

ORGANIC COTTON HELPS TO FEED THE WORLD





THE SOIL ASSOCIATION'S 'HAVE YOU COTTONED ON YET?' BRIEFING¹ HIGHLIGHTED THE 5 KEY BENEFITS OF ORGANIC COTTON. THIS BRIEFING EXPANDS ON ITS BENEFIT TO FOOD SECURITY, ILLUSTRATING THROUGH CASE STUDIES HOW ORGANIC COTTON HELPS FARMERS FEED THEIR FAMILIES.

COVER: MR SURA PUNJA MAKVANA, ORGANIC FAIRTRADE FARMER, INDIA, JANUARY 2012. MAIZE PRODUCED AS PART OF AN ORGANIC COTTON ROTATION SYSTEM. CREDIT: SIMON FERRIGNO

THE NEED FOR CHANGE

Around one in eight people in the world suffer from chronic hunger², 98% of whom live in developing countries². These countries are also home to 99% of the world's cotton farmers³ - indicating a clear need for methods of cotton production that better promote food security.

One in eight people in the world suffer from chronic hunger².

It is well known that the cause of food insecurity is much more complex than simply a lack of availability and that therefore intensifying production is not the answer - alternative solutions are needed.

Consumer awareness of these issues is also growing: A 2013 YouGov poll revealed that whether or not cotton is grown within a farming system that also helps farmers feed their families ranked top in a list of issues on which consumers think retailers should provide more information⁴.



THE ROLE OF ORGANIC

The United Nations recognises the importance of organic farming for food security:

“Research shows that organic agriculture is a good option for food security... and [is] more sustainable in the long term”

United Nations Conference of Trade and Development (UNCTAD)⁵

Organic farming works in harmony with nature rather than against it. Instead of chemical inputs, organic cotton farmers use a range of natural techniques to maintain healthy soils and restrict pests, weeds and diseases. Central to this is the growth of a range of food crops alongside cotton – each contributing specific functions within the organic system (see Figure 1) whilst also promoting food security (see Figure 2).

Contrary to common belief, organic cotton production is economically competitive with its conventional counterpart. A long term study in India recently revealed that, despite lower average yields, net profits of organic cotton systems are in fact similar, or sometimes better, than those of conventional systems due to the significantly reduced input costs⁶.



