Gujarat

“Organic farmers are not doing mono cropping; they have a wide range of crop diversity. We also promote the kitchen garden concept for ensuring the health and nutrition requirements of the farm family.” – PG, Maharashtra

“A few of our farmers are very progressive and they have started their own dairy and fruit/food (jams and juice) processing units. Other farmers, they grow cotton in almost 50 - 60 percent of their land and the remaining land is utilized for food/fodder and other cash crops.” – PG, Maharashtra

Livestock continued over page...
LIVESTOCK

All PGs reported the presence of animals/livestock on their farms. The role and use of the animals is naturally tied to the type of animal it is.

Buffalo, cows, goats, chickens, and to a lesser extent sheep are kept for food (milk/milk products, eggs, meat) and farm work. While oxen are especially useful for farm work and transport, goats may also be used for carrying things. Sheep (mainly for food, manure and income) are even put to work as vegetation trimmers and for weed control.

All animals are a source of manure and urine (for soil fertility, seed treatments, and botanical pest management).

“Milk and flesh as food, their excreta as good farm manure, fiber is sold in local market. Sheep are brought and made to roam in fields for a day, two or a week period so they graze on farm and their droppings are used as good manure in farm. Farmers pay to sheep owner as per number of sheep and the day. Farmers do not directly own any sheep.”

– PG, Maharashtra

“Cows are desi [local] varieties used as drought animals and for generating compost. In the tribal communities, these cows formes part of the asset base of the family.”

– PG, Andhra Pradesh
INVESTMENT PRIORITIES
PGs invest in a wide range of activities, technology, and equipment to improve business. Priorities tend to be associated with improving farm facilities and making technological improvements (88 percent). Improving infrastructure is also high on the list of priorities when it comes to investment. Investment in farmer training is consistently high with 65 percent of PGs providing innovative training and services (demonstration plots, field trials visits) in the year of the survey, and 76 percent carrying out considerable investment in training over the past two years.

"We bear the expenses of conducting workshops on crop improvement, lobby and secure central Government schemes such as Front Line Demonstration, Farmers Field Schools for the benefit of our farmers." - PG, Tamil Nadu

INVESTMENT OVER THE LAST TWO YEARS
Alongside training and technical investment, expansion strategies were reportedly common over the past couple of years. Expansion was diverse in terms of it being not only in organic cotton production but also other crops and other sustainability standards (such as Fairtrade and the Better Cotton Initiative). Comments in this section of the survey identified “Fairtrade premiums” as being a source of additional investment for farmers.

"Investment in drip irrigation, some of the equipment like tractor, loader, truck for cotton transport for community equipment is bought from FT premium." - PG, Gujarat

"We have our farm groups working on Fair Trade and BCI practices. They are separately formed and working." - PG, Madhya Pradesh

PERCEPTION: WHAT INFLUENCES FARM PRACTICE?
Farmers are influenced by local or traditional information, PG policy and practices (such as research and trials etc.) and external influences (R&D, academic papers, consultants) almost in equal proportion.

"Farmers are influenced by observations from demo plots and guidance of specialized consultants." - PG, Madhya Pradesh
ORGANIC COTTON SUSTAINABILITY ASSESSMENT TOOL

INDIA

SEED SECURITY

SEED REQUIREMENT

Average 6.7 kg per farmer per year

Cultivars in Use:

CHANGES OVER PAST 3 YEARS

INDIA

SEED SECURITY

Government Department
- Difficultly in sourcing seed
- Non-availability of desired seeds
- Performance

Seed Companies
- Independently
- Producer Group
- Research Institution

Reasons for Change
- Agronomic
- Market Demand
- Non-Availability of Desired Seeds
- Seed Quality

Degree of Difficulty
- Very
- Moderate
- Undetermined

SEED BREEDING & TRIALS

The use of genetic engineering, or GMO, is prohibited in organic products. This means an organic cotton farmer cannot plant GMO seeds.

SEED REQUIREMENT

PGs reported an average seed requirement of 6.7 kg of seed per farmer per year. Respondents reported a total of almost 50 different cultivars available for cotton production.

SEED SOURCE

Seed is procured or sourced from providers within both the private and the public sector. While 71 percent are sourcing from seed companies, 41 percent of the farmers save and grow their own seed and 35 percent of PGs source their seed through their own seed projects.

CHANGES OVER PAST 3 YEARS

The majority (59 percent) of PGs changed their supply and/or type of seed used over the past three years. This is mainly due to scarcity of non-GM seed (known as “Bt cotton” (Bosclius phumigenensis) in India. As suppliers of non-GM seed diminish, due to conventional farmers moving to GM seed, farmers are looking elsewhere for sources of seed (or investing in production themselves). This, along with the risk of seed contamination, places enormous burden on PGs and their farmers. Projects are in place to address this problem.

“Few seed companies are producing non-GM seeds, hence seed choice is limited. Moreover, we need to test each seed lot prior to distribution to see that GM contamination is not there.” – PG, Madhya Pradesh

“Sourcing non-GM cottonseeds has become a challenging task to organic farmers. Almost all major seed producing companies have started producing GM cottonseeds. Non-GM seeds stocks that they have is used as refuge crop with BT. We have to contact agriculture universities/research stations and different seed producing companies and try to arrange seed stock required for our organic farmers.” – PG, Gujarat

Performance, whether it is for agronomic (30 percent), technical (40 percent) or market reasons (30 percent), is also an influencer on seed choice.

SEED BREEDING & TRIALS

59 percent of PGs reported that they are now involved in seed breeding research and seed development trials. This number of PGs deciding to undertake their own seed trials reflects the urgency of the situation, and lack of investment in both the private/corporate and public sector. Seed trials are often a collaborative activity such as the bioRe/Chetna/PRB.

“Green Cotton” Initiative with support from Dharwad University, in Karnataka. Other initiatives are whole value chain based such as the Pratibha/EcoFarms project supported by C&A Foundation and CottonConnect. Another initiative supports "seed guardians" in Odisha. It is a partnership between Chetna Organic, Indiex, and TE.

“With the help of CottonConnect we are producing non-GM organic cotton seeds for our farmers.” – PG, Madhya Pradesh

“Our aim is to supply non-hybrid seeds to farmers so that farmers can reduce the spacing and get more yields, and bring the seed cost down substantially. We are also working on the development of Arboreums. On the hybrids side we would like to only provide/make available Certified seeds.” – PG, Madhya Pradesh

“This year onwards we plan to work with the national research institute like CICH Nagpur, and also source organic cotton seed from projects that are working on non-GMO seed programme.” – PG, Maharashtra

PERCEPTION: DIFFICULTY IN SOURCING SEED

Almost all PGs (94 percent) perceive a problem with sourcing seed for organic cotton agriculture. 13 percent believe the level of difficulty to be “extreme” and 56 percent “very difficult.”

“Seed companies are now developing BT cotton seeds and are very reluctant to produce non-GM cotton seeds for a small quantity. They also take billed money in advance.” – PG, Odisha

Others (19 percent), such as this group in Maharashtra believed the situation to be only “moderately” difficult.

“Because mostly GMO seeds are available in the market hence it is quite difficult to source non-GMO cotton seeds for our farmers but local research institutions do provide research variety of non-GMO cotton seeds.” – PG, Maharashtra
GROW CROPS FOR OWN USE

All PGs said that a quota of crops are grown for the farmers "own use"; for food consumption and as "systems crops" (soil fertility, pest management). The average allocation of land for "own use" is 34 percent, roughly one-third of each farmer's land holding.

All farmers (100 percent) grow their own food staples: grains, cereals, and sometimes paddy. 94 percent of PGs grow 4 or more types of crops and 47 percent grow 7 or more types of crops. For ease of reporting we have categorized crops into larger groupings. The most frequently selected crops grown for farmers' own-use are sorghum, wheat, maize, millet, and fresh and seasonal vegetables.

"The majority of our farmers are resource poor. Most of them raise food crops for household consumption and sell the excess only. Only about 35 percent of our farmers grow cotton annually, the rest work as farm laborers in their locality. Hence, cotton becomes an important income generation crop for them. Finger Millet forms an important and traditional food source for the farmers of the region. This is the second most important source of income." – PG, Tamil Nadu

PERCEPTION: FOOD SECURITY ORGANIC VS CONVENTIONAL FARMING

The majority of PGs (71 percent) believed organic farmers to be more food secure than conventional farmers. 12 percent believed there was a similar level of food security and a further 12 percent thought organic farmers were less secure.

"GMO and chemicals are not allowed in organic. And hence to maintain soil fertility farmers have to implement different ways of improving soil productivity. This gives farmers more crop of different utilization (for animal feed/own consumption) from the same field, ultimately supporting food security." – PG, Madhya Pradesh

"Organic farmers are more food secure. 1. Because the input cost are low. 2. The variation in yield on a yearly basis is not high. 3. The production is sustainable. 4. The land quality keeps increasing owing to correct organic practices. 5. Pest and other attacks are lower compared to conventional farmers. 6. Have more crop diversity." – PG, Madhya Pradesh

"Though theoretically organic farmer should be more food secure than conventional farmer, but on the ground we cannot make out any such difference." – PG, Rajasthan

"Farmers are less food secure due to higher prices of cotton. Therefore, farmers have more engagements of cotton crop." – PG, Gujarat

PERCEPTION: FACTORS AFFECTING FOOD SECURITY

Factors affecting food security were evenly divided. 18 percent of PGs perceived challenges to be associated with low yields and poor prices. 18 percent identified weather to be an influencer.

"Rainfall is around 1000 mm in a season but distribution is limited to 4 months. Many crops face terminal moisture stress if enough rain is not received during the crop maturity phase, affecting yields." – PG, Odisha
LABOR STANDARDS & POLICIES

All India PGs in this study have developed in-house policies to guide labor and socio-economic security and benefits for farmers. 47 percent of PGs are FT certified. 29 percent of PGs have gone beyond FT criteria to include additional formal policies. All PGs have policies covering fair treatment, freedom of association, child labor, discrimination and forced labor.

POLICY COVERAGE

The breakdown of formal policies reveals the extent to which PGs cover work and labor issues.

"Beyond organic certification, we follow our own social and environmental standards which are audited by FL0cert annually." — PG, Madhya Pradesh

"We have not developed policy in writing, but follow socially amicable procedures as follows: farmers are free to associate and bargain collectively, laborious work not more than 7-8 hours a day. No forced labor. No employing child and pregnant women in field. Work with protective clothing. Manure and botanical pesticide applications to be done by healthy men. Proper picking of cotton bolls so that the trash percentage is less. Wages as per local standards, etc." — PG, Rajasthan

WORKERS RISK ASSESSMENT

All PGs (100 percent) surveyed undertake risk assessment and associated training. 53 percent have implemented policy (such as Health & Safety), and 47 percent provided safety and other protective equipment.

TEMPORARY WORKERS

Each season the recruitment of seasonal workers expand the numbers of farmers working in organic cotton on average by 1 to 2 percent. 88 percent of PGs source additional workers from within the village and/or family members (82 percent) got involved. Formal contracting of labor by PGs was less common (6 percent).

"During the peak season of labor requirements (compost application, pest management and harvest/cotton picking), residents from village/local area are called for work. They are paid as per the standard charges prevailing in their area. Large farmers usually prefer to keep labor on a permanent basis. They are paid monthly, additionally, their accommodation with basic needs are well taken care of" — PG, Madhya Pradesh

"Most of the work is done by family members due to small landholding. 20 percent of farmers use hired labor during harvest time. Which means 1000 farmers uses 4-5 temporary workers during 10 picking day." — PG, Madhya Pradesh
Nearly a quarter (23 percent) of India’s organic cotton farmers are women but this figure is unlikely to reflect the actual number of women landowners. It is more likely to reflect husbands and wives working together on the family land holding. However, the rise in women’s self-help groups (SHGs) would suggest that a growing number of women are independently (from husbands) earning an income and accumulating savings.

