



Woven in Kentucky: An Assessment of the Natural Fiber Textile Sector in Appalachian Kentucky



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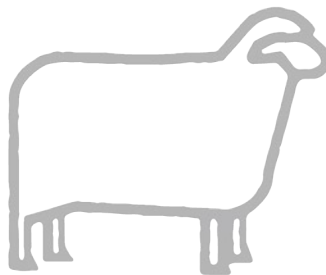
This report is a project of Community Farm Alliance and Fibershed as part of Highlander Research and Education Center's Appalachian Transition Fellowship program.

Introduction

Home-grown clothing is a concept unfamiliar to many young people in the millennial generation who grew up with little knowledge of the origin of products that we bought in establishments like Walmart and K-Mart. Super box-stores like these quickly swallowed up mom and pop establishments and my family frequented them for cheap goods and basic necessities. In today's highly globalized world, production and consumption practices are often confusing to the public. Horrendous working conditions in textile and apparel factories are frequently hidden from public view; realities of hazardous textile waste often obscured through corporate propaganda; and the depression of rural economies ignored by those not directly impacted by the losses. The issues surrounding the global textile sector can appear fragmented, difficult to grasp, and completely disconnected from the piece of clothing that we buy in box-stores. However, the issues of the North American Free Trade Agreement ([NAFTA](#)), globalization, the decline of domestic textile production, human rights abuses in clothing factories around the globe, and world-wide textile pollution are completely intertwined. The origin of the cloth and the labor that went into shirts that we wear on our backs have enormous implications on the livelihoods of people across the globe and our planet.

Here in Kentucky, people have seen the impacts first-hand of the globalization of the textile industry. In small towns in Central Kentucky like Mt. Sterling and Carlisle, entire clothing factories left in the early 2000s, leaving hundreds out of work and whole small-town economies in a state of crisis. However, Kentuckians are resourceful, creative people with a legacy of textile and apparel creation that originated long before the advent of assembly plants. Kentuckians have a long history of creating agricultural-based textiles as well as artisanal creation of woven goods such as blankets, quilts, rugs, and clothing. Fiber crops, such as hemp and flax, have been grown in Kentucky to produce twine, rope, and clothing for over 100 years and farmers have been shearing sheep for wool for generations. With the rise of the conscious-fashion movement [1] and consumer demand for sustainably-produced, locally-sourced textile items, farmers, fiber processors, and fashion designers face possibilities of putting Kentucky on the map in the international natural fiber textile and apparel sector.

The vision for this landscape assessment project is to provide a tool that will help Kentucky natural fiber farmers, entrepreneurs, and investors to better understand the current fiber infrastructure, including the major gaps in the fiber supply chain in the region, as well as opportunities for growth and investment.



ABOUT THE PROJECT

This project grew out of a collaborative proposal from [Community Farm Alliance](#) (CFA) and [Fibershed](#) for the [Highlander Research and Education Center](#)'s 2017 [Appalachian Transition Fellowship](#). The Appalachian Transition fellowship is a one-year project designed to provide young Appalachian leaders with opportunities to work in the field of community and economic development in Central Appalachia. Each leader is placed with a host community that is working on economic development in the region to enhance regional capacity and build new, sustainable economic opportunities.



Highlander Appalachian Transition fellow, Sam Hamlin, joined the Community Farm Alliance and Fibershed in 2017 to work on a fiber value-chain project. The project was focused on mapping out the current infrastructure, major gaps, and possibilities for growth in the natural fiber supply chain in Central and Eastern Kentucky, in hopes of paving new ground for CFA's work supporting small farmers in the region.

ABOUT THE PARTNERS

[Highlander Research and Education Center](#) has been supporting social justice leaders and organizations in the South and Appalachia for 85 years. Through popular education, language justice, participatory research, cultural work, and intergenerational organizing, Highlander develops leadership and supports strong, democratic organizations that work for justice, equality and sustainability. For more information visit their website at: www.highlandercenter.org



[Community Farm Alliance](#) (CFA) is a 32-year-old statewide-wide membership organization that works across Kentucky to develop community leaders in the agricultural sector and to strengthen local food and fiber systems. CFA has deep roots in the Appalachian region and has been working on food access and local food systems in the region for many years. With the goal of contributing to the revitalization of Eastern Kentucky's economy, CFA has been supporting the growth of the agricultural sector. Though food makes up a large percentage of agricultural production, natural fibers present an enormous opportunity to expand the economic possibilities of agriculture in our region. For more information visit their website at: www.cfaky.org



[Fibershed](#) is a nonprofit based in California that works internationally to develop regional fiber systems that build soil and protect the health of our biosphere. Fibershed develops regional and regenerative fiber systems on behalf of independent working producers, by expanding opportunities to implement carbon farming, forming catalytic foundations to rebuild regional manufacturing, and through connecting end-users to farms and ranches through public education. For more information visit their website at: www.fibershed.com



PROJECT GOALS, VALUES, AND OUTCOMES

Goals

- Map the natural fiber textile and apparel production and processing infrastructure in Central and Eastern Kentucky.
- Amplify stories of Kentucky’s fiber farmers, artisans, and entrepreneurs through CFA’s Woven Roots Fiber Podcast and Storytelling project.
- Share information with stakeholders on lessons from models of successful textile value-chain development in the Southern United States and Appalachia.
- Facilitate connections across the textile supply chain to support growth of sector in the region.

Values

- Encourage the growth of the natural fiber sector in Kentucky as part of the movement to create vibrant and diverse economies across the Central Appalachian region.
- Support regional ownership over textile production and grow regional wealth.
- Uplift regenerative and sustainable textile production practices.

Outcomes

- Produced 7 podcasts and 3 written stories for the Woven Roots: Appalachian Fiber Story Project that were distributed primarily through CFA and Fibershed’s social media, and the [Appalachian Transition Fellowship Blog](https://www.cfaky.org/blog/). All podcasts and written stories can be found at www.cfaky.org/blog/. Two podcasts were aired live on WMMT’s Mountain Talk Radio: [App Fellows, Alpacas, and Agriculture](#) and [Kenaf—A New Appalachian Fiber](#) can be found at www.wmmt.org.
- Developed a report identifying existing producer and processor infrastructure in Central and Eastern Kentucky, major challenges and gap in the natural fiber sector, and opportunities for sector growth in Appalachian Kentucky.
- Facilitated a stakeholder meeting with representatives from 4 organizations representing fiber farmers and fiber entrepreneurs across Kentucky.



Sam interviews sheep farmer, Kathy Meyer; photo by Hope Hart

Background and Context

Textiles and Rural Agriculture: A Changing Landscape

Agriculture and textile and apparel production have long been intimately connected. For most of human life, all apparel has come from plant or animal fibers, such as cotton, wool, flax, and hemp. The Appalachian region, in particular has a long legacy of natural textile production. For example, records dating back to the 1800s indicate that flax was grown, processed, and spun at Pine Mountain Settlement School in Harlan County, Kentucky, in addition to wool from sheep.



"Dyeing." Historic photograph of two women with buckets and dyeing vat at Pine Mountain Settlement School; Photo Courtesy of Pine Mountain Settlement School.