ORGANIC COTTON ROTATION CROPS PACKAGED FOR SALE, ZAMBIA.
CREDIT: SIMON FERRIGNO

Figure 1

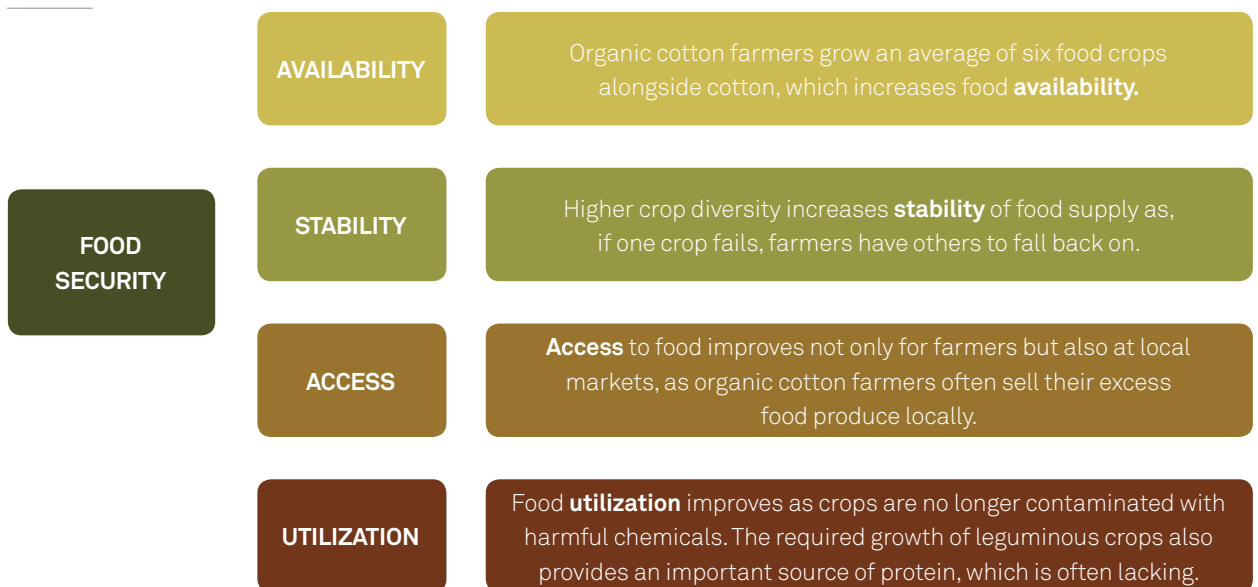
ORGANIC FARMING TECHNIQUES

CROP ROTATION	Frequently changing the crop varieties grown on each field helps to improve soil structure and restrict the build-up of pests, weeds and diseases.
LEGUMES	Nitrogen is essential for soil fertility and leguminous crops have roots systems that contain nodules of nitrogen-fixing bacteria ⁷ . Therefore, effective crop rotations must include legumes , which also happen to be nutritionally beneficial due to their high protein content. Important legumes in agriculture are alfalfa, beans, clover, cowpea, lupines, peanut, soybean, and vetches ⁸ .
INTERCROPPING	Intercropping involves planting alternate rows of different crops. This has multiple benefits, primarily increased productivity due to having slightly different resource use patterns – maximising efficiency. In Zimbabwe, for instance, cotton is often intercropped with cowpea ⁹ , which has the added benefits of deterring pests, fixing nitrogen and providing a protein source.
TRAP CROPPING	Trap crops , usually planted around the border, are grown specifically to attract unwanted pests away from main crops. In south-eastern United States, sorghum, millet, buckwheat and sunflower are recommended for managing Stink Bugs – a common cotton pest in this region ¹⁰ .
COVER CROPS	Planting cover crops when land is not in use protects soil from harsh weather conditions - reducing erosion, evaporation and nutrient loss ¹¹ . Cover crops also reduce weed growth and, if leguminous (which they often are), improve soil fertility.

FOOD SECURITY

The FAO identifies four dimensions of food security; **availability, stability, access and utilization**². These are used in the diagram below to illustrate the association between organic cotton and food security: due to the significantly reduced input costs⁶.

Figure 2



COTTON FARMING AROUND THE WORLD

The nature of cotton production varies enormously around the globe, from levels of irrigation, mechanisation and chemical usage¹² to farm size, the structure of local markets and its economic importance. This section explores these differences by looking at what cotton farming is like in different regions of the world.



ARTWORK BY RAMYA RAJASREE AND RAHUL – STUDENTS OF NACHIAR VIDYALAYAM SCHOOL, TAMIL NADU, INDIA ILLUSTRATES COTTON INTERCROPPED WITH MAIZE. PRODUCED AS PART OF TEXTILE EXCHANGE'S WORLD ENVIRONMENT DAY ART COMPETITION. PROJECT ASSISTED BY APPACHI.

RIPENING AND OPEN ORGANIC COTTON BOLLS, INDIA, JANUARY 2012.
CREDIT: SIMON FERRIGNO

KARNATAKA, INDIA

India is by far the world's largest producer of organic cotton, accounting for 74% of global production¹³. However, this is marginal in relation to India's production of Bt Cotton – a controversial genetically modified (GM) variety. Introduced in 2002, Bt Cotton now accounts for almost 90% of India's total cotton production¹⁴. This is due to its heavy promotion by seed companies, who make it virtually impossible to obtain non-Bt cottonseed¹⁵.

In Karnataka, south-west India, Bt Cotton growth is below average due to nearly 2,000 farmers growing cotton organically¹⁴. Organic farming is less dependent on irrigation due to the higher level of infiltration and retention of rainwater¹⁶. This makes it a much more resilient option than Bt Cotton, particularly in this drought prone region of India.

