



Photos by Paige Green

Understanding Sustainable Textile Investment Opportunities: Market Research Background



FIBERSHED

Local Fiber, Local Dye, Local Labor

Background

To attract new investment, there is a need for better market research to show the current and potential size of the market for sustainable textiles and the potential return on investment – both financial and environmental/social – for impact investors of many types, as well as for farmers who want to consider whether to shift their business operations to incorporate fiber production.

Goal

The goal of this project is to review and analyze conventional market research and selected interviews with investors and industry experts to compile high-impact information that would increase regenerative textile business funding opportunities and identify gaps and needed further research.

Sources

The following key sources informed this report:

- “Pivot Eco_Fiber_Market_2014-2025”, Grand View Research, Global Data Sheets, Microsoft compatible Excel workbook with 23 tabs of international eco fiber market projection with additional detail on US, sustainable fabric, organic cotton and wool markets.
- Eco Fiber Analysis and Segmentation Report 2018, Grand View Research, the 124 page report is a comprehensive source of international eco-fiber consumption.
- “Global Apparel and Non-Apparel Manufacturing Market Value Forecast, Dr. Sheng Lu, Market Line, Study, Department of Fashion and Apparel Studies, University of Delaware.
- “World Fashion Market” Global Fashion Industry Trade Association, www.FashionUnited.info © FashionUnited 2019
- “US Textiles By the Numbers” National Council of Textile Organizations, P-NCTO-By-The-Numbers-2018
- “Corporate Fiber & Materials Benchmark, Insights, Action, Impact, SDG Insights” Textile Exchange, World Benchmarking Alliance, Iseal Alliance (2019)
- “Organic Cotton Market Report 2018” Textile Exchange (2018)
- “2025 Sustainable Cotton Challenge.” Textile Exchange (2018)
- “Cotton and the Environment” Final July 2018, Organic Trade Association
- “The Impact of Tariff Preference Levels on US Textile and Apparel.” Mahnaz Khan (September 2018)
- “Safer Chemistry Innovation in the Textile and Apparel Industry.” Fashion for Good & Safer Made. (2018)
- “Textiles and Apparel Sustainability Update” Textiles Intelligence (2018)

Interviews

- Kathryn Hilderbrand, Owner, Good Clothing Company
- Eric Henry, TS Designs, Dirt to Shirt - 600 miles- Cotton of The Carolinas
- La Rhea Pepper, organic cotton farmer and Managing Director of Textile Exchange
- Timo Rissanen, Associate Dean, School of Constructed Environments at Parsons School of Design

Terms

To understand the data from these reports and market implications, it is important to clearly define the terms used. Drawing on the reports above, the use of the terms, “textile”, “fabric”, and “fiber” are defined as follows:

“Textiles” means a product woven or processed into some kind of covering/fabric and ready for use or ready to be made part of an end use product.

“Fabric” is used for apparel, industrial, medical and other products, is a subset of the textile market.

“Fiber” means raw or lightly refined raw material, such a plant, that must be processed before end use. Fibers are also derived from fossil petroleum and plant cellulose to make polymer fibers.

“Eco fiber” includes:

- Organic eco fiber are grown free of pesticides and artificial fertilizers.
- Regenerated fibers are chemical compounds that come from plant protein and cellulose.
- Recycled eco fibers are made from post-consumer goods such as plastic bottles and/or shredded fibers (ie. polyester, cotton) from used clothing and other textile waste.
- Natural eco fibers include plant, animal and mineral sources that are often eco-friendly — grown using less water and chemicals — but do not meet organic standards.¹

“Sustainable fabric” is made from plant and animal based fibers conventionally or organically raised (raised with and without pesticides and non-organic inputs).

Navigating this economic analysis

Fiber can be used to make fabric or used for other industrial purposes such as building components, soil amendment or animal feed. Farmed or ranch raised fiber, that are destined for some form of textile product, are most often processed into fabric which is then most often manufactured into clothing.