Weaving Room at Pine Mountain Settlement School, c. late 1940s; Photo courtesy of Pine Mountain Settlement School

In the mid-20th century synthetic fibers, made from man-made chemicals, were introduced. It was not until the late 20th century that they grew traction in the market. Rayon, nylon, polyester, and spandex all were competing in the textile and apparel market by the 1970s and by the 1980s, polyester led all fibers, including cotton, on the U.S. market. [2] Over the last two decades, U.S. large-scale mills increasingly started not only using, but importing synthetic materials to create fabric, with synthetics overtaking cotton in imports in 2014. [3]

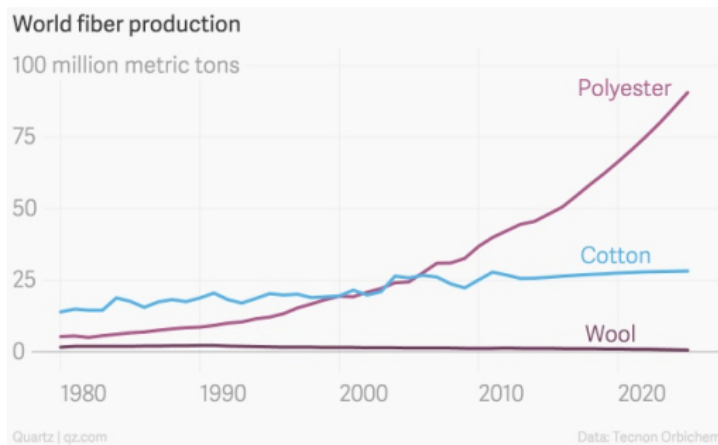


Chart indicating the growth of polyester in global fiber production. Source: <https://oecotextiles.wordpress.com/tag/synthetic/>

Cheaper to produce, imported synthetic fibers provide considerable competition for domestic natural plant and animal fiber producers, making it increasingly difficult for fiber farmers to compete in U.S. and global markets. Efforts to reshore textile and apparel production are often disconnected from agricultural production of fibers due to real and perceived unaffordability of textiles made from plant and animal fibers.

Environmental Problems Associated with Textile Production

Global textile production has been noted as one of the largest polluters in the world, second only to the oil industry [4]. Water usage in fiber-intensive crops, pollution of water bodies from synthetic fibers, and textile-dye run-off in streams and rivers are just a few of the polluting factors in the global industry. The rise in synthetic fiber production has increased pollution from plastics. In addition to being derived directly from crude oil, [5] polyester fabrics have been found to be connected to microfiber-plastic pollution in water bodies worldwide. [6] Pollution from textile dyes and other wastewater can have harmful effects on water sources near textile factories. A recent New York Times article noted that due to textile pollution, fish stocks are dying, rice patties are contaminated, and drinking water is threatened in one community near a textile factory near Dhaka, Bangladesh. [7] The situation in Dhaka provides one example of a global pollution crisis in the global textile industry.

Further Context: Domestic Textile Manufacturing and the Decline of a Giant

Throughout the 20th century, textile and apparel production was a major industry in the U.S., particularly in the South. Beginning with cotton production, textiles have been intertwined with slavery and exploitation of people of color. Well after the abolition of slavery and up until the decline of domestic textile manufacturing, a majority of textile and apparel workers were women and people of color. In the 1980s, the Southern textile industry was the largest employer of women and people of color in the U.S. [8] Many mill towns were located in rural areas and often were the main drivers of local economies. Today, it is widely acknowledged that fair labor practices were hard to come by in the textile industry, which was notorious for dismal wages and dangerous working conditions.

Several factors led to the rapid decline of the textile and apparel manufacturing industry in the U.S., including: automation, global competition, the rise of corporate discount clothing chains, and international trade policy. The development of shuttleless looms and break spinning greatly reduced the time and labor power required to produce fabric. [9] In addition to the challenges of mechanization, the confluence of a number of factors concerning U.S. imports and international trade made it increasingly more expensive to produce textiles domestically. In the 1980s, global textile production skyrocketed, as many nations across the globe rapidly moved from primarily agrarian to industrial economies. Countries with looser labor regulations, and therefore even more miserable working conditions in factories, were able to produce cheaper textiles on the international market.

While corporate CEOs sought out cheaper ways to produce goods, U.S. policies on trade and production pushed the entire domestic industry further into decline in the 1990s and 2000s. The World Trade Organization's (WTO) Agreement on Textiles and Clothing (ATC) eliminated domestic textile quotas and the North American Free Trade Agreement (NAFTA) increased the off-shoring of U.S. industry. The Department of Labor recorded that between December 2004 and July 2009, the textile and apparel sector lost 256,300 jobs, which equates to 38.2 percent of all its positions. [10]

The rise of corporate-box stores, such as Walmart and Kmart, also contributed to the shift in textile production. Frequently marketing cheap clothing made from synthetic fibers, corporate box store chains were in many ways on the forefront of influencing a paradigm shift around clothing. By promoting the idea that clothing is a short-term purchase, cheap on the front end and easily replaceable, corporate box stores capitalized on the decline of the domestic textile industry. This decline led to the accompanying rise in income disparities, particularly in areas hard hit from the decline of domestic manufacturing.

While the off-shoring of textile and apparel production was destroying the economic infrastructure of many rural communities in Appalachia and the South, there were many efforts to organize against factory closings. Headed up by mostly corporate sponsors and celebrity advocates (ironically, such as Walmart), the 1984 campaign, *Crafted with Pride in the U.S.A.*, promoted a consumer movement to purchase goods produced primarily within domestic boundaries. Meanwhile, within the South and Appalachian Region, community and worker-based groups such as the Tennessee Industrial Renewal Network, fought to protect textile workers' rights in the face of NAFTA. In Kentucky, Community Farm Alliance organized farmers to oppose the General Agreement on Tariffs and Trade (GATT), which lessened restrictions on international trade making it cheaper for U.S. companies to outsource production.



Community Farm Alliance members; Photo
Courtesy of Community Farm Alliance

Though these movements built consciousness and developed strong community organizers in the region, they were ultimately unsuccessful in stopping the decline of the textile and apparel industry. According to the USDA, the U.S. lost more than 900,000 textile and apparel jobs from 1994 to 2005.[11] These two sectors continued to take a massive downturn suffering even more losses in the 2000s.[12] Given the demographics of the textile workforce, women and people of color, in the South were most impacted by factory closings. In addition, many textile and apparel factories were located in rural communities, most of which faced economic devastation due to the decline of the sector.

Woven Roots Story—Made in Kentucky: Carlisle’s Textile Journey

Nestled in the rolling hills of Kentucky’s Bluegrass region, the town of Carlisle is home to around 7,000 people. Carlisle used to be home of two manufacturing plants for [Jockey International](#), a textile manufacturer and distributor of underwear and sleepwear for men, women, and children. In 2000, Jockey closed up its sewing plant in Carlisle, laying off 326 people. Four years later Jockey moved its operations to Mexico and [closed its Carlisle knitting plant](#), as well as the nearby Maysville and Mount Sterling facilities, affecting 440 total jobs in the region. Jockey’s closing had devastating impacts on the once bustling town of Carlisle, as young people began to leave in search for work elsewhere and high-wage jobs nearly disappeared. However, the economy of Carlisle is currently growing with a movement towards regional economic development and textile revitalization.



Museum dedicated to textile history in downtown Carlisle; Photo by Sam Hamlin



Tracy Pratt-Savage at the Historical Society in Carlisle, Photo by Sam Hamlin

Tracy-Pratt Savage, Development Director in Carlisle-Nicholas County and member of Carlisle-Nicholas County’s Chamber of Commerce, is part of a movement of folks in Central Kentucky who are working to revitalize textiles in the area through innovative production that taps into high-end and niche markets. For example, high-end baby bedding company, [Liz and Roo](#), [moved its operations to Carlisle](#) in 2016. Custom sewing for Liz and Roo is done at the former Jockey International plant, now owned by Carlisle-owned and operated, 3 Star Industries, which sews premium covers for utility vehicles and manufactures windshields.

One of the challenges that many emerging rural textile companies face is a shortage of skilled workers to take newly-created positions. Tracy is working with the [Maysville Technical and Community College](#) to develop a textile and sewing certificate program to assist young people in developing the skills needed to work in textile manufacturing.