Conventional cotton is most commonly grown either as a mono-crop or in rotation with wheat. Some conventional farmers also choose to intercrop cotton with food crops such as chilli, groundnut, black gram and green gram¹⁷. However, these are often contaminated by the chemicals used on cotton.

Organic crop rotations vary throughout the state but commonly include red gram, green gram, black gram, lablab, cowpea, castor and groundnut¹⁸. All except castor are nitrogen-fixing plants and therefore contribute to high levels of soil fertility. Households consume the majority of food produce, including castor and groundnut which are used to make oil¹⁴. Any surplus is sold locally.



SOUTH-EASTERN ANATOLIA (SEA), TURKEY

Turkey is the second largest producer of organic cotton in the world, accounting for 11.38% of global production¹⁴. The country differs significantly from others in that it has completely banned GM seed varieties¹⁹. This means that, unusually, farmers do not have to worry about contamination from GM organisms and that non-GM seeds are readily available.

Turkey's organic cotton production began in the west but has since shifted to the south-eastern Anatolia region, which now accounts for two thirds of production¹⁴. This is largely due to the 'South-eastern Anatolia Project' (GAP); an integrated sustainable development project that is building multiple dams in an attempt to double Turkey's irrigated farmland²⁰. Due to its dry climate, the vast majority of cotton production in Turkey is irrigation dependent²¹.



There is increasing use of machinery to harvest cotton as labour costs rise, reducing the economic efficiency of hand picking²².

Conventional cotton farms in SEA have traditionally grown cotton as a mono-crop although, increasingly, farmers are choosing to double-crop cotton with wheat, growing cotton in the summer and wheat in the winter²². This practice is partly to reduce the build-up of pests and partly to generate additional income²³.

Organic farmers include additional crops in their rotation systems, most commonly chickpea and lentil but also sunflower, soybean and vetches²⁴.

TURKISH ORGANIC COTTON FARMERS. CREDIT: EGEDENIZ
SUNFLOWER CROPS GROWN BY GADERAO AS PART OF HIS ORGANIC COTTON
ROTATION SYSTEM. CREDIT: DR. RASHDA ZAFAR, CHETNA ORGANIC

XINJIANG, CHINA

China's production of organic cotton, though globally significant at 5.84% of worldwide production¹⁴, is negligible in comparison to its production of conventional cotton, which is almost 100 times greater and accounts for over a quarter of conventional global cotton production^{14, 25}.

The majority of conventional cotton produced in China comes from Xinjiang province, north-western China¹⁴, which uses large-scale, highly mechanised methods of production²⁶. This province alone accounts for half of the country's total production²⁷, with other provinces consisting predominantly of small-scale farms²⁷.

The story is similar for organic production, the majority of which also stems from large-scale farms in Xinjiang²⁸. On these farms, it is common for organic cotton to be rotated with corn, although the frequency of rotation is generally determined by the current market price of each commodity²⁹.

Conventional cotton in Xinjiang is generally grown either as a mono-crop or as a double-crop in rotation with wheat²², allowing farmers to profit from two harvests in one season. The climate in Xinjiang is arid and so cotton production is entirely dependent on irrigation³³.

There has been relatively little interest from small-scale farmers in organic cotton. This is mainly due to farmers in China receiving government subsidies, providing less incentive to take the perceived 'risk' of converting to organic³⁰. However, these subsidies are not guaranteed long-term and conventional farmers remain at risk from the health and food security issues associated with conventional production.



STUDENT OF CHILDREN'S PALACE, GUANGZHOU, DISPLAYING ARTWORK
ILLUSTRATING FOOD CROPS GROWN ALONGSIDE COTTON.
PRODUCED AS PART OF TEXTILE EXCHANGE'S WORLD ENVIRONMENT DAY ART
COMPETITION. PROJECT ASSISTED BY MECILLA.