The global textile market includes a much broader set of production and consumption activity, such as car upholstery or medical devices. In this analysis the textile activity of most interest is the consumption of fiber for the use in apparel. Also in this analysis, the size and growth rate of fiber markets are sometimes compared with the size and growth of fabric markets and the broad category of the textile market to provide perspective about the momentum and scale of those markets close in proximity to the farm and ranch fiber producer.

¹ “Pivot Eco_Fiber_Market_2014-2025”, Global Data Sheets, Grand View Research, “Eco Fiber Analysis and Segmentation Report 2018.” (2018), p14, 47

Introduction to United States and World Eco Fiber Consumption

This analysis begins by displaying the market figures for the textile apparel consumption. Apparel consumption is the largest application for eco-fiber and the table below introduces the scale of the United States' and global market.

The global textile apparel (clothing) industry consumed 46% of all eco fibers in 2017. The Grand View Research report comments that “Fashion is expected to remain one of the most lucrative application segments in light of product innovation in terms of new apparels and clothing accessories.”²

| Eco Fiber Consumption* | | |
|------------------------|----------|-------------|
| Textile Apparel | US (\$B) | World (\$B) |
| 2017 | \$3.7 | \$15.8 |
| 2025 | \$7.3 | \$33.6 |
| CAGR | 9% | 10% |

*3

The Eco Fiber Consumption table above shows the amount of eco fiber consumed for use in the making of apparel. The United States apparel market consumed \$3.7 billion of eco fibers in 2017 and total global consumption for use in apparel was estimated to be \$15.8 billion in 2017. Growth estimates show eco fiber textile apparel consumption more than doubling by 2025. Global consumption of all eco fiber applications, including: textile/apparel, industrial, medical and household furnishings, totaled \$34.2 billion in 2017 and is forecast to grow to \$69 billion by 2025. Textile/apparel consumption is expected to maintain a 50% share of all eco fiber consumption.⁴

This analysis will touch upon the multiple hundred billion dollar markets of which eco fibers are a part. What becomes evident from this analysis is that United States is currently not participating in the multi-billion dollar sustainable fiber and fabric industry in a significant way. This analysis also shows that United States production (vs. consumption) of fiber and finished goods is dramatically smaller than domestic consumption. So while Americans are fueling the 9-10% annual growth of billion dollar markets in eco-fiber derived sustainable finished goods, the United States produces only a small fraction of those products.

² “Pivot Eco_Fiber_Market_2014-2025”, Global Data Sheets, Grand View Research, “Eco Fiber Analysis and Segmentation Report 2018.” (2018), p22

³ Ibid, p 54, 69

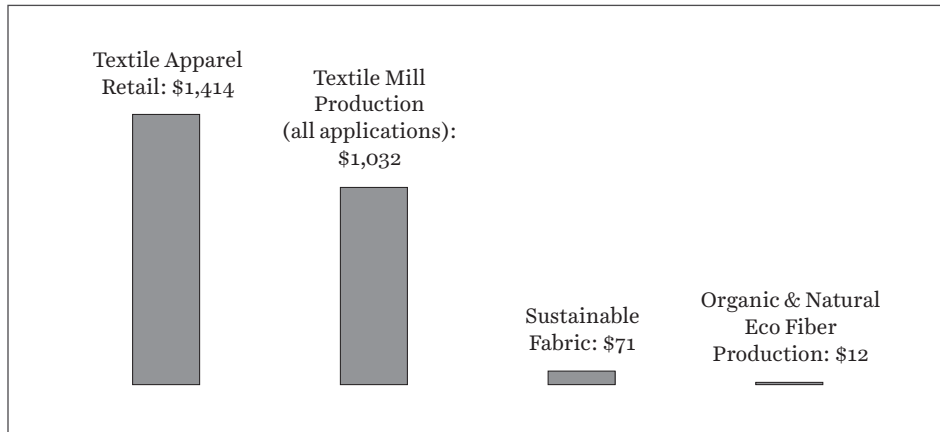
⁴ Ibid p 53-57

The Scale of Textile Production and Consumption

To provide perspective it is useful to compare the scale of the global eco fiber market with the global textile market. The global market for all textile mill production was \$1 trillion in 2017.^{5, 6, 7, 8}

