



Hemp.

A Challenge to
Bring It Home Again

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Executive Summary

Carolina Textile District calls the manufacturing industry “the very essence of the people” because of how ingrained it was in local communities in the mid-1900s.(1) The rich manufacturing environment of the Carolinas stretched from farmer to finished product. Choice crops included cotton, which was spun into t-shirts and other apparel right here at home.

Enter January 1, 1994, when the North American Free Trade Agreement (NAFTA) went into effect. Almost overnight, manufacturers recognized the chance to make their products cheaper somewhere else, and the race to the bottom on price went into full swing.

With NAFTA, some might say companies got tunnel vision, seeing only dollar signs and forgetting about the people and the communities who were part of the story.

One by one, mills in the Carolinas shut down. Farmers went bankrupt. And the Economic Policy Institute says within

seven years, many trade-displaced workers concluded they’d never hold a manufacturing job again.(2)

Fast forward to 2014 when US laws paved the way for research and development of industrial hemp. Like other states, North Carolina launched a pilot program in 2016, defining the governing rules of the budding industry in 2017.(3) In 2018, the US Congress passed the Agricultural Improvement Act (the 2018 Farm Bill), essentially relabeling hemp an agricultural product rather than a controlled substance.(4)

That label had been the last remaining barrier to an opportunity years in the making.

This is a watershed moment in the US. It’s a chance to work together and bring manufacturing back to US shores while also building an industry sustainably from the ground up. This paper will outline a path to keep farmers in the conversation while making sustainable, made-in-the-USA apparel a reality.



Fallout from NAFTA

One of the biggest problems with NAFTA was the globalization of every farm product from cotton to milk. Anytime there's a race to the bottom on price, farmers lose.

Every. Single. Time.

Karen Hansen-Kuhn, director of trade and global governance at the Institute for Agriculture & Trade Policy, put it this way:

"The farm bill and trade policies — but especially NAFTA — are geared around the idea that farmers should get big or get out and depend on export markets to make their ends meet. That undermines farmers who are trying to produce for a smaller scale, who are trying to produce more sustainably."(5)

Even 25 years later, because of the low prices of commodity agriculture and the tariffs President Trump imposed on China, farm bankruptcies have increased. The Wall Street Journal reported in 2018, US farmers filed Chapter 12 bankruptcy at a higher rate than in the previous 10 years. (6)

In May, 2019, National Farmers Union President Roger Johnson responded to the US Department of Agriculture's offer of assistance to struggling farmers:

"Family farmers and ranchers have borne the brunt of the trade war with China, which has intentionally targeted American agricultural products with retaliatory tariffs...The ever-worsening financial challenges being forced on family farmers and ranchers cannot be overstated. We urge the USDA to ensure that this assistance package provides fair and equitable relief to all family farmers impacted by disruptions in international markets."(7)

NAFTA didn't only impact farmers. It also ravaged the US manufacturing sector. Robert E. Scott of the Economic Policy Institute points out, "Since NAFTA was signed in 1993, the rise in the US trade deficit with Canada and Mexico through 2002 has caused the displacement of production that supported 879,280 U.S. jobs." (8)

The Bureau of Labor Statistics supports the claim, stating that from 1990-2010, the apparel manufacturing sector had seen an 80 percent decrease in employment.(9) See Figure 1.