TEXAS, UNITED STATES

Conventional cotton farming in Texas is characterised by large-scale monocultures, heavy use of agrochemicals and the widespread growth of Bt Cotton. However, the state is also home to 90% of the US' organic cotton output, which accounts for 1.14% of

global production¹⁴ - making it the 5th largest organic cotton producing country. Organic cotton is by no means a new trend in Texas - the average organic cotton farmer has been certified for 15 years³¹. Farm sizes are considerably larger than the majority of those in developing countries, averaging 180 hectares³⁵.

Most farms are too large to harvest by hand and so mechanical pickers are almost always used¹³.

The majority of organic cotton in Texas is rain-fed¹⁴ and so when a severe drought hit in 2011, production dropped by 45%. However, the US offers substantial

federal subsidies that provide a safety net for farmers. These subsidies are highly controversial as they artificially depress global market prices, reducing the ability of unsubsidized producers in developing countries to fairly compete on the global marketplace³².

The most common crops grown in rotation with organic cotton in Texas are wheat, rye and peanut³³ - the latter of which is important for fixing nitrogen in the soil. The majority of these food crops are sold locally or exported, receiving a premium price for being organic - a benefit that cotton farmers in developing countries rarely experience.



US ORGANIC COTTON - ILLUSTRATES THE HARSH CONDITIONS OF THE HIGH PLAINS: ARID, WHERE COTTON IS THE ONLY SUITABLE CROP. CREDIT: SIMON FERRIGNO
ORGANIC PEANUT CROPS IN TEXAS - ROTATED WITH COTTON. CREDIT: KELLY PEPPER

BENIN, WEST AFRICA

Cotton is Benin's most important commodity, accounting for 64% of the country's exports³⁴. It is therefore of vital importance to rural welfare and food security.

As in much of Africa, cotton in Benin is grown almost exclusively by small-scale farmers³⁵. Average farm size is estimated to be 2.5 hectares³⁶ and cotton is generally harvested by hand. For both organic and non-organic farmers in Benin, cotton is usually grown as a cash crop in rotation with subsistence food crops. However, in recent years, the costs of artificial inputs have risen to such an extent that many conventional farmers have resorted to planting a higher ratio of cotton to food. This is in an attempt to cover the rising cost of agrochemicals³⁷, since cotton is more lucrative than food produce. This trend has significantly reduced local food availability in conventional cotton growing areas to the extent that women are forced to travel much further afield to purchase food⁴².

Such situations, in addition to the many health risks that accompany the heavy use of agrochemicals, spurred local NGOs to push promotion of organic production methods in 1996. Consequently, production of organic cotton rose from 5mt in 1997³⁶ to 328mt in 2012¹⁴ - making Benin the 11th largest organic cotton producer in the world, despite its comparatively small size.

As part of their crop rotation systems, organic cotton farmers in Benin typically grow a combination of the following in addition to cotton: maize, yam, cassava, cowpea, peanut, cashew, soybean and pigeon pea³⁸. Cashew nuts are generally exported since they are high value and not part of the local diet. Other food crops are consumed by the household, with any surplus sold at local markets⁴⁴.



AN ORGANIC FARMER WITH HIS MAIN TOOL, THE HAND HOE, BENIN.
UNGINNED ORGANIC COTTON AFTER HARVEST IN BENIN.
CREDIT: SIMON FERRIGNO

The following section introduces three organic cotton farmers and summarises their experiences of converting to organic.

CASE STUDY

LI FANFAN, CHINA

Li Fanfan is 74 years old and lives with her husband and daughter. She runs a small cotton farm in ChenCun village in the south-western tip of ShanXi province, northern China. Li Fanfan only began cotton farming in 2005 and initially had little choice but to base her practises on the advice of pesticide sellers, who advocated the use of unnecessarily large quantities of pesticides. The frequent spraying and irrigation required was physically demanding for Li Fanfan and yet the results were meagre. Therefore, when a local Farmer's Association recommended she convert to organic production, she was keen to try it. She was taught the necessary techniques to manage cotton without chemicals and found it much easier, particularly since organic cotton requires less irrigation.