The global market for sustainable fabric was \$71 billion in 2017 about six times the \$12 billion global market for organic eco fiber (\$4.3 billion) and natural fiber(\$7.7 billion) from which sustainable fabrics are made.⁹ The ratio of fiber to fabric is a rough estimate of the significant amount of value, 6 times, that fabric brings to fiber.

Figure 1: 2017 Textile Global Scale (\$ Billions)



The above chart shows the size of global textile apparel and mill production markets next to the sustainable fabric and organic/natural fiber markets. Sustainable fabric is shown here to be less than 5.0% of the value of the global apparel textile market. The textile apparel market makes use of most of the world’s organic and natural fiber production, produced by farms and ranches around the world.

The scale and momentum of the textile industry does contain opportunity and caution. Only deliberate sustainable investment can create a profitable path away from the global textile industry’s current trajectory to produce 26 percent of global carbon emissions by 2050 (World Resources Institute).¹⁰

⁵ “Pivot Eco_Fiber_Market_2014-2025”, Global Data Sheets, Grand View Research, “Eco Fiber Analysis and Segmentation Report 2018.” (2018), p24

⁶ “Global Apparel and Non-Apparel Manufacturing Market Value Forecast, Dr. Sheng Lu, Associate Professor, Market Line, Study, <https://shenglufashion.com/2015/08/09/market-size-of-the-global-textile-and-apparel-industry-2014-to-2018/>. Department of Fashion and Apparel Studies, University of Delaware.

⁷ “World Fashion Market” Global Fashion Industry Trade Association, <https://fashionunited.com/global-fashion-industry-statistics/>. FashionUnited Group | www.FashionUnited.info © FashionUnited 2019

⁸ “US Textiles By the Numbers” National Council of Textile Organizations, P-NCTO-By-The-Numbers-2018_Post-Print

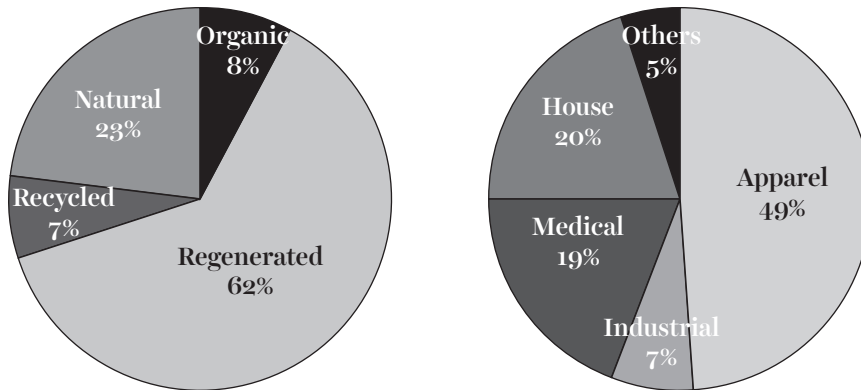
⁹ “Pivot Eco_Fiber_Market_2014-2025”, Global Data Sheets, Grand View Research, “Eco Fiber Analysis and Segmentation Report 2018.” (2018), p 103-104

¹⁰ “Corporate Fiber & Materials Benchmark, Insights, Action, Impact, SDG Insights” Textile Exchange, World Benchmarking Alliance, Iseal Alliance p 4.

US Sustainable Fiber and Fabric Consumption

Not all eco-fiber is equally sustainable. As was described in the “sources and terms” in the beginning of this analysis there are four different eco fibers organic, regenerated, recycled and natural. The US market share of each type of eco-fiber is shown in the figure below. Also shown below are the US share of eco fiber by textile application: apparel, industrial, medical, household and other.