ENCOURAGE FEMALE PARTICIPATION

All PGs surveyed indicated that they find ways to encourage female farmers, either formally through policy (24 percent) or informally.

SUPPORT WOMEN WITH EXTRA ASSISTANCE

53 percent of PGs indicated that they have systems in place such as SHGs to provide additional support for their women farmers.

“We support women by providing extra assistance such as special training, easier work during pregnancy and after birth, etc.” – PG, Maharashtra

“Eventhough our farmers are mostly men, the field operations, such as dribbling, weeding, plant protection, picking, grading and storage are all done by majority of the women folks of the family. In most of the cases, we have to negotiate the price with the women of the farmers’ household. And hence enjoys a rapport with them. Which in turn helps us engage them and making them feel they own the process of organic farming.” – PG, Tamil Nadu

The most commonly reported opportunity to engage women is via self-help groups, or special interest opportunities such as cooking, family nutrition, and seed saving.

“We support women with self-help groups, training on handlooms, stitching and construction of smokeless stoves.” – PG, Madhya Pradesh

“Even though our farmers are mostly men, the field operations, such as dribbling, weeding, plant protection, picking, grading and storage are all done by majority of the women folks of the family. In most of the cases, we have to negotiate the price with the women of the farmers’ household. And hence enjoys a rapport with them. Which in turn helps us engage them and making them feel they own the process of organic farming.” – PG, Madhya Pradesh

“We encourage women farmers to become members of the farmer groups and cooperatives. We also support women’s Self Help Groups to focus on specific areas such as food and nutrition security, seed related issues etc.” – PG, Andhra Pradesh

“Women farmers of Odisha are keen on preserving native varieties of crops through a system known as ‘seed mothers’.”

FARMERS IDENTIFIED AS INDIGENOUS

The total number of farmers identifying as indigenous was 83 percent of India’s organic cotton farmer population.

Note: The survey was not sensitive enough to distinguish “tribal” farmers from “indigenous”.

PERCEPTION: IMPORTANCE OF TRADITIONAL KNOWLEDGE ON FARM PRACTICES

31 percent of PGs stated that local and traditional knowledge influences farmers practices.

“In some tribal pockets families help each other also at the time of harvest.” – PG, Madhya Pradesh

“This is a waning practice, that we now encourage.” – PG, Odisha
COMMUNITY BENEFITS
77 percent of PGs reported that their community benefits as a result of their work. Some PGs linked community benefits to their FT premium. 23 percent had not made a linkage between their investment in organic cotton and wider community impacts.

“We are not providing any financial support in the community but we provide technical training to the farmers. Our project is also involved in fair trade so they are getting FT premium for their community development projects.”
– PG, Gujarat

The most commonly reported benefits were by way of local employment (54 percent), health and education (46 percent). PGs were less certain (8 percent) about the creation of spin-off industries and infrastructure contributions.

“The management has a great concern for the socio-economic status of the farmers of the group and is committed to uplifting their standard of living. Right from the inception of the partnership between the organic farmers and the group there is a clear understanding that any surpluses arising out of the processing and sale of organic produce would be shared with them. From a global perspective the group is committed to produce cotton in an ecologically sound manner to meet the need of the newer and responsible generation of people. That of a cleaner, healthier and chemical-free environment.”
– PG, Odisha

There was evidence that some PGs could see the business benefit to supporting rural development. The following comment sums this concept up nicely:

“To achieve sustainability in our value chain it is paramount to think deeply about sustainable cotton growing and sourcing. We believe that as large consumers of cotton we have the opportunity to promote agrarian systems that are environmentally and socially sustainable. We put in efforts to support small and marginal farmers from the rainfed regions in Maharashtra. We believe that this organic cotton project has contributed toward economic and social development in the Vidharbha region and is key to improving livelihood opportunities as well as delivering critical needs and services to communities. There are also important business considerations for working towards sustainable cotton growing.

For our business, assurance of a regular supply of quality cotton and reduction of supply unpredictability results in better output quality. Good traceability during the entire cultivation process results in better quality monitoring and ultimately increased customer confidence in our products.”
– PG, Maharashtra

INVESTMENT PARTNERSHIPS
29 percent of PGs report working in partnership with other organizations for rural development. From this sub-set, the majority of partnerships (80 percent) were with NGOs. Only 20 percent were with corporate partners, and likewise public sector government. One PG manager, based in Tamil Nadu, has set up a family trust and invests in the community. Examples of investment are in the table below (not an exhaustive list):

<table>
<thead>
<tr>
<th>Investment Activity</th>
<th>Indian Rupees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donated land for the Primary Health Centre in the village</td>
<td>4 million</td>
</tr>
<tr>
<td>Value additions e.g. handloom activities</td>
<td>5 million</td>
</tr>
<tr>
<td>Free education for employees’ children at the school run by our family trust</td>
<td>1.3 Million</td>
</tr>
</tbody>
</table>
TURKEY

OVERVIEW

Turkey currently grows around 6 percent of the world’s supply of organic cotton. Approximately 20 to 30 percent of organic cotton comes from the Aegean (in the west) and the rest is from the South East Anatolian (SEA) region. This assessment captures a representative sample from both regions.

The percentage quota has dropped over the past few years but picks up in response to good market conditions. In Turkey, organic “cotton” growers will alternate their key cash crop depending upon market conditions. For example, cash crops such as corn and wheat are popular with farmers and compete with cotton for priority in the organic farm system.

Survey responses indicated that while the majority of farmland (85 percent) was under cash crops, only 40 percent of income was derived from cotton. This result fits well with comments on farmers moving between a number of key cash crops.

Turkish organic cotton farmers tend to be relatively large landholders (overall average of 30ha and an average of 50ha in the SEA region). The majority of cotton is grown under rainfed conditions (86 percent) in the SEA region; however, the Aegean tends to have more irrigation infrastructure in place.

Farmers are likely to be classified as “self-employed” and are contracted to grow organic cotton. As a result farmers were less likely to report having their own labor policies and when they employ extra help (during sowing, weeding, harvest, etc.) it tends to be from local residents and on an informal basis.

In the survey, organic cotton farmers on average dedicate around half of their land to cash crops and the remaining half to food for their own use. The average number of non-cotton cash crops (primarily for the local market) was 3, while an average of 8 food crops are grown for own use.

Farmers in both the Aegean and the SEA region claimed that extreme weather conditions are affecting their crops - for the SEA farmers the issue was drought, but for the Aegean Producer Group the problem was prolonged or severe flooding and unpredictable rainfall patterns.
ORGANIC COTTON SUSTAINABILITY ASSESSMENT TOOL

TURKEY  |  COUNTRY PROFILE

PRODUCTION TREND (ACTUAL) 2004-05 TO 2011-12

Organic cotton production in Turkey has seen wide fluctuations over the past decade, yet it has consistently remained within the top four organic cotton producing countries. After a doubling of production between the 2005-06 and 2006-07 growing seasons, it continued to increase for two seasons until a sudden drop in 2009-10. Since then, production appears to be on a gradual decline, with the exception of the peak in 2011-12.

This peak was due largely to a good market price the previous season, however, it was followed by a significant drop in production in 2012-13. This has been attributed to increases in the price of inputs including electricity (used in irrigation) and diesel used by tractors, soil fertilization and crop spraying, as well as unsatisfactory subsidies, a lack of long term policies and the unavailability of suitable inputs (particularly in the GAP region).

In addition, Turkish farmers are very market driven and so when the price of organic cotton drops relative to other crops, production will quickly fall. One PG believed that this was due to organic cotton prices in some regions, such as India and Africa, being on a par with the price of conventional cotton in Turkey. This creates a situation in which Turkish farmers may not be able to receive a high enough premium on organic cotton to make the conversion from conventional economically worthwhile. Many farmers are unwilling to take this ‘risk’ and so opt to produce either conventional cotton or food crops.

SAMPLE SIZE & DISTRIBUTION

Two PGs participated in this survey – one in the South East Anatolia (SEA) region and one in the Aegean region. These are the two primary organic cotton producing areas of Turkey and the farmers in these two PGs together account for 81 percent of all Turkey’s organic cotton production.

Within these two PGs, 90 percent of fiber production takes place in SEA - however, since this region produces two-thirds of all Turkey’s organic cotton, the results remain fairly representative - although the slight weighting towards SEA should be taken into consideration.
### TURKEY | COUNTRY PROFILE

#### HOUSEHOLD STATISTICS

**SIZE OF HOUSEHOLD**

- Average 8 persons (Range: 5-10)

#### FARM STATISTICS

**SIZE OF FARMS**

- Average 30 ha (Range: 10-50)

**PG ORGANIC CULTIVATION SPLIT**

<table>
<thead>
<tr>
<th></th>
<th>0%</th>
<th>50%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CASH CROPS**

- Average 3 crops excluding cotton (Range: 1-5)

**FOOD CROPS**

- Average 8 crops excluding cotton (Range: 4-12)

#### COTTON CHARACTERISTICS

**COTTON SPECIES**

- G. Hirsutum

**FIBER STAPLE LENGTHS**

- Medium staple: 25-30 mm

**GINNING OUTTURN**

- Average 40%

**FIBER MICRONAIRE**

- Average 4.5mm (Range: 4-4.9mm)

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**SIZE OF HOUSEHOLD**

- Households averaged 8 people per household, with a range of 5 to 10.

**SIZE OF FARMS**

- Average farm size was 30ha, with a range of 10 to 50ha, which is significantly larger than some other major organic cotton producing regions, such as India or Africa.

**LAND UNDER ORGANIC CULTIVATION**

- All farmers in the PGs under survey are organic farmers only i.e. 100 percent of the land is organically farmed.

- The average number of non-cotton crops grown by the PGs was 3, with a range of 1 to 5. These were mostly cash crops sold to the local market.

**COTTON SPECIES**

- Both PGs grew the *Gossypium Hirsutum* species of cotton.

**FIBER STAPLE LENGTHS**

- Average fiber length was 25 to 30mm (medium staple).

- Cotton from the Aegean is regarded as one of the world’s highest quality cottons. The high quality of Aegean is mainly due to fiber length, spinability and “handfeel” (softness). Cotton from the SEA region tends to be a shorter staple fiber than that of the Aegean.

**GINNING OUTTURN**

- Average ginning outturn was 40 percent.

**FIBER MICRONAIRE**

- Average micronaire was 4.5mm, with a range of 4 to 4.9mm.
**WATER SOURCE**

Water sources differed significantly between the two PGs, with 95 percent of the SEA PG’s water coming from rainfall and only 5 percent from irrigation, whilst the Aegean PG’s water source came 100 percent from irrigation. The method of irrigation used by both PGs was surface irrigation (e.g., furrow, border strip, or basin), which the SEA PG had to pay for but the Aegean PG did not.

**WATER MANAGEMENT APPROACH**

In terms of water management, the SEA PG managed their water source collectively whereas farmers in the Aegean PG managed theirs independently.

**WATER CONSERVATION TECHNIQUES**

The SEA PG listed “crop selection” as a water conservation technique. However, the techniques for soil fertility and conservation would also help improve water efficiencies, since they are interconnected.

**PERCEPTION: WATER AVAILABILITY AND WATER QUALITY**

Both PGs perceived water availability as being an issue, whilst only the Aegean PG perceived themselves to have an issue with water quality. However, there was no specific data available regarding water consumption or quality.
SOIL MANAGEMENT APPROACH

Soil management was carried out collectively by farmers in the SEA PG but the Aegean PG said that management structure depended on the task.