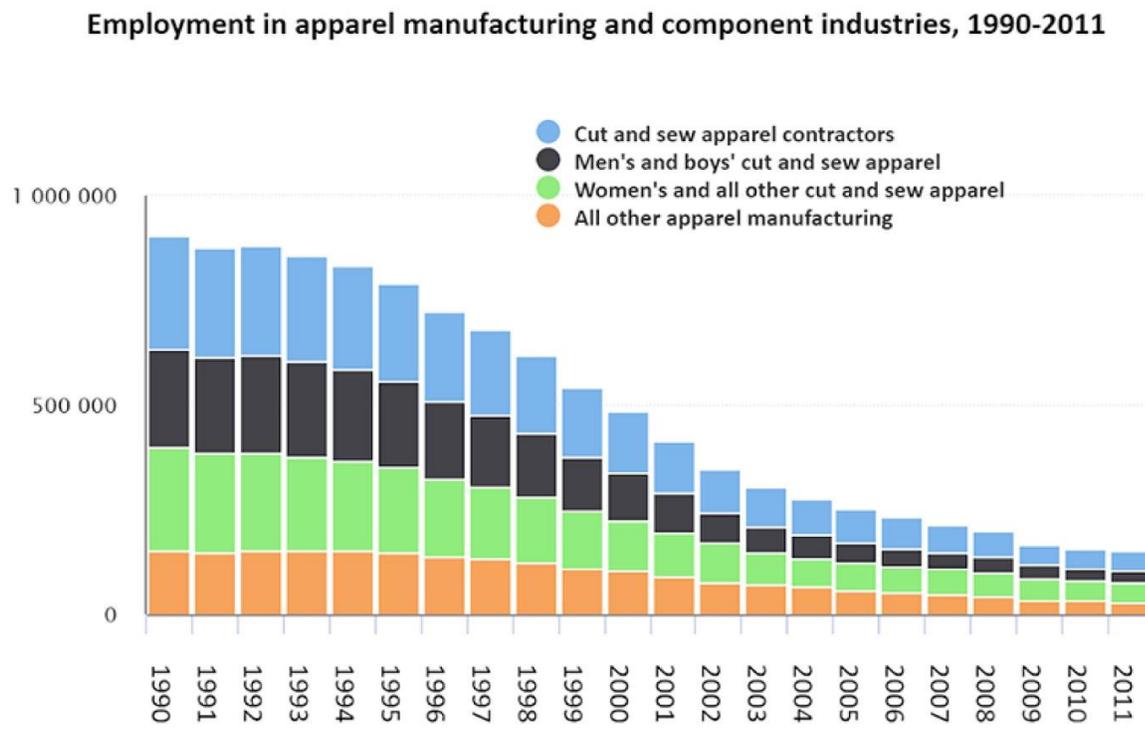


Figure 1: *Employment in apparel manufacturing and component industries, 1990-2011*

Although the second decade of the 21st century saw some improvement in manufacturing employment, the fact remains that the fallout from NAFTA has been long-lasting.(10) To make matters worse, the manufacturing sector had gotten hit hard again during the Great Recession of 2008. IndustryWeek reported a 20 percent loss of output for manufacturers and 15 percent reduction in workforce in those years.(11)

But that’s not the end of the story. Carolina Textile District points out the 2008 downturn shifted consumers’ focus back to domestic production because of their desire to rebuild the economy.(12) Modern consumers, then, want to buy local.

They also want to purchase from brands that incorporate sustainable practices. A 2018 Nielsen study reported 81 percent of global survey respondents of all ages felt strongly that companies they buy from need to prioritize environmental responsibility.(13) The combination of these consumer drives leaves the door open for innovative manufacturing.

A background image showing rows of spinning spindles in a textile mill, with white thread being spun. The image is slightly blurred and has a warm, golden light.

Manufacturing Industry Response

Introducing Industrial Hemp Apparel

How often is a new agricultural fiber introduced to US farmers and the domestic market? The passage of the 2018 Farm Bill opened up possibilities with hemp for apparel.

Hemp is a natural choice. Naturally durable, it partners well with cotton to make different fabric weights and construction, adding strength and durability when the two are blended.(14)

It's also a much better option than polyester/cotton blends because of its biodegradability. Polyester and hemp share similar wicking properties.(15) But a North Carolina State University study revealed polyester degrades least among cotton, rayon, and blended fabrics, often ending up as microplastics in our air and water.(16)

Hemp products, on the other hand, biodegrade easily. Stanford University researchers found biocomposites of hemp and the biodegradable plastic resin PHB start decomposing within weeks when buried. This fact alone is enough to consider hemp a viable resource for creating sustainable apparel.(17)

That fact isn't alone, though. The benefits of hemp extend to the agricultural and manufacturing sectors of the US.

North and South Carolina--with their rich manufacturing history--are states that not only have the climate to produce industrial hemp but also the supply chain to spin, knit, weave, finish, cut, and sew apparel made with it. They're better prepared than any other place in the US to develop this new industry and bring hemp products to the US apparel market.

Carolina Textile District puts it like this:

“The southeast, and much of America, still has a tremendous amount of infrastructure to support the textile industry, and a wealth of textile skill and knowledge exists here. The domestic textile industry has been influenced by technology and advanced manufacturing methods to innovate new uses for textiles, new material and new product development unimagined anywhere else.”(18)

Building the industrial hemp industry with a transparent and trackable supply chain will involve maximizing the advanced manufacturing methods of the domestic textile industry. It'll also use modern tools such as the Higg Index, Bluesign, and B Corporation practices to guide the industry from the ground up.(19)

Challenges Facing the Hemp Industry

If developing the industrial hemp industry would benefit farmers, manufacturers, and sustainability-driven consumers, why not start churning out hemp apparel made in the US tomorrow?

