Cotton, the largest revenue-generating non-food crop in the world, has a large and dangerous environmental footprint. It is responsible for 10 percent of all water used for agriculture and 25 percent of all insecticides. Each year, the harmful environmental by-products of conventional cotton affect millions of people worldwide. Shifting to organic practices could significantly reduce the environmental and social impact of cotton, but conversion brings many challenges to farmers, manufacturers, and retailers. In order to gain competitive advantage, the industry must look toward sustainable practices throughout the supply chain.

These issues are examined in “Trends in Organic, Transitional, and Sustainable Cotton,” a white paper to be published this spring by the Socially and Environmentally Responsible Supply Chains Program. The product of a research project and study trip that took place as part of the Stanford-Tsinghua Exchange Program in 2006-07, the paper was written by Diana Rothschild and Bilal Musharraf (both GSB MBA ’07), and Samuel Lu and Ning Sung (both Tsinghua University School of Economics and Management ’07). The team interviewed retail experts, supply chain experts, organic and sustainable fiber non-governmental organizations, and cotton producers in the United States, China, and Pakistan.

Three of the 10 chemicals banned by the U.S. Food and Drug Administration for use on agricultural food products are still used to grow conventional cotton. These chemicals can eventually find their way to the food supply through cottonseed oil (which is found in 10–15 percent of all processed foods) and cottonseed cakes (which are fed to cows). Additionally, aerial spraying has a severe effect on wildlife and the overall health of cotton-growing communities.

Despite greater awareness about the dangers of conventional cotton, many farmers are reluctant to convert to organic. A three-year transitional phase must be endured, during which the soil must be free of added chemicals. The cotton grown during this phase, called “transitional cotton,” is significantly lower in yield due to the soil depletion from the chemicals used during conventional cotton production. Simultaneously, transitional cotton cannot fetch premium organic prices, so the farmer is put in extreme financial risk.

Even after the transitional phase, organic cotton continues to be an expensive and risky crop to produce. It must be grown from seeds deemed non-GMO (genetically modified organisms), which are difficult to source. Additionally, labor costs tend to be high due to the need to hand-weed the fields, and organic crops are more susceptible to bad weather than conventional crops.
But demand for organic cotton is growing: Sales in the U.S. increased about 55 percent a year between 2001 and 2005, and organic cotton products can fetch prices 10 to 30 percent higher than conventional products. Even so, some farmers are still reluctant to commit to the three-year conversion process without a guaranteed price. Buyers have attempted to alleviate some of the risks by guaranteeing a set amount of purchases. For example, Wal-Mart has been employing strategies such as contracting in advance with farmers at a guaranteed price and purchasing transitional cotton at the same price as organic. This helps the farmers get bank loans and insurance policies at rates similar to those of conventional farmers.

As companies and NGOs find new ways to decrease risks to farmers and increase organic cotton production, manufacturers and retailers have taken the idea of sustainable sourcing to the rest of their supply chain. For example, one retailer’s sourcing department now works with its product development group to create products around raw cotton “as-is,” reducing the need for dyes and additional processing, thus saving time, money, and the environment. In another positive spin-off, the crop-rotation practice that is necessary in farming organic cotton has led Wal-Mart to a new source for organic foods.

As the worldwide supply and demand for organic cotton and other agricultural products changes, each step in the supply chain must reorient in order to make sustainability a reality. Eventually, as awareness and education efforts continue, sustainable supply chain practices can become an important factor in driving consumer purchasing decisions.

The Socially and Environmentally Responsible (SER) Supply Chains Program is an initiative of the Stanford Global Supply Chain Management Forum. To download the full paper and learn more about the SER Supply Chains Program, visit www.gsb.stanford.edu/scforum.

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