SOIL FERTILITY & CONSERVATION TECHNIQUES

In terms of soil fertility techniques, both PGs carried out crop rotation and, in addition, the SEA PG carried out composting and the Aegean PG used intercropping, green manure and animal manure.

SOIL FERTILITY

Both PGs carried out soil fertility testing and quantified soil organic matter (SOM).

“In general, it’s [soil organic matter] low, and animal manure is used to improve it.” – PG, Aegean
PEST MANAGEMENT APPROACH
Both PGs surveyed carried out pest management independently.

PEST MANAGEMENT TECHNIQUES
Farmers in the Aegean PG used pest scouting, manual removal, crop rotation and microbial products. The microbial product used was the Bacillus bacteria - applied in a concentration of 100g per 100 liters of water.

The SEA PG used physical traps and manual removal for their pest management.

PERCEPTION: EFFECTIVENESS OF ORGANIC VS CHEMICAL PEST CONTROL
In terms of effectiveness of these techniques, both PGs claimed that they are equally effective as using chemical controls.
CROP DIVERSITY

PGs in both the Aegean and SEA grow a large number of crops alongside fiber. Typically these crops are sold as cash crops but farmers will hold some back for their own use.

PERCEPTION: BIODIVERSITY LEVELS ON ORGANIC FARMS

Both PGs claimed they saw 'no noticeable difference' in the biodiversity levels of organic farms compared to non-organic farms.
USE OF FARM ANIMALS
No animals on the farm were used for farm work or transportation - all were used for food, and they include cows, goats and sheep.

USE OF FARM MACHINERY
Farmers in the SEA PG used only tractors, whereas the Aegean PG used tractors, utility vehicles and motorbikes. All vehicles used fossil diesel.

CARBON EMISSION REDUCTION
Neither PG currently implements any alternative energy technologies or practices to reduce carbon emissions.

ADAPTATION TO CLIMATE CHANGE
The SEA PG said that they used seed choice to better cope with extreme weather conditions, whereas the Aegean PG claimed not to make any direct adaptations.

PERCEPTION: HAS EXTREME WEATHER AFFECTED CROPS?
Both PGs claimed that extreme weather conditions affected their crops - for the SEA PG the issue was prolonged or severe drought, but for the Aegean PG the problem was prolonged or severe flooding/rain unseasonally late or early on-set of rain.
### LAND USE
Between the two PGs, 85 percent of land is used to grow cash crops and the remaining 15 percent is used to grow food. In SEA, farmers' main crop is lentil. This cash crop can provide a higher income than the cotton.

### PRODUCTIVITY
Organic cotton fiber yield between the Aegean and the SEA were similar and averaged 1,432 kg/ha between the two PGs (Aegean yields averaging slightly higher than SEA). At an average of 1.595 kg/ha for conventional cotton (according to the Mundi Index) this shows organic and conventional cotton to be on a par and equally high by world standards.

### PRODUCTION COSTS
Only the Aegean PG provided figures for the breakdown of production costs. Their figures reveal that labor is by far the highest cost, accounting for an average of 66 percent of total production costs. Next is bio-fertilizer, accounting for 5 percent of total costs, then seed at 4 percent, certification at 3 percent and botanical pest control at 2 percent. The remaining 20 percent is labelled ‘other’ production costs.

“Last year product costs were around 1.95 TL/kg seed cotton.”  
— PG, Aegean

### INCOME SOURCES
In terms of income sources, between the two PGs 40 percent of income came from cotton, 50 percent from other crops and 10 percent from livestock. The SEA PG produced a lower proportion of organic cotton compared to the Aegean PG, and a higher proportion of ‘other’ crops.

### PRICE DIFFERENTIATION
The SEA PG claims to receive less than 5 percent premium for organic cotton (in comparison with conventional cotton prices), whereas the Aegean PG claims to receive a premium of approximately 10 percent.

“Farmers can get around 10% difference on top of conventional. This may vary depending on season.”  
— PG, Aegean

### PERCEPTION: COST OF ORGANIC VS CONVENTIONAL FARMING
The Aegean PG perceived that the cost of organic cotton production was more expensive than conventional, whereas the SEA PG perceived it to be less expensive.
ORGANIZATIONAL STRUCTURE
Both PGs use contract farmers. Between the two groups there are 321 farmers.

ORGANIZATIONAL CAPACITY BUILDING
Both PGs held ownership of their organic certification. The Aegean PG says that they also have their own marketing department and that they provide farmer training on a regular basis, free or reduced cost farmer inputs and other financial support.

TIMELINESS OF PAYMENTS
Transactions in the Aegean tended to be more prompt than those in the SEA (especially from the buyer to the PG).

“Farmers usually get paid within one week. Some farmers do not fix prices immediately. They can do partial price fixing whenever they want.” – PG, Aegean

TRADING PARTNERS
The PG in the Aegean had more established buyers than the PG in the SEA (who tended to sell to traders).

“We sell to local spinners, to our sister company, and export overseas.” – PG, Aegean

LONG TERM CONTRACTS
Both PGs said they were in an ongoing relationship with buyers and the Aegean PG said that this provided them with improved business security.
Both PGs are certified organic but some farmers in the SEA PG also produce cotton under the Better Cotton Initiative.

**CERTIFIED ORGANIC**

Both PGs are certified organic under the European Standard ‘EU No 834/2007’. Additionally, the Aegean PG is certified under the USDA National Organic Program (NOP) standards. The organic certifier for both PGs is Control Union.

**CERTIFIED FAIRTRADE**

Turkey does not qualify for Fairtrade certification. However, PGs have indicated compliance with a number of FT criteria. See themes: Producer Organization and Decent Work.

**FURTHER PROCESSING STANDARDS**

The Aegean PG is integrated into the textile manufacturing which is GOTS certified.
CASH CROPS

All crops grown by these PGs are cash crops. In addition to cotton, the Aegean PG also grew clover/fodder crops, corn, sunflower, tomatoes and wheat, whilst the crops grown by the SEA PG in addition to cotton was wheat and lentil. All cash crops are sold direct to market.

“Farmers sell almost all to the local market for cash.”
- PG, Aegean

LIVESTOCK

Both PGs include farmers who also keep livestock. The SEA PG has approximately 50 sheep and some cows, whilst the Aegean PG has between 3 to 5 sheep, 3 to 5 goat and 2 to 3 cows. All animals in both PGs are used for food.
INVESTMENT PRIORITIES
The SEA PG is currently focusing its investment on farm facilities/technologies, whereas the Aegean PG is focusing on farm expansion/business development and machinery/infrastructure.

INVESTMENTS OVER THE LAST TWO YEARS
Over the previous two years the Aegean PG has invested in expanding organic agriculture, farmer training and better machinery/equipment, whilst the SEA PG has only invested in better machinery/equipment.

PERCEPTION: WHAT INFLUENCES FARM PRACTICE?
The SEA PG claims that its farm practices are influenced entirely by local factors, whereas the Aegean PG claims to be influenced 35 percent by external influences such as prices, 10 percent by PG policy and practices such as business relationships and farm-level support and 55 percent by traditional knowledge and local influences.
The use of genetic engineering, or GMO, is prohibited in organic products. This means an organic cotton farmer cannot plant GMO seeds.

**SEED REQUIREMENT**

Both PGs use organic seed and, on average, each farmer requires 25,002 kg of seed per year. The cultivars used include Flash, 308, 525.

**CHANGES OVER PAST THREE YEARS**

There have been no changes made to seed over the past three years.

**PERCEPTION: DIFFICULTY IN SOURCING SEED**

Farmers in both PGs save/produce their seed themselves and therefore say that they have no difficulty in sourcing seed.
Some farmers in both PGs produce crops for own use in addition to cotton and other cash crops. For the SEA PG these include wheat and lentils, and for the Aegean PG these include tomatoes, peppers, aubergines and okra. 

"Farmers don’t specifically grow food for food security, but some of them grow tomatoes, peppers, aubergines and okra for their own use." – PG, Aegean

**PERCEPTION: FACTORS AFFECTING FOOD SECURITY**

In terms of the factors affecting food insecurity, the SEA PG said that weather was the main factor whereas the Aegean PG said that there were no particular factors.

**PERCEPTION: FOOD SECURITY ORGANIC VS CONVENTIONAL**

The Aegean PG claims that they are now more food secure growing organically, 'since no chemicals are used in organic farming' (so the food is safe to eat). The SEA PG said they were unsure whether or not farmers were more food secure after converting to organic.
Turkish organic cotton farmers are relatively large landholders and relatively independent compared to farmers in other organic cotton producing regions. Most farmers consider themselves "self employed" and have no formal labor policies as a result. Hireage of farm labor, by landowners, at peak times such as weeding and harvesting is informal. See comment under temporary workers.

**WORKER RISK ASSESSMENT**
The SEA PG carried out risk assessments and training with regards to the use of botanicals but the Aegean PG did not carry out any formal risk assessment.

**TEMPORARY WORKERS**
On average, between the two PGs, 825 temporary workers are hired per year, most of which are local residents (paid), although the SEA PG says that family members (unpaid) sometimes also help out on a temporary basis.

"Farmers employ daily workers from nearby villages when necessary and all of them know each other for many years."

- PG, Aegean
INDIGENOUS FARMERS
Only the SEA PG included tribal/indigenous farmers, of which there were 133.

WOMEN FARMERS
Both PGs included some women farmers - the SEA PG had 10 whilst the Aegean PG had 5.

ENCOURAGE FEMALE PARTICIPATION
Both groups said that they informally encouraged female participation.

PGS EMPLOYING INDIGENOUS FARMERS
Note: The survey was not sensitive enough to distinguish "tribal" farmers from "indigenous".

PERCEPTION: IMPORTANCE OF TRADITIONAL KNOWLEDGE ON FARM PRACTICES
Both PGs claimed that traditional knowledge had an impact on their farm practices.
COMMUNITY BENEFITS
Both PGs answered 'yes, definitely' in response to being asked whether their community had benefitted from its organic cotton production and both said that the primary benefit was to local employment.

INVESTMENT PARTNERSHIPS
The SEA PG is in a partnership with a local NGO that gives financial support.
Common resources are those resources that all peoples of the planet need and share for their survival. These include soil, water, air, animals, biodiversity, and mineral resources.

In a truly sustainable, regenerative system, ‘waste’ does not exist. The implication is that everything is used, and, when that use is exhausted, the material components get transformed or absorbed into another part of the system in a beneficial way.”

Value chain actors are necessarily dependent upon each other and should therefore be responsible for co-creating value that benefits all persons involved. They should allow their respective enterprises to thrive without sacrificing their long-term viability, the health of the surrounding environment, or human rights.”

“All persons are born with rights, deserving equal and mutual respect. These include the right to safety, freedom from discrimination, access to opportunities for learning, self-determination, and right livelihood.”

SUSTAINABILITY THEMES:
Click on the icons on the right to find out more
Water (in terms of its availability, access, ownership, and quality) is an increasingly important indicator of sustainability. The diversion of water for agricultural uses (in some cases up to 80 percent of a country’s water supply) makes water use a politically, as well as, economically, socially and ecologically sensitive topic. The problem is made even worse by misdirected subsidies and weak environmental legislation. According to the WWF, the main causes of wasteful and unsustainable water use are: leaky irrigation systems, wasteful field application methods, and cultivation of thirsty crops not suited to the environment. Water diverted for irrigation can be problematic for populations living downstream, particularly in regions of high water scarcity. The Water Risk Atlas “Aqueduct” helps communicate high-risk situations by mapping and rating a country’s water scarcity (see further below).