Figure 2: 2017 United States Eco Fiber Market Share by Type and Application



The US eco fiber market was \$7.7 billion in 2017 and is estimated to grow to \$14.3 billion by 2025 at 8% CAGR.¹¹ The relative share by type and application are estimated to change only slightly between 2017 and 2025. Regenerated eco fiber is the largest segment and consists of reclaiming plastic and processing (regenerating) polymers from wood/plant based source materials. Some evidence is provided below concerning the ecological benefit of organic and natural based fiber over recycled and regenerated sourced fibers.

¹¹ “Pivot Eco_Fiber_Market_2014-2025”, Global Data Sheets, Grand View Research, “Eco Fiber Analysis and Segmentation Report 2018.” (2018), p 67

The graph below shows consumption of the size of sustainable fabric, and the main components of sustainable fabric (cotton, wool and natural fibers) in the United States.

Figure 3: 2017 US Sustainable Textiles (\$ Billions)

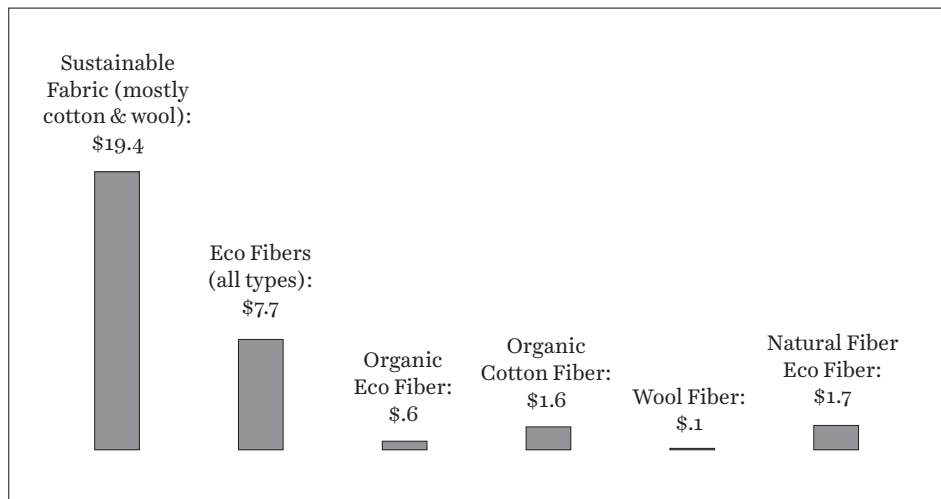


Figure 3: The value of all sustainable fabrics (mostly made of cotton and wool) purchased in the US was \$19 billion in 2017 (11% CAGR),¹² followed by the market for all eco fiber purchased in the US, \$7.7 billion (8% CAGR),¹³ organic eco-fiber \$0.6 billion (11% CAGR)¹⁴ (*excessive water usage disqualifies a good portion of Organic Trade Association defined organic cotton¹⁵ from being counted as eco-fiber according to Grand View Research*), organic cotton \$1.6 billion,¹⁶ wool \$0.1 billion (6% CAGR)¹⁷ and natural fibers \$1.8 billion (8% CAGR).¹⁸ Growth rates provided above are supplied by Grand View Research for the period from 2017 until 2025.

¹² "Pivot Eco_Fiber_Market_2014-2025", Global Data Sheets, Grand View Research, "Eco Fiber Analysis and Segmentation Report 2018." (2018), p 103

¹³ Ibid. p 67

¹⁴ Ibid. p 68

¹⁵ "Preferred Fiber & Materials Market Report 2018", Textile Exchange: Liesl Truscott (Lead), Evonne Tan, Sophia Opperskalski, p 11

¹⁶ Pivot Eco_Fiber_Market_2014-2025", Global Data Sheets, Grand View Research, "Eco Fiber Analysis and Segmentation Report 2018." (2018), p 105