Li Fanfan practices both crop rotation and intercropping. She plants majority cotton for 4 years and then changes to majority wheat for at least one year. These are intercropped with a wide range of vegetables and pulses, which make up approximately 15% of her growing area. These typically include pepper, cabbage, turnip, onion, green bean and sweet potato. Previously, this technique of intercropping cotton with food crops was not an option for Li Fanfan because the food would have become contaminated with harmful chemicals.



'I [now] have extra organic vegetables to eat without worrying about the pesticides [which] harm your health'

Li Fanfan

"I do a lot of intercropping such as pepper, cabbage, turnip, onion, green bean, sweet potato and some other vegetables"

Li Fanfan



Now, however, she enjoys a large and readily available supply of fresh, organic vegetables and pulses. Previously, she would have had to purchase these at local markets, which left her vulnerable to market price spikes and availability issues. Any surplus of her food crops are sold to the Farmer's Association, providing additional income.

Since conversion to organic, Li Fanfan claims that her yields have almost doubled as she now knows the most effective, natural ways to manage her crops. Yields are also more reliable since they are less dependent on rainfall/ irrigation. Li Fanfan is able to get a price premium for her organic cotton and, together with reduced outgoings from not having to purchase chemical inputs, her profits are now considerably higher, further improving her family's food security and overall quality of life.

LI FANFAN, CHINA CASE STUDY PARTICIPANT, SITTING OUTSIDE HER HOME.
LANDSCAPE OF YONGJI – AREA IN WHICH LI FANFAN'S FARM IS LOCATED.
LI FANFAN'S HOME
CREDIT: MECILLA

CASE STUDY

ATHRAM GADERAO, INDIA

Athram Gaderao is a cotton farmer in Pamulawada, a village in the Adilabad District of Andhra Pradesh. Gaderao has seven children and manages his 13 acre farm with his wife, Kosu Bai.

For generations Gaderao's family had farmed organically, but a government scheme promoting the use of agrochemicals encouraged Gaderao to convert to conventional methods - based on advice that this would improve his yields and therefore profit. However, Gaderao soon found that the high input costs and monoculture nature of conventional farming meant that net profit actually declined and food supply became unreliable. He therefore decided to revert to organic farming in 2007, when local NGO Chetna Organic began an organic cotton programme. Gaderao's farm is now a multi cropping system once again, in which approximately half of his land produces food crops.

"All farmers with a surplus sell their produce in the local market. The availability and diversity of vegetables has increased"
Athram Gaderao

This has enabled his family to become almost entirely self-sufficient. Some crops are grown purely for household consumption, including potato, ridge gourd, fenugreek, sesame, sunflower (for oil), sorghum, cowpea, black gram and green gram. Other crops produce a surplus that is sold at local markets. These include pigeon pea, castor, soybean, tomato, eggplant, common bean, wheat, chickpea, okra and onion. Gaderao also has 3 pairs of bullocks, 10 cows and 3 calves, which provide additional nutrition for the family as well as manure for the fields.



Since conversion to organic, Gaderao's cotton yields have increased by approximately 50% and it is now of better quality. These factors, together with the higher market price of organic cotton and the lower input costs of organic farming, have resulted in dramatic improvements to Gaderao's financial situation. His net profits have more than doubled, meaning he is now able to save, rather than borrow, money. The fact that he now grows and sells a much wider variety of crops has also improved his financial stability, since his income source is more diverse.



Over the last decade, all cotton farms in Gaderao's village have converted to organic production. It is estimated that 170 out of the 334 acres of land held by organic cotton farmers in the village produces food, with farmers growing on average of 12 food crops in addition to cotton. Approximately 60% of this food produce is sold to nearby markets, significantly improving local food security.