Ultimately, Tracy believes that in order to truly revitalize the economy, rural communities need to come together across county lines. Using an approach to economic development that Tracy calls rural regionalism, folks in Nicholas County are working with other small towns in surrounding counties to build up region-wide textile manufacturing, tourism, and community collaboration.

For more information on Carlisle’s history and current endeavors, visit the Nicholas County Economic Development Authority at nicholascounty.ky.gov.

For the full story, visit: <http://cfaky.org/woven-roots-episode-6-made-in-kentucky-carlises-textile-journey/>



Carlisle’s Jockey Park sits in front of the old Jockey International plant, which is now home to 3 Star Industries; Photo by Sam Hamlin

Human Rights Concerns in the International Textile Sector

In order to produce cheaper goods that can compete on a competitive, low-priced textile markets, many textile and apparel corporations place factories in areas with weak wage and labor protection laws. News outlets and human rights organizations have noted that many mainstream brands in Europe and U.S. are made in factories that use child labor and that pay poverty wages to workers.[13] A recent New York Times article explained that factory inspections that should prevent human rights abuses are often superficial and riddled with flaws, sometimes omitting basic workplace safety measures such as the existence of fire escapes.[14] The Rana Plaza factory collapse in Bangladesh that killed over one thousand workers in 2013 signaled the urgent need for increased accountability from global textile and apparel corporations.

Efforts to Reshore Textile Manufacturing

In recent years, an emerging movement to transform domestic textile manufacturing has been gaining momentum. Likely most notable in our region are the efforts of the Carolina Textile District and Opportunity Threads which are based in Western North Carolina. With a mission of contributing to the reshoring of the U.S. textile supply chain and increasing the number of good quality textile jobs in the region, the Carolina Textile District was formed in 2013. They operate as a network of over 350 textile manufacturing companies, cut and sew shops, and fabric



Workers at worker-owned sewing shop, Opportunity Threads, in Morganton, N.C., 2014; Photo by Catherine Moore, courtesy of the Appalachian Transition Fellowship

suppliers that “connect clients with a one-stop-shop of resources, and to guide the process from ideas, to development, to production, to distribution.”[15] Designers who are looking to base the production of their products domestically can go to the Carolina Textile District to be connected with textile production companies in Western North Carolina. One of the cut and sew companies in the network is Opportunity Threads which operates with a cooperative business model that emphasizes worker-ownership. Businesses such as the Carolina Textile District and Opportunity Threads, offer a model for manufacturing that addresses the impacts of the economic devastation many rural Southern communities faced with the off-shoring of textile production, while creating new job opportunities that are equitable and innovative.

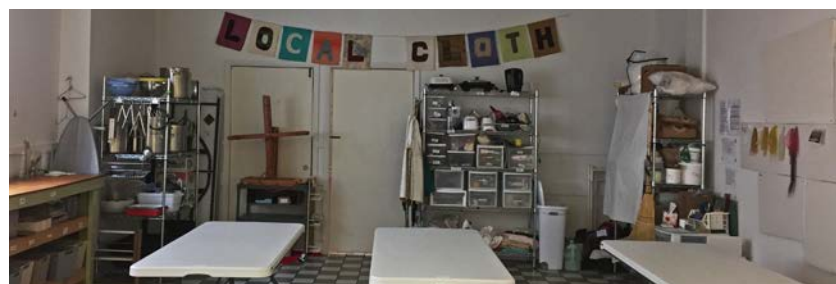
Visions for a Regional Textile System

In order to address harmful environmental and human impacts of the international textile agricultural, production, and manufacturing sectors, there is a budding movement of organizations seeking to build regional textile systems. Fibershed, one of the sponsoring partners of this project, is driven by a vision of international networks of regional textile communities that work together to rebuild carbon stocks and to strengthen regional economies. The term “fibershed” refers to a self-reliant textile system, where all actors in the supply chain, such as farmers, small-mid scale mills, cut

and sew shops, and consumers, are located within the same region. Fibershed works with community partners across the world to develop regional, regenerative natural fiber systems by “expanding opportunities to implement carbon farming, forming catalytic foundations to rebuild regional manufacturing, and through connecting end-users to farms and ranches through public education.” [16] Fibershed promotes regional ownership over what they call ‘soil-to-soil’ textile processes. By ‘soil-to-soil’ they mean that every part of the textile supply chain, from the farm-to the mill-to the compost bin, is made through environmentally-friendly processes that regenerate good quality soil and build regional wealth.



In the Appalachian region, Local Cloth, Inc., a non-profit organization and network based out of Western North Carolina, provides a model for how a regional textile system can be organized in our region. Local cloth connects farmers to fiber entrepreneurs and artists, small scale fiber mills, students, and suppliers within 100 square miles of Asheville through an online directory and educational events. They support businesses across the textile supply chain with an emphasis on natural fiber and natural plant dyes. In addition, they offer a studio space in Asheville, that can be used for workshops, natural dyeing, weaving, and other projects in the fiber community. Fiber producers, small-mid scale mills, and fiber artisans can be located through Local Cloth, Inc.’s online membership directory, therefore creating a one-stop spot for fiber entrepreneurs seeking regional sourcing. Organizations, such as Local Cloth, Inc., provide a model for how we may think about building a regional textile system in Kentucky.



The Local Cloth Studio in Asheville, NC, is available for members to use for weaving, natural dyeing, and more; Photo by Sam Hamlin

Woven Roots Fiber Story--Alpaca, Fiber Farming, and the Emerging Slow Fashion Movement

River Hill Ranch sits just outside of Richmond, Kentucky, where Alvina Maynard raises anywhere from 75 to 100 alpacas, depending on the time of year. Alvina started alpaca farming through a combination of her love of the outdoors, inspiration from other veteran-turned-farmers, and by following her calling. “I wanted a space that provided genuine connection; to experience both adventure and tranquility at the same time. So, alpacas...not only are they quiet animals but they’re relatively small livestock, they’re easy to manage, they have padded feet instead of hooves, so all of those aspects appeal to having children around.”



Alvina Maynard at River Hill Ranch;
Photo by Hope Hart

First named as official livestock in the 2008 Farm Bill, alpaca farming is a relatively new in the U.S. As a growing sector, there are lots of opportunities for new farmers and entrepreneurs to explore this unique industry. Alpaca are non-aggressive, curious animals who produce an incredibly soft fleece that can be used to make sweaters, socks, hats, mittens, and much more.



Hand-spun alpaca fiber at River Hill Ranch;
Photo by Hope Hart

Each April, Alvina completes an annual alpaca shearing at River Hill Ranch. She sorts through each fleece and determines its quality and She sells to a variety of processors on different scales, all who transform raw fleece into yarn and sometimes into value-added (or finished) products, such as socks and hats. Alpacas are multi-purpose animals: on the River Hill Ranch website, you can find beautiful alpaca shawls, gloves, hats, headbands, boot inserts and more for purchase. In addition to fiber products, Alvina also sells alpaca meat.

The slow fashion movement is gaining traction as many people are becoming more conscious about the environmental and human impact of the current global textile production system. Slow fashion advocates and farmers, like Alvina, are leading the way in reviving the natural fiber textile sector in Kentucky, and beyond. “Change will really happen in our society, when it is driven more by demand,”



Alpacas grazing at River Hill Ranch;
Photo by Hope Hart

Alvina pointed out. “Not a lot of people understand where their clothes come from or what they’re even made out of...In recent history, the slow food movement has seen a lot of success where it has brought that awareness mainstream, where people are asking questions now of where their food comes from, what’s in their food, and what went into making, growing, processing their food...So I’m really excited that the slow fashion and slow clothes movement is also starting to gain traction, and people are starting to ask those questions now, where their clothes come from.”