¹⁷ Pivot Eco_Fiber_Market_2014-2025", Global Data Sheets, Grand View Research, "Eco Fiber Analysis and Segmentation Report 2018." (2018), p 105

¹⁸ Ibid. p 68

Analysis

There is a great disparity between the small amount of sustainable production of fiber and fabric and the large market for textiles. In the United States textile industry this imbalance has a great deal of impact on the economic and biological health of our country. The United States organic cotton fiber production was 4.9 kilotons, \$18 million¹⁹ in 2017, just 1% of the estimated 468 Kilotons, \$1.6 billion of organic cotton consumed in the United States (shown in figure 2).²⁰

The US textile industry is dominated by GMO cotton production and finished textile goods consumption. On the production side, with the aid of millions of gallons of pesticides and petroleum based fertilizers, the US produces some of the highest quality, lower priced cotton in the world.^{21, 22} The US is the third largest cotton producer in the world (3553 kilotons in 2017). Only a small portion of conventional cotton grown in the United States is processed in the country. The US relies on neighbors like Mexico and highly unregulated manufacturing markets of Morocco and Honduras (who comply with US tariff law in order to gain access to US markets for finished goods that are re-entered tariff free by US brands).²³ Cotton tariffs combined with India's and China's decades old investment in higher volume lower cost textile processing leaves little room for products made here.

La Rhea Pepper, organic cotton farmer and Managing Director of Textile Exchange, tells us that even with all that chemical assistance cotton farmers are at a market disadvantage without local fiber processing. "The perception overseas is that there are a lot of subsidies for US farmers. The only remaining US government subsidy is for the multi-peril insurance program that benefits farmers with huge drought or hurricane losses. Farmers are pushed to make their cotton cheaper because we have lost our manufacturing. It is as if the textile industry does everything it can to avoid processing in the US and will only do so as a last resort."

The regenerated and recycled eco fiber markets are together 3 times larger than the organic eco fiber market in every region of the globe. Timo Rissanen, Assistant Dean at Parson School of Design, had this to say about the inclusion of recycled plastics in the discussion of eco fiber: "Recycled poly gets discussed as a miracle in the circular economy, but a lot of that infrastructure doesn't cater to end life analysis. At end of life, these fabrics are incinerated or go to landfill."

Most US fiber revenue currently comes from the use of synthetics, be they sourced from petroleum, recycled petroleum or plant/microbe/fungi. This technology-based fiber emphasis further disconnects US textile manufacturing from land based fiber production. Bolt Threads (yeast protein) and MycoWorks (mycelium) have received multiple rounds of venture capital in the San Francisco Bay Area. Much of their biotechnology textile manufacturing takes soil right out of the equation.^{24, 25, 26}

¹⁹ "Organic Cotton Market Report 2018" Textile Exchange (2018), p 66 -67.

²⁰ "Pivot Eco_Fiber_Market_2014-2025", Global Data Sheets, Grand View Research, "Eco Fiber Analysis and Segmentation Report 2018." (2018), p 105

²¹ "2025 Sustainable Cotton Challenge." Textile Exchange (2018), p 13-14.

²² Cotton and the Environment Final July 2018, Organic Trade Association, p 1

²³ "The Impact of Tariff Preference Levels on US Textile and Apparel." Mahnaz Khan (2018). all

²⁴ "Safer Chemistry Innovation in the Textile and Apparel Industry." Fashion for Good & Safer Made. (2018) all

²⁵ "Textiles and Apparel Sustainability Update" Textiles Intelligence 2018." (2018) all

²⁶ "Pivot Eco_Fiber_Market_2014-2025", Global Data Sheets, Grand View Research, "Eco Fiber Analysis and Segmentation Report 2018." (2018), p 48

If international eco-fiber sales are an indication of fiber processing capability, then overseas markets for sustainable fibers processing are well ahead of those in the United States. Advanced as international processing capabilities might be, US organic fiber pricing appears to remain in parity compared with other countries. Extrapolated from Grand View Research 2017 figures, organic eco fiber is selling in the US for about \$2.48/Kg, Europe \$3.78/Kg and China at \$3.18/Kg. US organic fiber price parity could mean that the distance between producing value added fabric has not been created by an economic barrier as much as by a lack of processing capacity. The raw material to supply sustainable fabric processing may not be more expensive to grow in the US, it might be cheaper.