The ITC estimate that about 53 percent of the global (conventional) cotton area is irrigated, producing 75 percent of the world’s cotton. According to Textile Exchange, approximately 25 percent of organic cotton acreage is under irrigation. The majority (75 percent) is irrigated, but the ratio varies greatly from country to country. Techniques such as drip irrigation and “precision agriculture” help, but more importantly, according to the WWF, will be a move towards integrated and innovative water management.

**Aqueduct Water Risk Atlas**

The global water risk atlas “Aqueduct” is an interactive mapping tool that provides customizable data and corresponding high resolution maps for 12 different water risk indicators. Data for these indicators can be aggregated to determine an area’s “Overall Water Risk” - and this is the measure used in this assessment.

### Data for Overall Water Risk

Data for Overall Water Risk is then normalized to a score between 1-5 and mapped to one of the following thresholds:

- Low risk (1) — — — —
- Low to medium risk (1-2)
- Medium to high risk (2-3)
- High risk (3-4)
- Extremely high risk (4-5)

### Aqueduct Water Risk Atlas Mapped Against Organic Cotton Growing Regions

#### Africa

- Egypt
- Ethiopia
- Kenya
- South Africa
- Senegal
- Benin
- Burundi
- Tanzania - Sisga
- Tanzania - Shinyanga

#### Asia

- China
- India
- Nepal
- Sri Lanka
- Bangladesh
- Pakistan

#### Turkey

- Turkey

#### Latin America

- Mexico
- Paraguay - Misiones

#### USA

- Texas
- Arizona

#### Central Asia

- Uzbekistan

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**References & Further Information**

- Cotton Inc. - The Life Cycle Inventory and Life Cycle Assessment of Cotton Fiber & Fabric
  - Website: [http://cottontoday.cottoninc.com/sustainability/about/LC1LCA-Cotton-Fiber-Fabric](http://cottontoday.cottoninc.com/sustainability/about/LC1LCA-Cotton-Fiber-Fabric)
- Ecological Farming Association (EFA) – Water Stewardship Project
- FAO – Creating Drought-Resistant Soils
  - Website: [http://www.fao.org/docrep/009/a0100e/a0100e01.htm](http://www.fao.org/docrep/009/a0100e/a0100e01.htm)
- International Trade Centre (ITC) - Cotton And Climate Change: Impacts And Options To Mitigate And Adapt
  - Website: [http://www.organicfairtrade.org/officr/Events/Documentation/34_501_1PDF](http://www.organicfairtrade.org/officr/Events/Documentation/34_501_1PDF)
- PE International - The Life Cycle Assessment of Organic Cotton Fiber - A global average
  - Website: [http://www.peinternational.com/assessments/](http://www.peinternational.com/assessments/)
- Textile Exchange – Environment Impacts: Water
  - Website: [http://farmhub.textileexchange.org/farm-library/farm-reports](http://farmhub.textileexchange.org/farm-library/farm-reports)
- Water Resources Institute – Aqueduct: Measuring and Mapping Water Risk
  - Website: [http://www.wri.org/our-work/project/aqueduct](http://www.wri.org/our-work/project/aqueduct)
- Watershed Support Services And Activities Network (WASSAN)
  - Website: [http://www.wassan.org](http://www.wassan.org)
- WFN - Product Water Footprints: Cotton
  - Website: [http://www.waterfootprint.org/](http://www.waterfootprint.org/)
- WFN - Water Pollution Organic vs. Conventional Cotton in India
- WWF – Water Innovations
  - Website: [http://www.wwf.org.uk/what_we_do/water.cfm](http://www.wwf.org.uk/what_we_do/water.cfm)
- WWF – Water Stewardship
  - Website: [http://www.wwf.org.uk/what_we_do/water.cfm](http://www.wwf.org.uk/what_we_do/water.cfm)
- WWF – Water Footprint
  - Website: [http://www.worldwaterfund.org/](http://www.worldwaterfund.org/)
- WWF – Water Footprint: Cotton
  - Website: [http://www.worldwaterfund.org/](http://www.worldwaterfund.org/)
- WWF – Water Pollution Organic vs. Conventional Cotton in India
  - Website: [http://www.worldwaterfund.org/](http://www.worldwaterfund.org/)
- WWF – Cotton Farming
  - Website: [http://www.worldwaterfund.org/about_our_earth/about_freshwater/freshwater_problems/thirsty_crops/cotton](http://www.worldwaterfund.org/about_our_earth/about_freshwater/freshwater_problems/thirsty_crops/cotton)
- WWF – Water Innovations
  - Website: [http://www.worldwaterfund.org/](http://www.worldwaterfund.org/)
About 12 million ha of arable land is lost globally per annum while the world population has tripled over the last 100 years. The FAO reports, on a worldwide average, the area of arable land per capita shrank from 4,307 m² per person in 1961 to 2,137 m² in 2007. According to the FAO, symptoms of soil degradation are numerous and include decline of soil fertility, development of acidity, salinization, alkalinization, deterioration of soil structure, accelerated wind and water erosion, loss of organic matter and biodiversity.

Monoculture (or near monoculture) is tough on the soil and tends to deplete nutrients over time. The use of synthetic fertilizer provides a quick fix but is not designed to build organic content or keep soil fertile. Over fertilization by mineral fertilizers can also lead to soil erosion.

Eutrophication, also known as over-fertilization, is connected to air, soil and water quality. Eutrophication is mainly caused by nutrient leaching and soil erosion. Through soil erosion, nutrients are removed from the cultivated system via water and soil and lead to the fertilization of neighboring water bodies and soil systems.

Soil erosion rates can be drastically reduced by soil protection measures that are widely used among many organic cotton farmers. While soil erosion rates are often difficult to specify, there is evidence of strong soil protection measures being applied in organically cultivated systems - capable of preventing 90 percent of the soil erosion that would otherwise enable the washing off of nutrients into the neighboring water and soil bodies (PE International research). Cultivation of rotation crops and intercropping contribute to the reduction of losses of nutrients due to leaching.

According to the United States Dept. of Agriculture, cotton is the fourth most heavily synthetic fertilized crop after corn, winter wheat, and soybeans. The use of insecticides and herbicides can lead to chemical contamination, reduce the number of beneficial insects and microorganisms living in the soil and leach into groundwater where it goes on to do more damage to aquatic life and migrate off the original site.

Successful agriculture depends on the quality of the soil and, just as importantly, how it is conserved. The soil organic content, which only accounts for 0.3 to 5 percent of the soil, is of crucial importance for a soil’s fertility and water retention capacity. Organic matter particles keep the soil moist for a long time and retain essential nutrients for plants. Moreover, organic material hosts numerous beneficial soil organisms that improve soil fertility. Many soils on conventional farms lack organic matter due to intensive cultivation and an overuse of mineral fertilizers.

Soil organisms contribute a wide range of essential services to the sustainable function of all ecosystems. According to the FAO Soils Portal, soil organisms act as the primary driving agents of nutrient cycling, regulating the dynamics of soil organic matter, soil carbon sequestration and greenhouse gas emission, modifying soil physical structure and water regimes, enhancing the amount and efficiency of nutrient acquisition by the vegetation and enhancing plant health.

Organic farming uses a variety of methods to improve soil fertility, including inter-cropping, crop rotation, cover cropping, reduced tillage, and application of compost. By reducing tillage, soil is not inverted and exposed to air; less carbon is lost to the atmosphere resulting in more soil organic carbon. This has an added benefit of carbon sequestration, which can reduce green house gases and aid in reversing climate change. In organic farming the use of synthetic fertilizers is not allowed.

The Life Cycle Assessment (LCA) of organic cotton fiber shows that organic cotton fiber production has an eutrophication potential (EP) of 2.8 kg PO₄³⁻ equivalent (per 1,000 kg fiber). Cotton Inc. 2012 calculated 3.8 kg PO₄³⁻ equivalent for the same amount of conventional fiber. Equivalent to an EP 26 percent less.
Cotton is susceptible to a wide range of insect pests. Among the most destructive are the cotton bollworm, plant bugs, stinkbugs, aphids, thrips and spider mites. Alongside insects and other arthropods, nematodes (slugs and worms), fungi and bacteria are other pests plaguing cotton crops. According to Cotton Inc., regardless of the pest, insect pest management is among the highest variable cost associated with production of the (conventional) cotton crop. Another being the cost of seed.

The WWF state that the use of insecticides and herbicides can lead to chemical contamination, reduce the number of beneficial insects and microorganisms living in the soil, and leach into groundwater where it can go on to do more damage to aquatic life and migrate off the original site. Overuse, poor practices, accidents, leakage of agrochemicals from storage facilities and spray drift can result in environmental contamination and increase the risk of human exposure.

According to the United States Dept. of Agriculture, and posted on the OTA website, cotton is ranked third behind corn and soybeans in the total amount of pesticides applied. The 2013 ICAC report suggests that, globally, pesticide use in cotton is reducing. According to Cropnosis, an agricultural chemical research company in the United Kingdom, cotton's share of world sales of plant protection chemicals by value was 6.2 percent in 2012. Cotton production accounted for 4.2 percent of herbicide applications and 17.5 percent of world insecticide sales.

Decline in pesticide use can be attributed to the use of integrated pest management (IPM) and other field improvements. The contribution of genetically modified (GM) cottonseed to pesticide reduction is less clear. Studies by Monsanto and others show that resistance (by primary pests) and the rise of secondary pests is occurring in India's Bt cotton. Further, the use of glyphosate (the active ingredient in the herbicide Roundup) is said to be on the rise, in part due to the promotion of the GM cotton "Roundup Ready" in the U.S and the use of Roundup as part of a conservation tillage technique. Some consider glyphosate relatively safe in agriculture and others say it is seriously problematic (such as Dr Don Huber an expert in an area of science that relates to the toxicity of genetically engineered foods).

In organic farming the use of synthetic pesticides or genetically modified seed is not allowed. Organic farmers use knowledge of ecology to manage pests and weeds, systematic crop rotation, inter-crops, trap crops and integrate other biological, cultural, mechanical, physical and bio-chemical tactics to manage pests. Organic weed management promotes weed suppression, rather than weed elimination, by enhancing crop competition and phytotoxic effects on weeds. Chemical defoliants are not used in organic cultivation.

Note: all substances in high quantities or used irresponsibly can be hazardous or have negative environmental impact.

REFERENCES & FURTHER INFORMATION

- Centre for Sustainable Agriculture Hyderabad
  Website: http://www.csa-india.org
- Cornell University – Sustainable Agriculture
  Website: http://ecologyandevolution.cornell.edu/research/environment-sustainability_conservation/sustainable-agriculture.rtf
- Cotton Inc - Entomology
  Website: http://www.cottoninc.com/fiber/AgricultureDisciplines/Entomology/
- Dr Don Huber – Read Dr Huber’s Bio
  Website: http://www.nvlv.nl/downloads/Dr_Huber_bio.pdf
- FAO – What is Organic Agriculture?
  Website: http://www.fao.org/organicag/oa-faq/oa-faq1/en/
- International Cotton Advisory Council (ICAC)
  Website: https://www.icac.org/Press-Release/2016/P8-22
- Information Systems for Biotechnology (ISB) - Insect Resistance to Genetically Engineered Crops: Successes and Failures
- Monsanto – Pink Bollworm Resistance to GM Cotton in India
- National Cotton Council – Pest Management
  Website: http://www.cotton.org/bi/cotton.php
- Organic Cotton Community of Practice - Organic Pest Management Strategies
  Website: http://www.organiccotton.org/oc/Organic-cotton/Agronomic-practice/Pest-management.php
- Organic Trade Association (OTA)
  Website: http://www.ota.com/organic/environment/cotton_environment.html
- Sustainable Cotton Project – BASIC Cotton Manual
- Union of Concerned Scientists U.S.A
The common definition of biodiversity is the totality of genes, species, and ecosystems of a region. According to EUSoils, at least a quarter of the Earth’s biodiversity can be found in the soil. Biodiversity and agriculture are strongly interrelated.