To listen to the episode of Woven Roots visit:

<http://cfaky.org/fiber-podcast-2-alpaca-fiber-farming-and-the-emerging-slowfashion-movement/>

Landscape Assessment

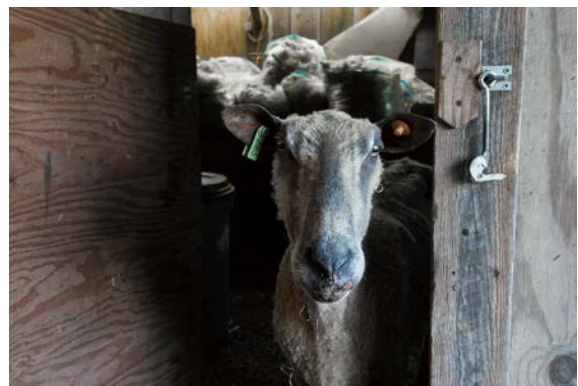
Methodology

The information in this landscape assessment was conducted through an informal action-based research process that consisted of informal interviews and survey distribution between January and November of 2017. The content is informed by a producer survey and informal interviews that engaged 35 Kentucky farmers, 9 regional mill or processing facility operators, numerous fiber entrepreneurs, and dozens of members of non-profit organizations, university programs, and government organizations that work in agriculture or in economic development in Kentucky.

The producer surveys were sent out by email to fiber farmers across the state. In addition, the surveys were distributed by the Kentucky Sheep and Goat Association and the Kentucky Alpaca Association which both emailed the survey out to their membership. The survey data reflects sheep, goat, and alpaca farmers disproportionately to other fiber farmers. Farmers who grow plant-based fibers are minimally reflected in the survey results. Most information that was gathered on plant-based growth is from informal interviews that were conducted with farmers, entrepreneurs, university staff, and staff in state agricultural programs.

Kentucky Fiber Production Infrastructure

Of the 41 total participants in the producer survey, only 16 respondents were in counties that are considered Appalachian counties under the Appalachian Regional Commission's current designation. Of those respondents, only 6 are located in Eastern Kentucky, while 10 are located in either Central or South Central Kentucky. The conditions in Appalachian counties, particularly in Eastern Kentucky, are significantly different for fiber farmers. For example, in mountainous areas of Eastern Kentucky, it is difficult to find an abundance of flat land for fiber growth, presenting significant limitations for those hoping to grow hemp, kenaf, or other bast plant fibers.

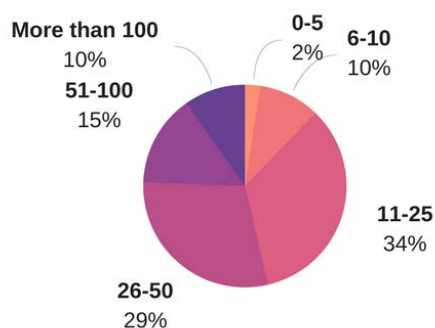


Sheep on Final Frontier farm; photo by Hope Hart

This study was originally intended to focus on the fiber landscape in Eastern Kentucky, however, due to the lack of existing natural fiber infrastructure in Eastern Kentucky, the study was expanded to include Appalachian counties in the central part of the state, as well. For the purposes of the producer survey, data is reported from from all respondents, in hopes of getting the full breadth of experiences across the state. Inevitably, the statewide landscape impacts the conditions and possibilities for fiber farmers in Appalachian counties of Kentucky.

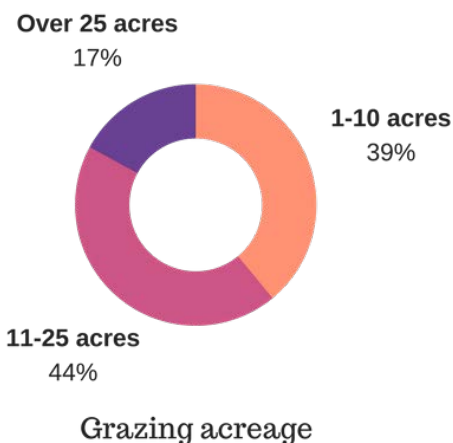
Animal Fibers

Over 60 percent of the fiber animal producers indicated that they have between 11 and 50 animals. Though several have larger flocks, ranging from 51 to over 100 animals, a majority reported to have medium-size flocks. In addition, over 80 percent of respondents reported modest grazing acreage, between 1 and 25 acres, which



Number of animals reported

corresponds with the data on animal flock sizes. This data indicates that a majority of the farmers who participated in this survey rely upon animal production as a significant portion of their farm work and income. About 10 percent of animal farmers have between one and 10 animals, indicating that they are most likely supplementing their income with their fiber animal flocks.



Grazing acreage

Alpaca is the most common fiber animal, with 65 percent of animal producers responding that they own at least one alpaca. It should be noted that because this survey was sent out through the Kentucky Alpaca Association membership list, the number of alpaca farmers reflected is likely higher in this sample population than the average across the state.

Sheep and fiber goats followed closely behind alpaca, with over 30 percent of farmers responding that they own goats and 40 percent indicating sheep ownership. Fewer raise llamas and rabbits for fiber.

The breed data indicates that Huacaya Alpaca, known for their fluffy and crimped soft fleeces, are slightly more popular than Suri Alpaca, which have longer, straight, softer fleeces. This reflects global trends in alpaca ownership; 82 percent of the alpaca population are Huacaya, while Suri alpacas make up less than 20 percent.[17] Angora goats, which produce Mohair, a long silky fiber, are the most popular goat breed. Producers also indicated raising Boer and long haired Spanish goats. Sheep producers indicated a range of breeds, including Merino, Shetland, Icelandic, Balwen Welsh Mountain, Polypay, Rambouillet, Tunis, Gotland, Cormo, and Jacob's sheep. Shetland sheep, a British breed known for soft, durable wool that comes in eleven different natural shades,[18] are the most common sheep breed of survey participants.



Alpacas at River Hill Ranch; Photo by Hope Hart

Over 60 percent of producers responded that they contract their sheering out to other parties; mostly individual professional shearers or to shearing companies. Over 20 percent shear their animals themselves; while around 15 percent shear some animals themselves and contract out others.

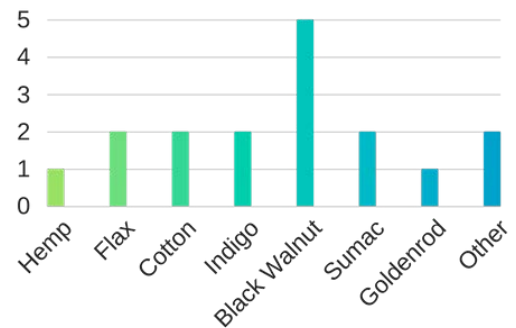


Rows of indigo plants growing at Hill and Hollow Farm;
Photo by Sam Hamlin

Fiber and Natural Dye Plants

The data collected through this producer survey does not accurately reflect the breadth or number of fiber and natural dye plant farmers in Kentucky. Through the course of this landscape assessment, the number of plant producers that I was able to locate was significantly lower than animal fiber producers, particularly in Eastern Kentucky. In part, this is because the landscape in Eastern Kentucky is more suitable for animal production, due to little amount of flat land available for agriculture. In part, this is because Central and Eastern Kentucky is not equipped with the processing equipment, facilities, and infrastructure required to successfully make a profit from plant fibers and dyes, especially on smaller scales. In part also, was my own inability to tap into plant producer networks. Regardless, the information that I was able to gather about plant fiber and natural dyes in our region provides valuable insight into trends, challenges, successes, and opportunities for those interested in fiber and natural dye plant production.