Sounds like a great idea, doesn't it? But wait...

The reality is the right varieties of hemp seed do not currently exist in the US. In four trips to China in 2018, Guy Carpenter--current President at Bear Fiber, Inc, and a member of the NC Industrial Hemp Commission--along with his Bear Fiber partner Patrique Veille discovered this reality.(20)

Perhaps it sounds simpler than it is or maybe it seems absurd that you can't just buy some seeds, toss them in the ground, and a few months later harvest textile-grade hemp and start making clothes.

At one time, Guy thought so, too. A gardening hobbyist, he was one of those who believed anyone could grow hemp. One day, he found himself standing in a field with a Chinese farmer who'd grown up with hemp.

The farmer explained, "Some people make baskets or other goods with the stalks from these plants."

Thinking out loud, Guy mentioned he'd like to use fiber from stalks like those to make clothes.

The farmer seemed a little shocked. "Oh, that hemp fiber isn't good for textiles."

And Guy walked away from the conversation determined to understand why hemp fiber that's good for baskets isn't good for textiles.





Varieties of Hemp Seeds

Like Apples & Oranges?

He learned that varieties of hemp seed are similar to varieties of other fruit we're all familiar with. Take apples, for example. Some species require colder climates than others, and apple growers in the US have to be tuned in to the US Department of Agriculture Hardiness Zones to grow the fruit successfully.(21)

With hemp, the key is sunlight. Latitudes are critical because hemp is photosensitive.(22) One variety grows better with extended hours of sunlight, the kind you might experience near China's northern border with Russia. Another takes less sunlight and thrives in the south where the days are shorter. If you switch the two, you will still grow hemp, but the variety moved north may not reproduce seeds or the variety moved south may not produce an adequate yield.(23)

Take a seed used in China's northern Heilongjiang Province, for example. With up to 16 hours of daily sunlight, it'll mature and flower in 130 days. Plant it in Yunnan, where the sun shines 13 hours a day, and it'll flower much sooner when it's only reached three to four feet in height. The fiber from a plant that small will not produce enough yield to be economical(24)

When aiming to produce textile-grade hemp fiber, a sweet spot exists where the right seed meets the right geographical climate conditions, producing plants of the right height to provide fiber that's just the right strength.

And that's where the journey starts.

The Process

Like Cotton?



Even with the right varieties of seed in hand, the challenge of processing infrastructure remains. Where are farmers going to send hemp fiber for initial processing and who will cottonize it? Cottonization and production of uniform fiber for blending are primary focuses.(25)

For textile-grade hemp fiber, the processes are totally different than those for the cannabidiol (CBD) craze that's hit the US market.

Let's take a closer look. Spinning systems around the world are cotton-based systems, meaning if a fiber doesn't fit in the cotton-based system, no one can spin it into yarn. Part of what determines whether a fiber fits is its length. Fibers that are too short can only be used for non-woven textiles like carpets and insulation while fibers that are extra long require some adjustment of the spinning machines but can be spun. Other factors include fineness, uniformity, and slickness.

Simply put, the right variation of hemp seed must produce the right fiber that's the right length and uniformity so that it can be cottonized, that is, processed through equally demanding procedures to produce textile-grade fiber that's spun on cotton-based spinning systems.

It's easy to see that bringing sustainable hemp apparel to the US market has its challenges, but Guy Carpenter, TS Designs President Eric Henry, and others believe it's worth the effort. And they're doing everything in their power to build this industry from the ground up in a transparent, trackable, and beneficial supply chain from local farmers to global consumers.

The Win



Roger Johnson, president of the National Farmers Union reminded the world, "The net effect of trade agreements like NAFTA is to put more power, more authority with the large multinational companies and by extension, take that power away from family farmers."(26)

For Farmers

Partnering with family farmers to build the US hemp industry with a transparent and trackable supply chain on US soil puts power back in their hands. The University of Vermont Extension highlights some of the benefits to communities when farmers are an intrinsic part of them:(27)

- Farmers get better prices when selling direct to consumers, increasing their ability to support their families and communities.
- Farmers preserve our working landscapes.
- Farms that are responsibly managed provide ecosystem services like protecting our water and sequestering carbon.
- Farms provide healthy habitats for wildlife.