**Natural capital** is the land, air, water, living organisms and all formations of the Earth’s biosphere that provide us with *ecosystem goods and services* imperative for survival and well-being. Furthermore, it is the basis for all human economic activity.

The degree of biodiversity (especially its loss) can be measured in a number of different ways such as land use change, species richness (comparisons made within similar geographic zones), the viability of “natural capital” (forests, water, soil), and effectiveness of ecosystem services (pollination, climate regulation, and flood defenses).

Agriculture is a major land use. According to the WWF, around 40 percent of the world’s habitable land has already been converted to farmland. The WWF predict that in developing countries, a further 120 million ha of natural habitats will be converted to farmland to meet demand for food by 2050. This will include land with high biodiversity value.

The endangered species Red Lists maintain that intensive farming is one of the main causes for species decline in cultivated landscapes (Bengtsonn, J. et al. 2005; Hole, D.S. et al. 2005). Pesticide use, synthetic nitrogen fertilizer, land consolidation, drainage and the use of heavy machinery, have all contributed to a drastic loss of biodiversity.

Alongside the loss of natural habitats, monoculture and the use of agrochemicals, the introduction of genetic modification (GM) is showing signs of impacting biodiversity. For example research by the University of Minnesota found that after the introduction of Roundup Ready cotton and maize in the U.S. (Midwest) the monarch butterfly population in that area has declined by 81 percent. Textile Exchange estimates that 50 percent of cotton is now produced from GM seed, with some countries such as India and the U.S. up to or =90 percent.

The relationship between agriculture and biodiversity can be understood in two ways: First, as the biodiversity within farmland landscapes (i.e. the biodiversity of soil microbes, birds, insects, etc.), and second, as the biodiversity of agricultural crops and animals, or agro-biodiversity (i.e. varieties of cotton, wheat, breeds of cattle, etc.).

Through organic practices for soil fertility (microbial applications, rotation and intercropping) and natural pest deterrent methods, organic cotton farming potentially contributes to biodiversity levels. However, there needs to be further research to test this in practice.

According to the Technical Platform for Organics, *Eco-functional intensification* (EFI) is the intensification of knowledge, information and organization per ha, can preserve and enhance conservation areas, as well as increase overall biodiversity and productivity. Eco-functional intensification leads to greater yield variety, and potentially increases yields of calories and protein (even when the primary cash crop is fiber), essential for food security in some countries.

A recent study, published in February 2014 in the Journal of Applied Ecology, compared biodiversity under organic and conventional farming methods. The study found that on average, organic farming increased species richness by about 30 percent. According to the researchers, this result has been robust over the last 30 years of published studies and shows no sign of diminishing.

**Biodiversity in cotton** is an important indicator of sustainability due to many factors, not least of which is geographical suitability and climate change. There are between 40 and 50 species of cotton (500 known varieties), which have evolved to suit geographical growing conditions. These species include many intriguing characteristics and traits such as extremely long and fine-stapled cotton, “colored” cotton, and native indigenous or “wild” cotton. However, there are only 4 commercial species of cotton, with Upland (*Gossypium hirsutum*) now the dominant species, having spread to over 45 countries and accounting for over 90 percent of all cotton produced.

A number of organic cotton ‘projects’ are located in marginalized or under-resourced rural areas; here it is more likely that local, indigenous or wild cotton is cultivated (as within the Amazonian rainforest, Peru or on the borders of the Western Ghats in India). These projects are important in many ways: to species diversity, protection of sensitive bioregions, and keeping traditional farming alive.
Agriculture is both a contributor to, and a victim of, climate change. Agriculture can also help mitigate or slow down climate change, for instance through soil carbon sequestration. Agricultural production, processing, trade and consumption contribute up to 40 percent of the world’s emissions when forest clearance for reclamation of agricultural land is included in the calculation. In the ITC report, Cotton and Climate Change, it states that cotton production contributes to between 0.3 percent and 1 percent of total global GHG emissions.

The agricultural sector, particularly the organic sector, has the potential to mitigate climate change mainly by increasing the carbon sequestration rate (the rate at which carbon is stored in the soil), and, to a lesser degree, through the reduction of some Greenhouse Gas (GHG) emissions, principally nitrous oxide (N₂O) and methane (CH₄) according to the ITC. (Note: GHG emissions are measured in equivalent carbon dioxide (CO₂eq); CH₄ possesses 25 times greater global warming potential (GWP) than carbon dioxide, and the GWP of N₂O is 298 times greater.)

According to CABI, the overall effect of climate change on cotton growth and development is, on balance, going to be detrimental. The negative effect of water limitation will be greater than the beneficial effects of moderate temperature and elevated CO₂ and so cotton yield is expected to decrease under climate change.

FiBL found, in a meta-analysis of 74 studies worldwide, that carbon stocks are more enhanced in soils under organic farming management and that carbon sequestration can be more effective in organically managed soils. Relevant data, however, is lacking for most countries of the developing world, particularly for Africa. A further global analysis of 19 studies led by FiBL has shown that area-scaled nitrous oxide emissions from organically managed soils are on average 492 kg CO₂ eq. per ha and are lower than those from non-organically managed soils. Moreover, uptake of atmospheric methane on organically farmed lands is slightly higher. However, yield-scaled nitrous oxide emissions are higher under organic management. This is due to the lower crop yield levels under organic management in the studies evaluated for this meta-analysis. To equalize yield-scaled nitrous oxide emissions a yield increase of about 9 percent under organic management would be necessary. On the other hand, the present study only assessed soil-derived emissions on agricultural land and did not take into account emissions arising for example in fertilizer production or farm-waste management.

Adaptability and resilience in production systems will become increasingly important to enable farmers to cope with climate change and more extreme climate variability. Resilience in organic agriculture is a result of farm and crop diversification and increased soil fertility. According to FiBL, these practices result in more soil organic matter (SOM) as mixed systems (livestock and crop production) favor higher SOM levels. Increased SOM (that holds or drains water more effectively) can help save crops in times of prolonged dry periods or floods, thus contributing to climate change adaptation.

The Life Cycle Assessment (LCA) of organic cotton fiber shows the global average Global Warming Potential (GWP) of organic cotton fiber at 978 kg of CO₂ equivalent per 1,000 kg of cotton fiber produced. Conventionally grown cotton is calculated to be 1,808 kg of CO₂ equivalent (Cotton Inc. 2012). Resulting in a GWP saving for organic of 46 percent. Under current system boundaries of the LCA, the difference in results can be attributed to the lower agricultural inputs that are required by the principles of organic agriculture, namely of mineral fertilizer and pesticides, as well as the practices related to tractor operations and irrigation.

The LCA shows the Potential Energy Demand (PED) to produce 1,000 kg of organic cotton is ca. 5,800 MJ. As in the case for GWP, avoiding the use of mineral fertilizer reduces the use of nonrenewable fossil energy, since mineral fertilizers are petroleum-derived and carry a high PED. For conventional cotton (Cotton Inc. 2012) PED for conventional cotton is ca. 15,000 MJ/1,000 kg lint cotton. This results in a reduced PED (non-renewable) for organic of 62 percent.

REFERENCES & FURTHER INFORMATION

- CABI - Climate Change and Agricultural Commodities Website: http://www.cabi.org/default.aspx?site=170&zone=collaborative-learning-series
- FiBL (Gattinger, A.) - Enhanced Top Soil Carbon Stocks Under Organic Farming Website: http://www.pnas.org/content/109/44/18226
- FiBL – Organic Farming and Climate Change Website: http://www.fibl.org/en/themes/climate-change.html
- International Trade Centre (ITC) - Cotton And Climate Change: Impacts And Options To Mitigate And Adapt Website: http://www.organicandfair.org/itcc/events/Documentation/34_SO_1.PDF
According to the FAO, more than half the people of the world and the vast majority of the people in developing countries (Asia, Africa and Latin America) live in rural areas and gain part or all of their livelihoods from some form of agriculture. Many lead their lives barely at subsistence level. It can also be argued that agriculture is a vital part of a country’s economy and that its development is important to the development of the country’s economy as a whole.

The FAO claim that business activity tends to be the main contributor to a decent livelihood. COSA reports that for the cotton sector, income from agriculture is closely linked to the metric of yield (i.e. production weight of the crop per ha). Although yields give a good indication of how well a farmer is doing, it does not factor in the actual costs of production, nor does it reveal other trade-offs a farmer has to make. These trade-offs might be costs to the environment such as degraded water resources and biodiversity, or social costs such as crop diversification, food security and nutrition.

According to ICAC, there are approximately 30 million ha under cotton globally, roughly 10 million cotton farmers worldwide, 99 percent of them in developing countries, farming on less than an average of 2 ha. Many small-scale farming operations are family affairs, meaning perhaps 100 million people are dependent upon an income from cotton. Approximately 215,000 cotton producers in around 20 countries are certified organic, many more practice agro-ecology (uncertified organic) by design or by default.

IFOAM report that family farmers, among other smallholders, play an essential role in sustainability: local food production, contributing to rural economies, and acting as stewards of biodiversity. Research shows that organic farming systems, can contribute to an improved quality of life for small-scale farmers. For example, in 2008, a field study by the University of Berne assessed the livelihood impact of an organic/Fairtrade cotton program in Burkina Faso. The researchers studied the socio-economic conditions of both men and women producers. The study showed that organic and Fairtrade production enabled the producers to increase their income and at the same time to improve soil fertility, human health and food security. Cotton yields were below those of conventional cotton but production costs were lower, and the study found that there was less risk of producers running into debt than with conventional cotton production.

According to the results of a recent FiBL/bioRe study in Madhya Pradesh, India, yield gaps between organic and conventional can close significantly after the first year of conversion. Just as importantly, margins can be higher in organic due to less variable production costs. More research is needed on the longer-term productivity and profitability of the different farming systems.

REFERENCES & FURTHER INFORMATION

- COSA – Measuring Sustainability
- FAO – Framework of Development
  Website: http://www.fao.org/docrep/010/060e/01060e02.htm
- FAO – Sustainability Assessment of Food and Agriculture Systems (SAFA) Guidelines
- FiBL and bioRe India - Yield and Economic Performance of Organic and Conventional Cotton-Based Farming Systems – Results from a Field Trial in India
  Website: http://www.plosone.org/article/fetchObject.action?uri=info%3Adoi%2F10.1371%2Fjournal.pone.0081038&representation=PDF
- IFOAM - Organic Agriculture and Family Farming
  Website: http://www.familyfarmingcampaign.net/archivos/comunicacion/organic_agriculture.pdf
- University of Berne - Impact Study on Organic and Fairtrade Farmers in Burkina Faso
According to the Participatory Management Development Advisory Network (PAMDA), the growth of liberalized agricultural markets has led to an increased marginalization of smallholder farmers. Farmers need to organize themselves or else they will be organized by market forces. Both the World Bank and PAMDA believe that organizing production is an important way for rural producers to address a range of constraints on agricultural production and marketing.

A “Producer Group” (PG) refers to farmers organized for the purpose of providing better access to production equipment, inputs, capacity building, technology and most importantly, markets. Organization can also lead to PGs expanding their skills base to include intermediary functions such as processing, grading, and other “value-add” which increases their role in the value chain.

With organic agriculture, farmers also organize for group certification. Producer groups are often geographically clustered around villages, and can fall into a number of different structures ranging from informal farmer groups and farmer-organized “contract farming” through to formally registered farmer “associations” or “cooperatives”.