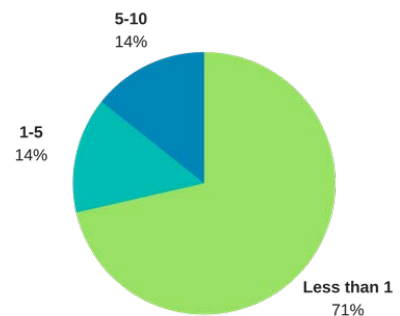
Amongst survey respondents, the cultivation of black walnut as a natural plant dye had the highest rate of production. Several farmers indicated that they grow either flax, cotton, indigo, or sumac; flax and cotton are natural fibers, while indigo and sumac are used to create natural plant dyes. One producer grows a small plot of hemp for fiber production; another indicated growing pokeberry, wild carrot, and goldenrod for natural dye production.



Types of fiber crops and natural dye plants reported

Acreage numbers trended toward smaller scale production, with over 71 percent of respondents indicating that they grow less than one acre of their fiber or natural dye plant crop. 14 percent grow one to 5 acres and 14 percent grow 5 to 10 acres. No producers indicated that they grow larger plots over 10 acres.

Harvesting: 90 percent of producers indicated that they harvest their own crop; versus the 10 percent that contract out. This is correlates with smaller scale of production that was most common amongst respondents. Many fiber and natural plant dye crops can be harvested by hand with smaller acreage numbers. When producers grow higher acreages of fiber crops, typically special harvesting tools are required.



Acreage of fiber crops and natural dye plants reported

Woven Roots Fiber Story--A Dream of Indigo: Growing Natural Plant Dyes in South Central Kentucky



Robin Verson of Hill and Hollow Farm holds indigo leaves;
Photo by Candace Mullins.

Nestled in the rolling hills of south central Kentucky, [Hill and Hollow Farm](#) is home to dozens of Jacob and Dorset sheep, acres of organically-grown vegetables, a small plot of Japanese indigo and the farm's dedicated owners, Robin Verson, her husband Paul Bela, and their lovely children.

Robin discovered her love for natural dyes and fiber by accident. In 2006, Paul was offered sheep as a payment for a fencing repair job. Paul and Robin have a good amount of pasture on their land, so it made sense to invest in livestock. After they obtained other sheep by chance from a friend, word got out that they accepted sheep and their flock grew substantially, as did Robin's love for natural dyes: "Once people realized that we'd accept sheep, it seemed like it went on and on from there. So that's how the fiber started. And once you have wool, you want to turn it colors, inevitably."



Jacob and Dorset sheep at Hill and Hollow Farm, Edmonton, Kentucky;
Photo by Sam Hamlin

In 2007, friends of Robin's visited the farm to do a natural dye workshop. At the time, Robin was not growing any plants to use for dyes, though, they did use walnuts harvested from the farm to create brown hues. The workshop sparked Robin's interest in dyes and the next year she decided to see what plants she could grow for color. She tried working with Hopi sunflowers, marigolds, and Japanese indigo. The deep blue color created by the indigo blew Robin away, so she decided to focus on raising and perfecting her Japanese indigo crop.



Indigo leaves at Hill and Hollow Farm;
Photo by Candace Mullins

Robin harvests all of her indigo by hand during the peak harvesting season in August. Just up the road from her farm she runs a natural dyeing studio, where she dyes her own yarns and holds natural dyeing workshops. To make indigo dye, she mixes fresh indigo leaves with cold water to make a vat. She directly dips cloth and yarn into the vat; cloth and yarn made from animal fibers, such as wool and alpaca, take up color best. The longer the cloth or yarn stays in the vat, the deeper blue is the color. In addition to indigo, Robin also uses wild-harvested goldenrod, which grows abundantly right next to her dye studio, to create a vibrant yellow dye. While she creates vibrant yellow goldenrod

yarns and deep blue indigo yarns individually, she also creates a green yarn through a process called overdyeing. Yarn that is overdyed is first dipped in an indigo vat and then dipped again in a goldenrod vat, creating a beautiful mossy green color.

Robin sells skeins of naturally dyed yarn processed from her own sheep, as well as yarn made from a sheep and alpaca blend. On [Hill and Hollow Farm's Etsy page](#) fiber enthusiasts can find Jacob's sheep roving and yarn, Dorset sheep yarn that is naturally dyed with indigo and native goldenrod, lamb skins (available seasonally), and hand-knitted and woven items created from fiber that came straight from Robin and Paul's farm. Find them at: www.etsy.com/shop/HillandHollowFarm

For the full story, visit:
<http://cfaky.org/woven-roots-fiber-story-a-dream-of-indigo/>



Indigo-dyed yarn by Robin Verson; Photo by Sam Hamlin

Regional Fiber Processing Infrastructure

– Processing Equipment:

Feltloom, Inc.

Sharpsburg, Kentucky
Needle felting machines available for purchase
Classes and product line available
Contact: 855-335-8566
info@feltloom.com
<http://www.feltloom.com>

– Small to Mid-Scale Mills[19]:

U.S. Natural Fibers

Springfield, Kentucky
Fibers Accepted: Animal fibers
Services: Carding, washing, picking, spinning, plying, skeining, dehairing, commercial scouring
Yarn, roving, batts, and other value-added products available
Contact: 859-336-7272
Lori@USNaturalFibers.com
Shawn@USNaturalFibers.com
<https://usnaturalfibers.com>

Ohio Valley Natural Fibers

Sardinia, Ohio
Fibers Accepted: Animals fibers
Services: Picking, carding, washing, spinning, plying, skeining.
Yarn, roving, batts, and other value-added products available
Contact: 937-446-3045
info@ovnf.com
<http://www.ovnf.com>

New Era Fiber Mill

Gallatin, Tennessee
Fibers Accepted: Alpaca fibers
Services: Sorting, grading, picking, washing, carding, spinning, plying, skeining, blending (can blend alpaca with merino, silk, and mohair), commercial automated knitting
Value-added products available
Contact: 615-452-7852
karlh@newerafiber.com
<http://www.newerafiber.com>

Morning Star Fiber Mill

Andrews, North Carolina
Fibers Accepted: Animal fibers
Services: Washing, opening, carding, spinning, dehairing, blending, plying, skeining
Yarn, roving, batts, and other value-added products available
Contact: 828-321-9299
info@morningstarfiber.com
www.morningstarfiber.com

Echoview Fiber Mill

Weaverville, North Carolina
Fibers Accepted: Animal fibers
Services: Tumbling, skirting, scouring, opening, carding, pin drafting, spinning, plying, skeining, felting
Yarn, roving, and other value-added products available
Contact: 855-693-4237
<https://www.echoviewnc.com>

– Industrial:

Sunstrand

Louisville, Kentucky
Fibers Accepted: Hemp, kenaf, flax, bamboo
Services: Fiber processing (blending, size reduction, decortication), surface treatment, consulting
Products: Biomaterials for industrial manufacturing, including: bulk fibers, chopped strand mat, wet lay, short, long, and filler compounding fibers, fiber material for animal bedding, concrete, paper and packaging, coreboard, and natural fiber insulation
Contact: 502-415-8505
info@sunstrands.com
www.sunstrands.com

Industrial Hemp Manufacturing, LLC

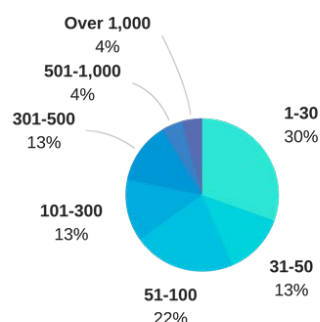
Spring Hope, North Carolina
Fibers Accepted: Hemp, kenaf, flax, jute
Services: Fiber processing, fiber treatment (to make fibers fire retardant, water repellent, absorbent, or soft)
Products: Custom cut fiber, treated fiber, carded opened fiber, textiles, non-woven mats, woven mats and other value-added products
Offer line of oil well drilling loss circulation materials (LCM)
Contact: 252-478-3646
info@ihempman.com
www.ihempman.com

Producer Processing Data

Data from the fiber producer survey indicates that most farmers process their fiber with multiple mid-size to small-scale mills both in inside and outside of the region. 23 percent of producers said that they process their fiber exclusively in mills located either in Kentucky, Tennessee, or North Carolina; while 30 percent said that they send to regional mills, as well as processing facilities located in the Midwestern or Northeastern regions of the U.S. 23 percent indicated that they have processing capabilities on their farms and process exclusively through internal means. Only 10 percent of respondents process their fiber exclusively through mills located outside of the region.