There is much that remains to be understood about global pricing numbers, such as what is the amount of cotton, hemp, bamboo or flax that is contained in each global region's organic eco fiber average price? What the data shows here is that global eco fiber prices are comparable to the US organic cotton price of about \$3.40/Kg.²⁷

The US textile industry has often reported about producer price anxiety, that international milling grade fiber pricing is too low for US farmers and ranchers to compete.²⁸ The data here does not seem to support this anxiety. Price becomes a barrier when you add logistics of shipping to a distant processor, when you don't have local processing sustainability, instead of being seen as supporting a price premium, is seen as a business barrier.

Vertical Integration and Financing

Clothing manufacturing: cut and sew is many steps downstream from farming and ranching fiber. Some clothing manufacturing is still being done in the US and "Made in USA" has created value. Combine "Made in USA" with "US sourced sustainable fabric" and you may have additional price leverage. The perception is that there is so much value in clothing manufacturing that sustainable fibershed businesses (farmers, ranchers, crafters) often count on either being able to sell into the supply chain of successful cut and sew operators or becoming a cut and sew operator themselves. Whether or not "building-in" apparel manufacturing into fiber and fabric production is good business, or not, is beyond the scope of this analysis. For the time being US made apparel continues largely without a source of US fabric or fiber.

Financing: established clothing manufacturers and other fibershed participants, who show year over year profitability, should have access to favorable financial terms for operations, growth and acquisition. The reality is that banks, and other standard lenders, don't typically do business with smaller enterprises because their debt requirements don't meet lending thresholds. Kathryn Hildebrand, CEO and founder of Good Clothing Co. a cut and sew facility in Massachusetts, is a real life example and has had to accept a higher interest loan from a local financier because local banks won't lend her the money. Can foundations figure out a way to fund rotating lines of credit for profitable businesses? How many sustainable farm or fashion companies are paying too much for their money? This seems to be a simple fix to stabilize businesses that are processing sustainable fiber either as growers or cut and sewers.

²⁷ Ibid, p 105

²⁸ "Organic Cotton Market Report 2018" Textile Exchange (2018) p 17-19.

CONCLUSION

US Fiber and Fabric Production

While the US fiber processing infrastructure has been vacated, the entire global industry is having to rebuild around automation and sustainable practices.^{29,30} There is a new green field opportunity to re-invest in US fiber processing.

US fiber to fabric processing investment should be paired with industry experience and careful planning of operational fundamentals.

It may take more than just one fibershed and likely more than the fibershed community to establish the promise of domestic sustainable fiber processing.

The US demand for sustainable fiber is over 100 times larger than what is currently produced in the United States (organic cotton 468 kiloton demanded vs 4.9 kiloton supplied in the US).^{31,32}

Eco fiber production is a nascent \$33 billion dollar market growing at 10% annually and there is ample opportunity for US production of natural and organic fiber to grow with the industry. The missing ingredient to larger revenues for the sustainable farmers and ranchers is domestic fiber processing, fiber into yarn, yarn into fabric.

²⁹ “Safer Chemistry Innovation in the Textile and Apparel Industry.” Fashion for Good & Safer Made. (2018) all

³⁰ “Textiles and apparel sustainability update 2018” Textiles Intelligence (2018)

³¹ “Organic Cotton Market Report 2018”. (2018) Textile Exchange p 66 -67.

³² “Pivot Eco_Fiber_Market_2014-2025”, Global Data Sheets, Grand View Research, “Eco Fiber Analysis and Segmentation Report 2018.” (2018), p 105



FIBERSHED

Local Fiber, Local Dye, Local Labor