The FAO Contract Farming Resource Centre describes contract farming as production being carried out on the basis of an agreement between the buyer and farm producers. The farmer undertakes to supply agreed quantities of a product, based on the quality standards and delivery requirements of the purchaser. In return, the buyer, usually a company, agrees to buy the product, often at a price that is established in advance. The company often also agrees to support the farmer through, e.g., supplying inputs, assisting with land preparation, providing production advice and transporting produce to its premises.

A guide published by GIZ in 2013 seeks to advise on ways in which contract farming can be developed to maximize such benefits for smallholders in developing countries. Although contract farming is common, effective linkages between companies and thousands of farmers often require the involvement of formal farmer associations or cooperatives or, at least, informal farmer groups.

Cooperatives or farmer associations align their activities and operations with their members’ needs and requirements. Instead of merely providing services at the input and output ends, an integrated cooperative directly helps members to increase their production and productivity by providing an integrated package of services including extension, finance or credit, inputs, guidance and supervision, negotiation in getting higher prices for their output and value-add, plus other marketing functions (see the PAMDA reference for further information).

Additionally, the FAO explains that producer organizations support farmers in defending their local interests and enables them to participate in policy dialogues on issues like fairer market conditions (e.g. revolving around issues of price control for cash crops, seed sovereignty), fairer access to international markets, improved government support in relation to extension service, the provision of rural infrastructure and a greater role for smallholder farmers in the decision-making process.

According to UNCTAD, organic agriculture has positively contributed to the establishment of producer groups and cooperatives that are attributed with improved ways of managing collective natural resources. These organizations also provide farmers with a number of economic benefits such as increased knowledge transfer amongst farmers, reduced costs of organic certification and greater food security.
Standards regulate production methods, and in some cases, final output for organic agriculture. Standards may be voluntary or legislated. In a recent study, COSA found evidence of a relationship between having multiple (including organic) certifications and productivity. It is not yet clear to what extent this links to increased sustainability in other dimensions, but there is some evidence of correlation to improvements in incomes, environmental and social dimensions. Producers may also be motivated to attain multiple certifications as a risk mitigation strategy. There can be a positive relationship between productivity and environmental practices. However, this is not linear and varies between countries.

In another study “Pro-Poor Certification”, the IIED states that certification is often proposed as a means to avoid the traps associated with low and volatile commodity prices, environmentally unsustainable farming practices and poor market access. A certificate is a way to guarantee a higher quality of what otherwise would be a homogeneous product (e.g. conventional cotton vs. organic cotton). However, the IIED reveal that while certification can improve the value of the product, evidence suggests that it does not necessarily lead to an increased share of the final price for the farmers themselves.

Organic certification is carried out against a standard which is a set of conditions that have to be met when farming and/or processing an organic product and ultimately necessary to ensure its integrity. Typically, certifying agencies accredit certification groups (organic cotton producer groups) rather than individual farms. A retailer selling products containing organic cotton is able to track the organic fiber content through their supply chain with the final product being certified to one or more of the available standards (e.g. the Organic Content Standard (OCS) or the Global Organic Textile Standard (GOTS)).

Common Objectives and Requirements of Organic Standards
The IFOAM Standards Requirements, also called Common Objectives and Requirements of Organic Standards (COROS), were developed as a joint venture of the IFOAM Organic Guarantee System (OGS) and the GOMA Project (Global Organic Market Access) undertaken by FAO, IFOAM and UNCTAD. The COROS is intended for use in international equivalence assessments of organic standards and technical regulations and provides the basis for assessing equivalence of standards for inclusion in the IFOAM Family of Standards. It contains requirements that have been found common across many private and government organic standards. There are a number of government standards that define production and certification requirements for organic farming production. These include:

- USA – USDA National Organic Program
- Canada – Canada Organic Regime
- Australia – Australian Certified Organic
- India – India Organic – National Programme for Organic Production
- Japan Agricultural Standard

A full list can be found on the International Organic Inspectors Association website.

Alongside organic, the Fairtrade Standard offers a complementary standard in many developing countries (where arguably labor rights are weaker). By selling to the Fairtrade market, cotton farmers have the security of a Minimum Price based on their average costs of sustainable production, plus a Fairtrade Premium to invest collectively in farm and community projects.

Other voluntary sustainability standards (VSS) in cotton include the Better Cotton Initiative (BCI), Cotton made in Africa (CmiA), Cleaner Cotton and Bayer e3 (in the U.S.).

### CURRENT SPECTRUM OF COTTON SUSTAINABILITY STANDARDS

The number of sustainability standards for cotton has increased considerably over the past five years. The table below, prepared by CottonConnect and Textile Exchange, highlights most of the major standards in operation to date. It is not intended to be an exhaustive list. The organic standard is often used in combination with the Fairtrade standard - with a considerable number of producer groups in developing countries certifying to both. Recently the CmiA-Organic standard has been developed and is now an offer to farmers in Africa.

<table>
<thead>
<tr>
<th>Product Label</th>
<th>Bayer e3</th>
<th>BCI</th>
<th>Cleaner Cotton</th>
<th>CmiA</th>
<th>Fairtrade</th>
<th>Organic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certified (Cotton)</td>
<td>Verification by 3rd party</td>
<td>Verification by 3rd party</td>
<td>Yes</td>
<td>Verification by 3rd party</td>
<td>Certification by 3rd party</td>
<td>Certification by 3rd party</td>
</tr>
<tr>
<td>Certified (Supply Chain)</td>
<td>Yes, to the mill for further content claims use</td>
<td>No</td>
<td>Verified by 3rd party government and industry base identification programs</td>
<td>No</td>
<td>Certification by 3rd party</td>
<td>Certification optional</td>
</tr>
<tr>
<td>Identity Presented</td>
<td>Yes (bale of lint)</td>
<td>Yes (bale of lint)</td>
<td>US PB system goes through to spinner</td>
<td>Yes (bale of lint)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>GMO</td>
<td>Allowed</td>
<td>Allowed</td>
<td>Not allowed to date</td>
<td>Banned</td>
<td>Banned</td>
<td>Banned</td>
</tr>
<tr>
<td>Countries of production</td>
<td>USA</td>
<td>Restricted</td>
<td>Brazil, China, India, Mali, Mozambique, Pakistan, Tajikistan, Turkey, CmiA agreement &amp; Australia (JMP)</td>
<td>USA</td>
<td>Restricted</td>
<td>Ghana, Ivory Coast, Malawi, Mozambique, Zambia, Zimbabwe</td>
</tr>
</tbody>
</table>
Risk and uncertainty are inherent in the agricultural sector. According to Cotton Inc., cotton markets, have become more volatile, and it is more important than ever for farmers to be aware of the importance of risk management. On top of market volatility, the FAO state that farmers differ in their exposure to risk (vulnerability) as a result of their social group, gender, ethnicity, age or other factors.

The impact of unfavorable weather on a crop has always been a risk factor for farmers, and is now rising due to increasing severity and irregular weather patterns (linked to climate change). Assessing risk, and finding appropriate ways to mitigate, transfer or cope with these risks is, therefore, essential for farming communities. Fairtrade International define a risk assessment as a component of risk analysis that involves identifying, evaluating and quantifying risk factors in any given process.

Some of the measures to reduce risk come from diversifying farm systems and income. Stable business relationships and good knowledge of the market as well as access to sufficient finances are also important factors.

The Sustainable Organic Agriculture Action Network (SOAAN) states that the more kinds of products a farm can sell, the less likely that its business viability will be destabilized by a crop or market failure. According to the FAO there are two main approaches to crop diversification. Horizontal diversification refers to the addition of more crops to the existing cropping system. Vertical crop diversification means that various downstream activities are undertaken. This, for example, can include crop species, like fruits, that can be processed, dried, canned or manufactured into juices or syrups.

Alongside environmental benefits of crop diversification, economic advantages include:

- **Comparatively high net return from crops**
- **Higher net returns per unit of labor**
- **Optimization of resource use**
- **Higher land utilization efficiency**
- **Increased job opportunities**

According to SOAAN, farmers, and those who buy their products, should approach their business relationship as a partnership to assure ongoing exchanges over the long term, not just one-time or isolated purchase events. When farmers, buyers, and even consumers participate in a mutually interdependent and supportive relationship, the long-term stability of their enterprises is more likely to result.

### REFERENCES & FURTHER INFORMATION

- **Chetna Organic – Farmer Organization Structure**
  Website: [http://www.chetnaorganic.org.in/COAPCL/about-coapcl/organisation-structure](http://www.chetnaorganic.org.in/COAPCL/about-coapcl/organisation-structure)

- **Cotton Inc. – Agricultural economics**
  Website: [http://www.cottoninc.com/tiber/AgriculturalDisciplines/AgriculturalEconomic/](http://www.cottoninc.com/tiber/AgriculturalDisciplines/AgriculturalEconomic/)

- **Fairtrade International – Fair Trade Glossary**

- **FAO – Intensification of Crop Diversification in the Asia-Pacific Region**
  Website: [http://www.fao.org/docrep/003/x6906e/x6906e0e.htm](http://www.fao.org/docrep/003/x6906e/x6906e0e.htm)

- **IFOAM – SOAAN Best Practice Guidelines**

- **Textile Exchange – A Snapshot of Crop Diversification**
  Website: [http://farmhub.textileexchange.org/farm-library/farm-reports](http://farmhub.textileexchange.org/farm-library/farm-reports)

- **Textile Exchange – Crop Diversification Research**

- **World Bank – Producer Groups: Becoming Full Partners in Agricultural Markets and Agro-Enterprises**
The Sustainable Organic Agriculture Action Network (SOAAN) suggests that improved infrastructure and collective learning enables more efficient and powerful use of human capital. Farmers, organized through producer groups, are usually best placed to identify needs and manage investment productively. To ensure strong and resilient producer groups, investments in knowledge, working capital, and capacity building are essential.

According to the FAO, investment in knowledge and capacity building has shifted from the conventional top-down test and verification (T&V) extension approach towards the implementation of Farmer Field Schools (FFS), which are based on people-centered learning. FFSs are a way for farming communities to improve their decision-making abilities and stimulate local innovation for sustainable agriculture. The emphasis is on empowering farmers to implement their own decisions in their own fields.

In organic production, farmers require specialized training in technical topics of organic agriculture, conversion from conventional to organic practices, and assistance for attaining permits or certifications necessary for market access. Capacity building and training etc. is usually provided by a producer organization’s backbone team, NGOs, or extension service providers from supply chain partners.

In several African countries the organic sectors have established national organic agriculture networks to represent the organic sector both at national and international levels. These umbrella organizations provide a range of support services for farmer groups, link stakeholders and make efforts to promote and get recognition for organic agriculture among farmers groups, NGOs, governments and intergovernmental organizations, and development organizations.

According to Capacity.Org (a resource portal for the practice of capacity development) innovative approaches to financing (including impact investing, public private partnerships, self-help groups, and revolving funds) are often essential business investment and an alternative to donor funding in the longer-term. Impact driven investors (or “social lenders”), such as Root Capital and Caspian, use a Social Lender Model whereby they work through cooperatives or producer organizations making this an efficient channel for providing finance to small-scale farmers.