Wool being processed at Morning Star Fiber Mill, Andrews, North Carolina; Photo by Sam Hamlin



Total pounds of fiber that farmers process per year

30 percent of fiber producers who participated in the survey indicated that they only seek processing for approximately one to 30 pounds to fiber per year. This low number likely indicates that a majority of respondents do not rely on fiber as their primary source of income. Additionally, it could also reflect a common concern amongst fiber producers in the state on limited knowledge and availability of local or regional markets for fiber. Several producers who I talked to mentioned that they have pounds of unprocessed fiber in storage but have no place to sell without taking significant cuts or lack the funds to get the fiber processed.

A number of producers did say that they process higher amounts of fiber, likely indicating that fiber sales consist of a higher portion of their income. 22 percent said that they process 51 to 100 pounds of fiber per year; while 30 percent process between 101 and 500 pounds. Very few indicated that they process industrial levels of fiber; with only 8 percent processing over 500 pounds per year.

Amongst the producers who responded to the producer survey, yarn is by far the most highly sought out product in terms of fiber processing. 20 percent of respondents reported that sell their raw fleeces; while 16 percent reported requesting roving. Smaller numbers reported requesting felted products and value-added apparel and textile items.



The Big Book of Flax sits beside flax roving at Cedar Creek Farm, Somerset, Kentucky; Photo by Sam Hamlin

Markets

Over 30 percent of respondents said that they sell their products at fiber festivals; while around 25 percent indicated that they sell straight from their farms through on-farm stores. Online sales were also prevalent, with many selling on Etsy or from their business websites. Yarn shops and farmers' markets had fewer respondents. It was notable that no respondents indicated that they sold directly to retail apparel stores. This perhaps indicates a trend for smaller-scale producers to sell more directly to buyers, where industrial producers might be more likely to contract with retail markets.

In informal interviews, some farmers said that they sell in a variety of places in order to tap into different markets. For example, one farmer sells at the farmers' market in the summers, online on Etsy and a website year-round, and offers farm tours where customers can purchase fiber directly from the farm while also learning about animal production. Many farmers offer on-farm classes and tours in order to generate greater knowledge about the connection between farms and clothing, while also developing relationships with potential customers.



Where do KY farmers sell their products?

Woven Roots Fiber Story-- Farm to Fashion: Lan Mark Farm and the Feltloom



The Feltloom at Lan Mark Farm;
Photo by Sam Hamlin

In the Central Kentucky, just outside of Sharpsburg, Lanette Freitag and Don Bowles operate [Lan Mark Farm](#), where they raise sheep, llamas, and alpaca. They also operate a small wool mill where they process and dye their own fibers from their farm. Lan Mark Farm is home to the [Feltloom](#), which is a needle felting machine capable of processing natural fibers into felt cloth. What began as a creation that Lanette and Don developed to more efficiently process their own fiber, has grown into a global processing tool for small-scale fiber farmers, processors, and designers across the world. Feltloom is now sold in 17 countries around the globe.

Each year, Feltloom hosts a Farm to Fashion show in Central Kentucky, featuring clothing designed from natural fiber using the Feltloom. This year fashions, many from made from Kentucky farm products, were featured at the fashion show in Mount Sterling, Kentucky.

To learn more about Lan Mark Farm and the Feltloom, and to view their product line, visit their website at <http://www.feltloom.com/>.

To listen to this episode of Woven Roots, visit:
<http://cfaky.org/woven-roots-fiber-podcast-4/>



Farm to Fashion Show in
Mount Sterling, Kentucky,
2017; Photo by Sam Hamlin

Challenges and Needs

Production

— Climate and landscape

Kentucky has a rich history of fiber production. With a strong legacy of hemp production, as well as fiber animal production, many farmers are equipped with the knowledge, tools, and infrastructure to successfully produce quality fiber. Kentucky's climate and landscape can be both an asset and challenge to fiber farmers, particularly for those growing fiber crops. Kenaf, hemp, and flax offer enormous opportunities for Kentucky farmers, though they all face challenges for profitable growth in the region.

Kenaf grows well in warmer climates and the subtropical climate of some places in Kentucky make it an optimal place for kenaf production. However, producing seed can be an issue for kenaf growers due to Kentucky's latitude and climate. Places across the U.S. South with longer warm growing seasons have had better luck producing seed. Seeds can be imported for strong growth in Kentucky, however, this adds to production costs.



Flax harvest at Cedar Creek Farm, Somerset, Kentucky; Photo by Sam Hamlin

The mountainous landscape in Eastern Kentucky makes plant fiber production overall a challenge. Given the lack of small to mid-scale processing infrastructure for fiber crops such as hemp, kenaf, and flax, farmers need to grow fiber crops on higher, industrial scales in order to be profitable. Farmers in Eastern Kentucky are mostly working with smaller plots in the valleys between mountains and therefore, struggle to grow the amount of fiber crops needed to generate profit. Fiber animal producers in Eastern Kentucky are likely to have more success, given the conditions of the mountainous landscape. Fiber animals, such as sheep and goats, can thrive in valleys and on hillsides, therefore allotting farmers more options when it comes to finding adequate farmlands.

Reclaimed mine sites offer potential flat farming land in Eastern Kentucky. Some Kentucky farmers have attempted to grow fiber crops such as hemp and kenaf on reclaimed mine sites. However, both crops require good quality soil and fertilizer to thrive. More investment into replenishing soil quality is needed to successfully grow on reclaimed mine sites.

— Access to capital

The most common challenge that farmers named through surveys and informal interviews is access to start-up capital for starting or expanding production and processing, including access to money to purchase quality farmland. In our producer survey, one farmer stated:

“Without large investments of cash to get fiber processed in larger batches, there is no product for us. And then we have to sit on the inventory to get paid back for far longer than say beef in the freezer. We have not found a way to get things profitable without just waiting until we save up enough for the next larger processing order and then we know it may take a year to get our product back, depending on the mill’s load.”

A vast majority of respondents to our producer survey said that they plan to expand their fiber production. Access to capital that can be loaned with low-interest rates or granted until profit is made is required for significant expansion. Small to mid-scale farmers can be put in a bit of a conundrum between making low profit on low fiber yield but not being able to afford to scale up in order to make higher yields and to gain access to more lucrative market sectors.