For Manufacturers

In addition to the support it provides farmers, manufacturing hemp apparel in the US is significant because a robust manufacturing industry bolsters local economies. The Brookings Institution says it like this:

“Manufacturing matters to the United States because it provides high-wage jobs, commercial innovation (the nation’s largest source), a key to trade deficit reduction, and a disproportionately large contribution to environmental sustainability.”(28)

For Local Communities

Nielsen studies predict consumers' demands for sustainable products and sustainable-focused brands will only grow in the years ahead.(29) A Consumer Reports survey found 80 percent of Americans prefer American-made products, with more than 60 percent saying they'll spend more for them.(30)



The Urban Conservancy explains why this fact is crucial for local communities throughout the US. When consumers choose to buy local, the small businesses in their communities thrive. Those small businesses, in turn, return about 30 percent of their revenue to the local economy because they buy other goods and services locally. Chain stores, on the other hand, return about half that amount.(31)

Numerous studies have shown similar findings. Harvard Business Review found local-business communities' job growth rate is higher per capita than those dependent on chain stores.(32) An economic analyst from the Federal Reserve Bank of Atlanta said locally owned businesses contribute income and employment growth, and reduce poverty rates.(33)

Building the hemp industry through local supply chains will impact employees, owners, suppliers, and entire communities. When hemp apparel is made on US soil, farmers stay in the conversation, the manufacturing sector thrives, consumers satisfy desires to invest locally, and communities become healthy and vibrant.

In short, everyone wins.



Next Steps

For North Carolina-based manufacturer TS Designs, the next steps are clear. The company is testing the US market for hemp apparel made in the US by launching a three-stage process that begins with sourcing a hemp/cotton fabric from China and putting t-shirts together in the US.

Stage 1: Source finished Prepared for Dyeing (PFD) hemp/cotton jersey fabric from China. Cut and sew in the US.

Globalization of industrial hemp is not a solution, but some believe learning from manufacturers in the East--who are ahead of us in growing and manufacturing hemp--is a good idea.

It just so happens that farmers in China grow and process the best hemp fiber in the world. So... for once, why not copy them? US farmers and manufacturers can learn what the Chinese have done right and do it the same way.

In the meantime, manufacturers in the US can get the process started by sourcing finished PFD hemp/cotton jersey fabric from China and putting it together here.

TS Designs is taking this route, currently testing various blends of cotton and hemp, using higher percentages of cotton than are typical in apparel. The hope is to blend the most comfortable, most durable, most sustainable fabric on the market.



Stage 2: Bring textile-grade hemp fiber from China to manufacture “fiber to tees” in the Carolinas.

Keeping the end goal of farmer to finished product being on US soil, a next step is bringing textile-grade hemp fiber from China to start the process of manufacturing from fiber to fabric to finished product locally.

Stage 3: Connect with domestic hemp growers to bring hemp apparel dirt-to-shirt in the US.

Finally, TS Designs believes the NAFTA fallout where manufacturers got so focused on price, they forgot the people is a mistake that shouldn't ever be repeated.

Instead, why not learn from mistakes made with cotton and connect with domestic hemp growers right out of the gate? As leaders begin assembling the supply chain for hemp products, they can tell the industry there's no reason in the world consumers shouldn't know where the hemp in their apparel was grown and who grew it.

From seeds to final stitches--hemp apparel sourced and made in the US--TS Designs plans to build a dirt-to-shirt fully transparent and trackable supply chain.

As discussed in this paper, the opportunity before us is a watershed moment. It's a once-in-a-lifetime chance to make a lasting impact by building an industry sustainably from the ground up. We'll return manufacturing to US shores, strengthen local economies, and keep farmers in business all while taking care of the planet we call home.



Join Us in Making History

Consumers who buy your brand are environmentally savvy. They care about their communities, the local economy, and the sustainability of the clothes they wear. Looking for durable apparel that's easy on the environment, eco-friendly consumers are willing to spend a little extra for top-quality, comfortable, planet-friendly attire.

In fact, the question isn't whether the buyers are ready for hemp apparel. It's whether you're ready. Are you on board with supporting your local economy by sourcing and manufacturing your brand's hemp tees right here on US soil?

You have a chance to make history. You can help us build the hemp industry with a transparent supply chain on US soil. When you join us, you'll bring manufacturing jobs back to the US, invest in local farmers and suppliers, and contribute to healthier communities right here at home.

Looking Forward

Later this year TS Designs plans to offer a pre-sale and wholesale program to start acquiring hemp fiber, fabric and/or yarns from China to start this journey to grow - process - manufacture hemp textiles in the US.

TS Designs is a certified B corporation located in Burlington, North Carolina. Eric Henry, President. For more information about TS Designs' sustainable apparel, visit tsdesigns.com.

tsdesigns
cultivating responsible clothing™



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