REFERENCES & FURTHER INFORMATION

- Capacity - Innovative Financing for Inclusive Agricultural Development
- Caspian India
  Website: http://www.caspian.in
- FAO - Farmer Field Schools
- IFOAM – SOAAN Best Practice Guidelines
  Website: http://www.ifoam.org/sites/default/files/best-practice_guideline_v10_rated.pdf
- Organic Africa
  Website: http://www.organic-africa.net/oa-home.html?&L=0
- Root Capital
  Website: http://www.rootcapital.org
- Textile Exchange – Social Impacts: Rural Development
  Website: http://farmhub.textileexchange.org/learning-zone/all-about-organic-cotton/social-impacts/-rural-development
- World Bank – Producer Groups: Becoming Full Partners in Agricultural Markets and Agro-Enterprises
  Website: http://www.worldbank.org/organ/topic/agriculture
Organic cotton farmers rely upon access to good quality, affordable, non-genetically modified seed suitable for farming without the use of agrochemicals or genetically modified seed. While there is no legal definition as to what seed security actually entails, Van Der Burg's definition of seed security is a good starting place: "The state in which all farmers in a region or farming system have ready access to sufficient quantities of seeds of adequate genetic and physical quality, at the right moment, year after year."

Over time, commercial cotton has become increasingly "hybridized" to meet the needs of the spinning mills. Alongside performance at the mill, seed has been bred to increase yield, fiber length, and speed of maturation. These days, research funds also go towards genetic modification. As a result, the cottonseed on the market is increasingly genetically modified.

While seed companies have worked hard to improve the industrial performance of cotton (and created more homogenized seed), climate change may require different qualities for seed to thrive. The ITC and CABI, among many others, predict that changing and more extreme weather patterns (droughts and floods) will result in shifting agricultural patterns. The greater the range of genetic characteristics (seed varieties): the more resilient farmers will be to climate change. For some the answer might be further genetic modification, for others the answer lies in seed diversification suitable to for low-input agriculture, such as "straight" (non-hybridized and non-GM) cultivars.

According to ISAAA, by 2013 74 percent of the global cotton area was cultivated with GM cotton (23.9 mil ha) in 15 countries in five continents. In some countries, such as India and the U.S., over 90 percent of cottonseed is genetically modified. Other countries have banned the introduction of genetically modified organisms (GMOs) including a number of well-established organic cotton producing regions such as Turkey and Peru. Others, such as Tanzania, are about to open the market to GM cotton.

For organic cotton farmers, obtaining non-GM cotton seed in countries where genetically modified seed has been introduced is becoming increasingly difficult. It can also be a barrier to conventional cotton growers wishing to convert to organic, or farmers simply wanting the choice to grow non-GM cotton varieties in areas where GM does not perform as well.

Furthermore, the risk of contamination of organic cotton crops by GM cotton is a significant concern. Contamination by GMOs can damage the integrity from farmers and the fiber to the entire organic cotton sector. Contamination can happen at the seed level, during production, and at the gin or spinning mill if controlled segregation is not strictly followed.

It is imperative for the organic sector and seed industry (including public sector research institutions and private companies) to act collaboratively to ensure seed security for organic agriculture is achieved. The sector and its many stakeholders along the supply chain: from farmers to consumers, is potentially at risk.

REFERENCES & FURTHER INFORMATION

- CABI - Climate Change and Agricultural Commodities
  Website: http://www.cabi.org/default.aspx?site=1704&page=3782

- International Services for the Acquisition of Agri-biotech Applications (ISAAA)
  Website: http://www.isaaa.org/resources/publications/briefs/46/tablesandfigures/default.asp

- International Trade Centre (ITC) - Cotton And Climate Change: Impacts And Options To Mitigate And Adapt
  Website: http://www.organicandfair.org/oftcc/Events/Documentation/_34_SO_1.PDF

- MSc thesis at Hohenheim University, Stuttgart, Germany on how seed security can be achieved for organic cotton projects in two states of India: Andhra Pradesh and Karnataka
  Website: http://www.organiccotton.org/oc/Library/library_detail.php?ID=305

- Textile Exchange - Organic Cotton Round Table: Seed Strategy Task Force
  Website: http://farmhub.textileexchange.org/learning-zone/organic-cotton/round-table/occforum/focus-point-2-seed

- Textile Exchange – see Farm & Fiber Report 2010-11 (page 29)
  Website: http://farmhub.textileexchange.org/farm-library/farm-fiber-reports

- Union of Concerned Scientists USA – Genetic Engineering
  Website: http://www.ucsusa.org/food_and_agriculture/our-failing-food-system/genetic-engineering/
Food security is defined by the World Health Organization as existing “when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life.” Commonly, the concept of food security is defined as including both physical and economic access to food that meets people’s dietary needs as well as their food preferences.

Food security is built on three pillars.

1. Food availability: sufficient quantities of food available on a consistent basis.
2. Food access: having sufficient resources to obtain appropriate foods for a nutritious diet.
3. Food use: appropriate use based on knowledge of basic nutrition and care, as well as adequate water and sanitation.

Food security is a complex sustainable development issue, linked to health through malnutrition, but also to sustainable economic development, environment and trade.

SOAAN explain how organic farmers strive for diversity in their own production. In best practice situations, groups of farmers or farming communities may successfully trade and integrate their crops to achieve food security and food sovereignty simultaneously.

Textile Exchange research shows that cotton is just one of the crops coming off organic farms. The global average is between 5-7 crops. Although, cotton is usually the primary cash crop certified organic, other crops make it into local markets. Increasingly, other high-value crops such as sesame and soybean are making their way into organic markets.

Studies, such as the UNEP study in Africa, show that organic agriculture contributes to an:

- Increased quantity of food ensuring that all household members have access to food that is of high nutritional value;
- Improved economic situation for organic farmers through the production and selling of surplus food;
- Improved natural environment of healthier soils that can hold more water, which in turn leads to better plant growth.

The World Development Movement promotes food sovereignty, a status beyond food security. Food sovereignty is about the right of peoples to define their own food systems. Advocates of food sovereignty puts the people who produce, distribute and consume food at the center of decisions on food systems and policies, rather than the demands of markets and corporations that they believe have come to dominate the global food system.

REFERENCES & FURTHER INFORMATION

- PAN UK - Organic Cotton Systems Reduce Poverty and Food Insecurity for African Farm Families
  Website: http://www.pan-uk.org/foodAfrica/PDFs/FFB%20stories%20and%20issues%20briefing.pdf
- Textile Exchange – A Snapshot of Crop Diversification
  Website: http://farmhub.textileexchange.org/farm-library/farm-reports
- Textile Exchange – Crop Diversification Research
  Website: http://farmhub.textileexchange.org/learning-zone/spotlight-crop-diversification
- UNEP-UNCTAD – Organic Agriculture and Food Security in Africa
- World Development Movement – Food Sovereignty
  Website: http://www.wdm.org.uk/food-sovereignty
- World Health Organization – Health Indicators of Sustainable Agriculture, Food and Nutrition Security
  Website: http://www.who.int/nutrition/topics/green_economy_indicators_food.pdf
Over 1 billion people are working in agriculture. The majority of these workers do not enter into formal wage employment, but instead are engaged in self-employment or unpaid family work such as, subsistence farming. According to ICAC, 99 percent of the world’s cotton growers live in developing countries.

Decent work sums up the aspirations of people in their working lives. It involves opportunities for work that is productive and delivers a fair income, security in the workplace and social protection for families, better prospects for personal development and social integration, freedom for people to express their concerns, organize and participate in the decisions that affect their lives and equality of opportunity and treatment for all women and men.

Labor or workers’ rights are legal rights and often referred to as human rights that are linked to specific labor relations between workers and their employers. In many countries, there are laws governing working conditions and social aspects of employment. Law implementation, however, is often poor and cannot be relied upon. The issues range from working hours, fair compensation and safe working conditions, to very specific labor challenges involving the use of migrants or forced labor of children and adults.

Health and safety in the use of agrochemicals, particularly pesticides, is one of the most common concerns when it comes to safe working conditions on farms. Pesticide use is a threat to the health of farmers, their families and rural communities. It is not only the farmers who are at risk of exposure, but also the wider community through spray drift, the ingestion of chemical-coated food crops, or mistaking a pesticide solution for something else if not securely stored or labeled. This is where organic cotton with its controlled pest management techniques can play a positive role.

Wherever there is extreme poverty exploitation of child labor will be an issue. Fairtrade International defines child labor as work that is unacceptable because the children involved are too young and should be in school, or because even though they have attained the minimum age for admission to employment, the work that they do is unsuitable for a person below the age of 18. In cotton, Uzbekistan has the worst reputation for violating human and child labor rights. The International Labor Rights Forum state that forced labor and child labor in the cotton sector of Uzbekistan is unique to the world: it is a state-controlled system, under the direction of a president in power since the end of the Soviet Union.

The seasonality of farming poses a challenge for cotton farmers, especially where workers are on temporary contracts only for labor-intensive periods such as sowing and harvesting. This creates uncertainty and, for seasonal workers, can often involve moving entire families from place to place, making it difficult, if not impossible, for laborers and their families to improve their living conditions or enroll their children in formal education.

TheIFOAM Standard for Organic Production and Processing (2012) states that production methods, which violate human rights, cannot be certified as organic. However, most organic standards do not explicitly cover labor rights, so producer groups need to develop their own in-house policies, follow Fairtrade standards or take some action to promote their commitments to fair and decent working conditions. The use of a robust auditing system, preferably independent, is essential to demonstrate compliance with in-house standards or policies. To manage organic certification, an Internal Control System (ICS) is set up by the producer group to provide a system for management and help achieve group certification. The ICS framework and associated bookkeeping is often used to capture a producer group’s employment and labor procedures and compliance records.

Farmer organization, sensitized communities, government intervention (and democracy), fair incomes, and secure supply chain partners can all help improve work and labor standards.
It is important to recognize the role of equality and cultural diversity in the pursuit of sustainable development. Equality is ensuring individuals or groups of individuals are treated fairly and equally and no less favorably, specific to their needs, including areas of race, gender, disability, religion or belief, sexual orientation and age. Cultural identity, according to the FAO, includes ethnicity, language, religion and cultural diversity, including spiritual belief and political affiliation.

The profound relationship between indigenous peoples and their lands, territories and natural resources has particular importance for their cultures, spiritual values and, ultimately, for their continued existence as distinct Peoples. The International Land Coalition (ILC) adds resource rights to the mix claiming that, these days, there is a growing consensus on the cross-cutting contribution of resource rights to reducing poverty, achieving food security, resolving resource conflicts and providing incentives for sustainable resource management, in addition to being a contribution to democratic development.

Indigenous peoples have rich and ancient cultures and view their social, economic, environmental and spiritual systems as interdependent. They make valuable contributions to the world’s heritage thanks to their traditional knowledge and their understanding of ecosystem management. But indigenous peoples are also among the world’s most vulnerable, marginalized and disadvantaged groups.

The Common Objectives and Requirements of Organic Standards (COROS) include requirements to respect and protect the rights of indigenous peoples. The IFOAM Standard claims that operators “should not use or exploit land whose inhabitants or farmers have been or are being impoverished, dispossessed, colonized, expropriated, expelled or killed, or which is currently in dispute regarding legal or customary local rights to its use or ownership”

Women also often experience discrimination despite making a significant contribution to the economic and social fabric of communities. Gender rights are therefore associated with access to opportunities and empowerment of girls and women.

Although women are strongly involved in cotton cultivation, COSA states that more work is needed to fully acknowledge and reward their role. Issues of limited access to finance and training, lack of independent decision-making and lack of property entitlement tends to affect female cotton farmers disproportionately. This, according to some studies, does not necessarily translate into lower yields on female-led farms, which highlights the positive contribution that women can make.

Textile Exchange research is consistent with COSA findings. For example, in Africa, women represent 26 percent of the total number of organic cotton farmers. In East Africa women make up 17 percent of organic cotton farmers, while in West Africa the number of women involved is considerably higher at 33 percent. In contrast to these impressive numbers, women are still cultivating very small plots in comparison to their male counterparts. In many producer groups, even where gender opportunities are being addressed, the culture of the farming communities still considers (conventional) cotton as a “man’s crop”.