Gaderao has no hesitation in recommending organic cotton farming to others:

'All farmers in the country [should] get back to natural practices that our forefathers used to follow - no chemicals, loans and no health problems'
Athram Gaderao



ANTHRAM GADERAO, INDIA CASE STUDY PARTICIPANT.
CREDIT: DR. RASHDA ZAFAR, CHETNA ORGANIC SUNFLOWER CROPS GROWN BY GADERAO AS PART OF HIS ORGANIC COTTON ROTATION SYSTEM. CREDIT - DR. RASHDA ZAFAR, CHETNA ORGANIC. KOSU BAI, ANTHRAM GADERAO'S WIFE

CASE STUDY

BARNABAS PAUL GUERRA, BENIN



Barnabas is an organic cotton farmer in the Kassakou district of Kandi, north-east Benin. He chose to convert to organic methods of cotton production in 2002 with the hope of improving his family's health and avoiding the financial problems that he experienced when farming conventionally. Such problems arose due to the rising cost of agrochemicals and the expensive healthcare bills that Barnabas frequently faced as a result of his exposure to these harmful chemicals.

Conversion to organic has improved Barnabas' financial situation to the extent that he has been able to make improvements to the family home as well as send his children to school. It has also led to a significantly improved diet for his family.

Before conversion to organic, Barnabas grew maize, sorghum and cassava in addition to cotton. However, these were laden with chemicals and insufficient to feed his large family. As part of his organic farm system, he continues to grow these crops but with the addition of yam, peanut, sweet potato and black-eyed pea. This has provided a much more varied, chemical free and nutritious diet, particularly



thanks to the protein rich peanuts and black-eyed peas. His improved net profit means that he can also afford to purchase additional food items when necessary.

At local markets, Barnabas says that there is now a much wider variety of produce on sale as nearby farms have also converted to organic production and sell their surplus food crops locally. Barnabas estimates that the average organic cotton farmer in the area grows 8 different food crops alongside cotton, producing approximately 10 tonnes of food per year, per farmer. As a result, the region now produces enough food to sustain itself. Barnabas describes how this has eliminated price inflation at local markets since they are no longer dependent on food imports.

"With conventional cotton, I used to have no money left for me or my family once I had paid back my debt to agrochemical suppliers. I also used to go to the hospital every other week when I was spraying pesticides. Now I get to keep all of my profits as I no longer use pesticides"

Barnabas Paul Guerra

BARNABAS PAUL GUERRA, BENIN CASE STUDY PARTICIPANT. MAIZE PRODUCED AS PART OF AN ORGANIC COTTON ROTATION SYSTEM. CREDIT: SIMON FERRIGNO

ORGANIC COTTON FOR IMPROVED FOOD SECURITY

These case studies have illustrated the multiple ways in which conversion to organic can improve the food security of cotton farmers.

Central to this is the requirement in organic systems to rotate and intersperse organic cotton with food crops, providing farming families and their communities with a more stable, accessible, abundant and diverse food supply.

In addition, despite possible yield reductions, income from organic farming is more stable due to greater crop diversity and net profits are often higher, or at least similar, due to significantly reduced input costs⁷. Along with reduced medical bills and food purchases, organic farmers are able to save and invest their income for a more secure future, rather than become trapped in debt cycles as has been the unfortunate experience of millions of conventional cotton farmers.

The findings of this paper mirror those of research by the UN, which revealed that, in terms of food security, 'organic agriculture...is equal or better than most conventional systems'⁶.

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Acknowledgements: Sincere thanks to Sarah Compson of **Soil Association** for her guidance and support and to **PAN UK, Mecilla** and **Chetna Organic** for their assistance in the collection of case study information. Thanks also to Liesl Truscott of **Textile Exchange**, Martin Ma of **Solidaridad**, Kelly Pepper of **Texas Organic Cotton Marketing Cooperative**, Murat Candemir of **UNDP** and Simon Ferrigno of **Sustainable & Organic Farm Systems** for their valuable contributions.

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Soil Association

**HAVE YOU
COTTONED ON YET?**

The organic cotton initiative

The Cottoned On campaign was launched by the Soil Association and the Global Organic Textile Standard (GOTS), the leading standard for organic textile processing.

Consumers, manufacturers, brands and NGOs can sign up here: www.cottonedon.org

The Soil Association was founded in 1946 by farmers, scientists, doctors and nutritionists to promote the connection between the health of the soil, food, animals, people and the environment. Today the Soil Association is the UK's leading membership charity campaigning for healthy, humane and sustainable food, farming and land use. To find out more visit www.soilassociation.org