— Regulations on hemp production

Hemp is classified as a controlled substance under state and federal law, hemp producers face a unique set of challenges due to the strict regulations on hemp growth. All hemp growers must be licensed through the Kentucky Department of Agriculture. There is a one-hundred dollar nonrefundable application fee, in addition to a five-hundred dollar fee to be licensed as a grower, and a five-hundred dollar fee to be licensed as a processor, and a number of other potential fees. The grower fee is universal across acreage numbers and is sometime prohibitive, particularly for small-scale farmers. In order to become a licensed grower, farmers must have a clear criminal record with no recorded felonies. The equipment needed to harvest and process hemp on a large scale is expensive and there is only one large-scale industrial hemp processing facility in the United States. Some speculate that there will be a lack of investment in the infrastructure needed to grow and process hemp at scale statewide (or even national) until industrial hemp is removed from the national controlled substance list.



Industrial Hemp growing at Pine Mountain Settlement School, Harlan County, Kentucky;
Photo by Sam Hamlin

Processing

— Cost of processing

A common obstacle that all small to mid-scale fiber producers noted was the high, and sometimes prohibitive costs, of fiber processing. Many small-scale producers noted that they do not have access to the markets necessary to be able to sell their products. Without access to abundant markets, the costs, including transport, shipping, and labor associated with value-added processing (requesting finished, sellable products such as clothing items, blankets, and more) makes it difficult for small-scale fiber farmers to covers costs to make a profit. Many small-scale mills find it difficult to compete given the larger,



Wool on Final Frontier Farm; photo by Hope Hart

world-wide fiber market, which is highly saturated with imported textiles and synthetic fibers. Due to the high processing costs of smaller batches of fiber and the lack of strong natural fiber markets, many small-scale mills must raise prices in order to stay in business, making it more difficult for small-scale farmers to afford processing.

— Lack of strong plant fiber processing infrastructure

Though there are many options for small to mid-scale animal fiber processing, options for flax, hemp, kenaf and other fiber crop growers are more limited. Most small to mid-size mills do not have the equipment required to adequately process plant fibers. Some smaller-scale fiber plant growers hand-process their crops, however, the labor costs required to do this can be prohibitive for those seeking to make profit. For those that own their own processing equipment, small and mid-scale operations are more likely to be successful if producers are tapped into a lucrative consumer market. Plant farmers who have the capability of growing at a large scale or who can pool products and profit with other farmers will have access to more profitable markets that require larger scale production scale, such as bio-material production.

Even larger scale processing is limited in the state. [Sunstrand](#), a bio-materials producer and industrial fiber processor located in Louisville, Kentucky, is the only industrial-scale fiber crop processor in the United States. Sunstrand has the capability to process large amounts of hemp, kenaf, and other plant fibers. Though farmers can pay for their own fiber processing in higher quantities, Sunstrand mainly contracts with farmers growing quality fiber crops for fiber that can go into the production of their own product line. Producers would need to grow at least 50 acres to be worth processing and transport costs. Farmer would optimally live within a 100-mile radius of Louisville to lessen transport costs.

Markets

Challenges associated with marketing were overwhelming and the most highly reported, in both the producer surveys and informal interviews.

— Business and marketing knowledge

Some farmers reported a lack of knowledge and skills around business planning and marketing, including market research, branding, and product development. Some sheep and alpaca farmers said that they need better information on market availability based on fleece quality. Some farmers reported having a lot of available fleece, but uncertainty about the quality or if and where it could sell. One farmer/weaver in the region pointed out the difference between design and craft markets. High-end niche fiber markets have a different price point for goods than craft fairs and farmers' markets. Artists and designers in high-end markets must cater to a different clientele and fiber farmers must have an awareness of high-end clientele buying trends to be successful in this market. Many fiber farmers lack significant knowledge around what kinds of products sell in high-end markets.



A local marketing success story-- Tree of the Field's creative product, Fiber Flame Logs, are made of kenaf. They can be found for sale at Whole Foods in Lexington, Kentucky; Photo by Sam Hamlin

— Access to local and regional markets

Farmers who are seeking to sell their products within state lines sometimes struggle to sell their products at prices that make it possible to cover costs. Natural fiber production and processing can be expensive, particularly for small to medium-scale farmers. This means that many products are more expensive than Kentucky buyers are used to. Farmers are more likely to have success in areas outside of the state where wealth is more concentrated, such as coastal cities. One farmer and designer noted in an informal interview:

“A farm fresh hat can sell in Grand Central Station for 135 dollars. I probably couldn’t get more than 60 dollars in Kentucky.”

Some farmers also said that they’ve struggled to sell at farmers markets because of a lack of knowledge around natural fiber production. Many markets will only allow farmers to sell unprocessed fleeces, and will not allow local farmers to sell their value-added products, such as socks, hats, and gloves, especially if some amount of processing has taken place beyond state lines. Farmers market rules about where products are produced that have been developed for food production can be prohibitive for fiber farmers, many of whom process at least a portion of their goods out of state due to pricing and infrastructure.

— Competition in global fiber markets

Perhaps the largest hurdle that fiber farmers and entrepreneurs face is an inability to compete in the broader global fiber market. With synthetic and imported fibers being sold cheaply at most retail stores, it is difficult for smaller-scale natural fiber producers to compete. Due to production and processing costs, most natural fiber products are more expensive than box-store prices, and can be prohibitive, especially for low-income consumers. One survey respondent described this challenge:

“Getting local customers to understand the value of alpaca and handmade homegrown fibers. They want to pay Walmart prices.”

Most natural fiber products are better quality and produced to last much longer than synthetic or cheaply-made products. When consumers do purchase textile products at box-stores such as Walmart, in many cases they are forced to re-purchase goods after a short time due to the low quality and durability of products. If consumers were able to purchase natural, local products, they likely will spend less money in the long-term. However, many consumers lack the money up front to invest in local fiber products.

Competing with imported goods occurs at the level of finished, value-added products, such as clothing, as well as seeds. For example, most hemp seed used for planting in the state is imported from other countries due to regulation issues. Domestically-produced seed would lessen costs of hemp production. Imported hemp products, such as clothing, also can sell for less money in the domestic market, therefore, making it difficult for domestic producers to compete with local fibers.

Opportunities and Recommendations

Production

1. Increase new, young, and minority farmers' ability to access start-up and expansion capital and quality land.

There are several organizations across Kentucky that support new, young, and minority farmers with a range of services including business planning, grants and loans, business development, specialized education and troubleshooting, land access, and more. Non-profit and professional organizations and state and university programs, such as the [Kentucky Center for Agricultural and Rural Development \(KCARD\)](#), [Kentucky State University's College of Agriculture, Food Science, and Sustainable Systems](#),



Alpacas grazing in the sun; photo by Hope Hart

[University of Kentucky's College of Agriculture, Food and Environment](#), [University of Kentucky Cooperative Extension Service](#), [Kentucky Department of Agriculture](#), [Community Farm Alliance](#), [Kentucky Sheep and Goat Development Office](#), and the [Kentucky Alpaca Association](#), offer Kentucky farmers an abundance of opportunities for increased opportunities for capital and land access. However, increased funding and support for expansion of grant-opportunities, land access, and farmer education, particularly for new and potential fiber farmers, would be beneficial to Kentucky's natural fiber sector.

2. Expand educational opportunities for new and potential fiber farmers in Eastern Kentucky.

While there are many resources for fiber farmers to increase farming knowledge and skills, they are mostly concentrated in or near Central Kentucky. Increased opportunities for education for new and interested fiber farmers in Eastern Kentucky would strengthen Eastern Kentucky's fiber production and infrastructure. Given Eastern Kentucky's mountainous landscape, fiber animal production is likely to be more lucrative than plant fiber farming, which requires larger acreage of available flat lands for the best possible yields. Therefore, education on fiber animal care, fiber processing, and product marketing would be particularly useful in Eastern Kentucky. Education and research on the market possibilities for high-value Eastern Kentucky-made products would also be fruitful to help farmers to identify a market-need before investing in production.