A report by ActionAid “Marginalization to Empowerment” found a clear and significantly positive correlation between women’s secure land ownership, control or access, and their empowerment, particularly their ability to withstand food crises and avoid the fight hunger. It also confirms that empowerment is a non-linear process of change rather than a targeted or defined outcome and involves complex contexts of culture, values, knowledge, relationships, attitude and behavior practice.

Oxfam agree in their “Women Leading Change” publication. Women’s access to resources, assets, credit or cash is limited, and they rarely have any monetary resources of their own.

The rise of Self-Help Groups (SHGs), particularly in India, offers a significant opportunity for women, Tribals, and other marginalized groups to take more control of their finances. The existing organizational structures evident in organic cotton grower communities (including the book-keeping necessary for organic certification) provide a good starting point for SHG enterprise and development. (For an example of how this is working on the ground, see the Chetna Organic reference.)

The findings in a recent case study from the University of Mycose, claimed that member-based and “member-controlled” cooperatives, favoring the empowerment of women and tribal communities, can deliver key benefits such as improved knowledge transfer and norms for natural resource management or broader community development.

According to BD Sharma, Senior Consultant, Inter-cooperative Alliance (ICA) Domus Trust, India, the organization of tribal communities into cooperatives is integral to strategies for tribal development and can work as a conduit for substantial technical, financial and administrative support.

Organic farming has the potential to create strong social organizations at the local level through the formation of farmers’ groups and cooperatives.
According to the FAO, agriculture is a vital part of the economy of any country and rural development is often critical to the development of the country’s economy as a whole.

Rural development encompasses a range of approaches and activities that aim to improve the welfare and livelihoods of people living in rural areas. For example, it may aim at improving public works and infrastructure (e.g. rural roads and electrification) or technology (e.g. tools and techniques for improving agricultural production).

Rural community development, on the other hand, focuses on individual and community empowerment aiming to equip communities with knowledge and skills that help them make self-fulfilling decisions about their future. These latter approaches pay attention to social issues, particularly community organizing.

The FAO categorizes rural development into:

- Economic. The development of the economic or productive base of any society, which will produce the goods and materials required for life.
- Social. The provision of a range of social amenities and services (i.e., health, education, welfare) that cater to the non-productive needs of a society.
- Human. The development of the people themselves, both individually and communally, to realize their full potential, to use their skills and talents, and to play a constructive part in shaping their own society.

SOAAN acknowledge in their Best Practice Guidelines that rural communities need support systems that maintain the knowledge and culture of agricultural practices and that also support new farmers.

Urban migration, according to SOAAN, is a problem both for rural as well as urban development. The increasing flight of people from rural to urban areas is destabilizing to both areas. Loss of people in rural areas drains those areas of labor power and diversity in terms of ideas, innovation, inspiration, activities and employment opportunities – all of which in turn can lead to impoverishment of culture. On the urban side, an influx of new residents puts strain on infrastructure and public services. It can also cause increased competition for employment and/or result in greater overall unemployment conditions that create even more imbalance between densely populated areas and the rural agricultural supply base on which they depend. Slowing or reversing trends of urbanization would lead to greater overall sustainability and the regenerative potential of regions.

Further, assuring intergenerational continuity on the farm and in the community is an important factor in maintaining the knowledge and culture of practices needed for ongoing vitality.

REFERENCES & FURTHER INFORMATION

- Cyclopaedia – Definition of Community Development
  Website: http://en.cyclopaedia.net/wiki/Community-development
- FAO – Framework of Development
  Website: http://www.fao.org/docrep/10060e/10060e02.htm
- IFOAM – SOAAN Best Practice Guidelines
  Website: http://www.ifoam.org/sites/default/files/best_practice_guideline_v1.0_rated.pdf
- Textile Exchange – Social Impacts: Rural Development
  Website: http://farmhub.textileexchange.org/learning-zone/all-about-organic-cotton/social-impacts/-rural-development
The Committee on Sustainability Assessment

The Committee on Sustainability Assessment (COSA) works with research institutions around the world, generating insights and recommendations that can serve governments, private enterprise, producers, and consumers. Using globally comparable indicators, field surveys, electronic data gathering, data management, impact analysis, assessments, and managerial tools, COSA offers a thorough understanding of sustainability, and can help to improve overall strategies with regard to sustainability initiatives in agriculture. COSA's work was initially developed for coffee, but the approach and lessons have been adapted and applied to other commodities. It has been used in twelve countries across the coffee and cocoa sectors and has, so far, produced approximately 20,000 data sets. This represents the first effort to generate a global and publicly available common methodology and database to assist stakeholders in assessing the impacts of sustainability initiatives across a variety of commodity sectors.

Website: http://thecosa.org

The ISEAL Alliance Impacts Code

The ISEAL Alliance is the global membership association for sustainability standards (ISEAL). ISEAL produced a "Code of Good Practice for Assessing the Impacts of Social and Environmental Standards" (Impacts Code) to help standards systems better understand the sustainability results of their work, as well as the effectiveness of their programs. The Impacts Code offers a framework for building a monitoring and evaluation system capable of examining both short-term and long-term outcomes and requires standards systems to publicly report on the results of their evaluations. All standard-setting organizations that are members of the ISEAL Alliance commit to implementing the Impacts Code.

The Impacts Code requires standards systems to develop and implement a monitoring and evaluation plan that includes all the steps required to assess their contributions to social and environmental impact.

Website: http://www.isealalliance.org/our-work/defining-credibility/codes-of-good-practice/impacts-code

The Expert Panel on the Social, Environmental, and Economic Performance of Cotton

The International Cotton Advisory Council's (ICAC) Expert Panel on the Social, Economic and Environmental Performance of Cotton Production (SEEP) has prepared a list of recommended indicators that will serve as the starting point for discussion. "Measuring Sustainability In Cotton-Farming Systems: Towards A Guidance Framework".

Website: http://www.fao.org/3/a-i4170e.pdf

Sustainability Assessment of Food and Agriculture

Sustainability Assessment of Food and Agriculture (SAFA). Today, 106 countries have National Sustainable Development Strategies and, at least, 120 voluntary sustainability standards are being implemented by the food and agriculture industry. However, developing and implementing an integrated approach to analyzing different sustainability dimensions, as a coherent whole, and integrating them in development or business strategies remain a major challenge.

With a view to offer a fair playing field, the United Nations Food & Agriculture Organization (FAO) built on existing efforts and developed a universal framework for sustainability assessment of food and agriculture. After 5 years of participatory development, SAFA has been presented to FAO member countries; the SAFA Guidelines, Indicators and Tool are freely downloadable from their webpage. Users are encouraged to test the Beta version of the SAFA Tool.

Website: http://www.fao.org/nr/sustainability/sustainability-assessments-safa/en/
The Sustainable Organic Agriculture Action Network

The Sustainable Organic Agriculture Action Network (SOAAN) is a think tank initiated by IFOAM that positions organic agriculture and its related supply chains as a holistic, sustainable approach to the production of food and fiber for all of human society. Working together as an alliance of likeminded organizations, members can use the SOAAN's outputs to jointly and individually impact the world's practices around the production and consumption of agricultural products. Through these efforts, good organic production can become a real and significant institutional alternative to conventional agriculture and its related policies, and members of SOAAN can be seen as increasingly desirable partners.


The State of Sustainability Initiatives Project

The State of Sustainability Initiatives (SSI) project seeks to enhance global understanding and learning about the role and potential of market-based voluntary sustainability initiatives (VSS). These include eco-labels, sustainability standards and roundtables, which promote sustainable development. By providing objective, reliable and timely information on the characteristics, performance and market trends associated with voluntary sustainability initiatives, the SSI will facilitate more strategic decision-making and continual improvement across VSS. The Sustainable Commodity Initiative is managed by IISD and UNCTAD.

Website: http://www.sustainablecommodities.org/ssi

The Sustainability Flower

The Sustainability Flower was born with the simple insight that being certified organic and/or fair is not necessarily the most pragmatic or sufficient way to tackle the challenges of agricultural practices. The overall goal is to achieve improvement on all levels of the agricultural supply chain along the nine dimensions of sustainable development. The nine dimensions include ecology and the human being (including societal, cultural and economic life).

The Sustainability Flower represents a pragmatic and scalable approach to create transparency and cooperation based on partnerships. The analytical tools help to understand the sustainability performance in an organization as well as supply chain partners. The tools support mutual development with additional focus on the hot spots.

Website: http://www.soilandmorefoundation.org/projects/sustainability-flower

Pilot - 3DPnL™

Pi Foundation, with valuation partners Gist Advisory and Trucost, has developed 3DPnL™ – a comprehensive 3 dimensional (social, environmental, financial) assessment and economic accounting report that identifies, measures, values, and reports on a company's internal and external (supply chain) interactions. The 3DPnL™ forms the initial basis for understanding a business' real profit. The pilot has been conducted with support from C&A Foundation on Chetna Organic Farmers Association, Armstrong Knitting Mills, Armstrong Spinning Mills, Rajalaksmi Cotton Mills and a coalition of 16 brands called Chetco.

Website: http://www.paintstopoverty.com/pages/business-in-3d
GLOSSARY

DEFINITION

ORGANIC AGRICULTURE

Organic Agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic Agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved.


PRINCIPLES OF ORGANIC AGRICULTURE

The Principle of Health - Organic Agriculture should sustain and enhance the health of soil, plant, animal, human and planet as one and indivisible.

The Principle of Ecology - Organic Agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them.

The Principle of Fairness - Organic Agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities.

The Principle of Care - Organic Agriculture should be managed in a precautionary and responsible manner to protect the health and wellbeing of current and future generations and the environment.


COMMONLY USED TERMS & MEASUREMENTS

Terms and Measurements commonly used in the cotton and textile industry

Textile Exchange Farm Hub: http://farmhub.textileexchange.org/trading-post/glossary

ACRONYMS / ABBREVIATIONS

BCI Better Cotton Initiative
CABI Centre for Agriculture and Biosciences International
CmiA Cotton made in Africa
COSA Committee on Sustainability Assessment
FAO United Nations Food & Agriculture Organization
FFS Farmer Field Schools
GHG Greenhouse Gas
GMO Genetically Modified Organisms
GOTS Global Organic Textile Standard
ha Hectares
ICAC International Cotton Advisory Council
ICS Internal Control System
IFOAM International Federation of Organic Agriculture Movements
IIEC International Institute for Environment and Development
IISD International Institute for Sustainable Development
IPM Integrated Pest Management
ISEAL International Social and Environmental Accreditation and Labeling
ITC International Trade Centre
JAS Japanese Agricultural Standards
mt Metric Tons
NGO Non Governmental Organization
NOP National Organic Program (USA)
NPM Non-Pesticide Management
NPOP National Program for Organic Production (India)
OCS Organic Content Standard (Textile Exchange)
PAMDA Participatory Management Development Advisory Network
PG Producer Group
SAFA Sustainability Assessment of Food and Agriculture
SEEP Social, Economic and Environmental Performance of Cotton Production
SHGs Self Help Groups
SOAAN Sustainable Organic Agriculture Action Network
SOM Soil Organic Matter
SSI State of Sustainability Initiatives
T&V Test & Verification
TP Technical Platform for Organics
UNEP United Nations Development Programme
UNEP United Nations Environmental Programme
UNCTAD United Nations Conference on Trade and Development
VSS Voluntary Sustainability Initiatives
WFN Water Footprint Network
WWF World Wide Fund for Nature