Members of the Kentucky Alpaca Association demonstrate alpaca shearing at Kentucky State University's Third Thursday Thing; Photo by Sam Hamlin

3. Pass legislation to fully legalize hemp production, including certified domestic seed production, in order to lessen prohibitive regulations and costs for small and family farmers.

The Kentucky hemp sector, and the natural fiber sector as a whole, would be greatly strengthened by the passage of policy to fully legalize hemp production. Such policy would lessen regulations and costs associated with becoming a licensed hemp producer and processor that are often prohibitive for small farmers. In the meantime, rather than charging a flat-rate hemp production license fee, attaching the production license fee to acreage size would increase financial accessibility for small-scale hemp producers.

4. Invest in replenishing soil quality on abandoned mine lands in Eastern Kentucky.

State abandoned mine lands (AML) money provides potential opportunities for agricultural products on former strip mines in Eastern Kentucky. Plant fiber production requires quality soil for successful growth. Projects that invest in replenishing soil quality on AML sites would increase opportunities for successful fiber plant production in Eastern Kentucky.

Processing

1. Invest in stronger plant fiber processing infrastructure across the state.

Domestic processing capabilities for large amounts of bast fibers like hemp and kenaf are very limited. Louisville-based Sunstrand is a huge asset to the hemp and natural plant fiber market in Kentucky; however, an expansion of processing infrastructure would greatly strengthen the bast fiber sector. Facilities that can process a diverse range of amounts of bast fiber would be beneficial, as well.



Hand-processing flax on Cedar Creek Farm, Somerset, Kentucky;
Photo by Sam Hamlin

Markets

1. Expand and increase opportunities for farmers to learn business and marketing skills.

As mentioned above, there are several nonprofit organizations and university and state programs that assist farmers in marketing and business planning. A full list of available resources for farmers are listed at the end of this document. Despite the availability of resources, in the producer survey and many of the informal interviews, many farmers identified a need for more education around marketing, in particular. This led to the conclusion that more education is needed to make farmers aware of the many resources that are offered throughout Kentucky.

In addition, in one informal interview, a need was identified for education specifically around the difference between high-end and craft markets that entails the benefits and availability of both markets, sales trends and projections, and support in making connections with national high end markets. Support and training around internet sales would also be beneficial for many Kentucky fiber farmers.

2. Conduct a regional and national market analysis for natural plant and animal fiber products and natural plant dyes.

Overwhelmingly, the biggest hurdle facing farmers, mill owners, and fiber entrepreneurs in Kentucky is access to profitable markets. A regional and national market analysis for natural fiber products would be highly beneficial for the Kentucky fiber sector.

3. Develop education programming for farmers' markets about local fiber production.

Though farmers' markets are well-versed in what constitutes a local food product, education is needed around local fiber production and what kinds of fiber should be allowed to be sold at markets. In order to reduce processing costs and develop value-added finished products, such as clothing, many farmers get at least some portion of their fiber processed out of state. For example, many alpaca farmers send their fleeces out of state to mills that specialize in alpaca fiber processing and production. As a result, some farmers have experienced difficulty selling their products at local farmer's markets. Because local food production is quite different from fiber, particularly on the level of processing, standards need to be developed for what constitutes a local fiber product.



Local Cloth display table at Fiber Feel Day at the Farmers Market in Asheville; Photo by Sam Hamlin

4. Increase and expand consumer education about natural fiber products to expand demand.

A consistent comment from farmers about challenges in the sector is consumer awareness about the value of natural fiber. Due to production and processing costs, products made from natural fibers usually cost more for consumers than synthetic and imported products. Consumer education



Kacie Lynn of Fiber Farm in East Tennessee teaches participants in a hemp demonstration how to spin fibers, Livingston, Kentucky; Photo by Sam Hamlin

campaigns that highlight the value and benefits of natural fiber products and production would be beneficial in creating and sustaining new markets. The possibilities for increasing public education on natural fibers are endless. Developing curricula for school-aged children that could be incorporated into science and agricultural programs, increasing support for farmers to hold farm tours and on-farm learning courses, and incorporating the use of natural fiber products into skill and trade building courses on spinning, weaving, and knitting are a few of the ideas that emerged from the informal interviews.

Value-Chain Development

1. Create a public, online inventory of farmers, mills, fiber artisans, and local fiber markets.

Several members of the regional fiber value chain expressed interest in the creation of an online inventory that could increase awareness of production and processing possibilities in the region. Farmers, mill owners, artisans, and designers could use the inventory to identify potential clients. For an excellent example of an online fiber inventory, see [Local Cloth, Inc.'s](https://localcloth.wildapricot.org/directory) membership directory of fiber businesses in Western North Carolina: <https://localcloth.wildapricot.org/directory>

2. Organize a series of textile roundtables to increase collaboration across the supply-chain.

Increased opportunities for farmers, mill owners, artisans, designers, and fiber entrepreneurs to meet and collaborate would be highly beneficial for the growth of the fiber sector as a whole. Roundtables could include panel discussions on regional fiber innovation, skills-exchange, and group discussion on needs, challenges, and opportunities in the fiber and textile sector. In person meetings can foster relationship-building across the sector, as well as information exchange. An excellent example of a fruitful fiber roundtable is [Southeastern Massachusetts Agricultural Partnership's](https://semaponline.org/programs/research/) (SEMAP) Southeastern Massachusetts Fiber & Textile Roundtable: Exploring the Local Supply Chain from Farm to Finished Product. Download the [agenda](#) and [notes](#) from SEMAP's textile roundtable here: <https://semaponline.org/programs/research/>

3. Develop a regional yarn incubation project.

A regional yarn incubation project could bring together Appalachian fiber farmers, natural dye growers, a small to mid-size mill, artisans, and designers to create a collaborative yarn product with a unique Appalachian brand. Fiber producers could source fibers and could work with mill owners, natural dyers, and designers to create yarn brand that could sell in a high value market. A yarn incubation project could be beneficial across the supply chain, and could help to increase national demand for Kentucky natural fiber products.



Naturally-dyed yarns by Phil Willett at Cedar Creek Farm Fiber Day; Photo by Sam Hamlin

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- [1] For more information, see The Slow Fashion Movement. <https://www.notjustalabel.com/editorial/slow-fashion-movement>
- [2] Johns, L. S., H. Kelly, and R. Ruttenberg. *The US Textile and Apparel Industry: A Revolution in Progress*. Research Report, Office of Technology Assessment, Washington, DC, 1987.
- [3] Why U.S. Cotton is No Longer King. ABS/CBN News. <http://news.abs-cbn.com/business/03/16/14/why-cotton-no-longer-king-us-apparel-industry>
- [4] Fast Fashion Is the Second Dirtiest Industry in the World, Next to Big Oil. *Eco Watch*. <https://www.ecowatch.com/fast-fashion-is-the-second-dirtiest-industry-in-the-world-next-to-big--1882083445.html>
- [5] If you're clothes aren't already made out of plastic, they will be. <https://qz.com/414223/if-your-clothes-arent-already-made-out-of-plastic-they-will-be/>
- [6] How your clothes are poisoning our oceans and food supply. *The Guardian*. <https://www.theguardian.com/environment/2016/jun/20/microfibers-plastic-pollution-oceans-patagonia-synthetic-clothes-microbeads>
- [7] Bangladesh Pollution, Told in Colors and Smells. *New York Times*. <http://www.nytimes.com/2013/07/15/world/asia/bangladesh-pollution-told-in-colors-and-smells.html>
- [8] Minchin, Timothy J. *Empty Mills: The Fight Against Imports and the Decline of the US Textile Industry*. Rowman & Littlefield Publishers, 2012, p. 7.
- [9] Minchin, Timothy J. *Empty Mills: The Fight Against Imports and the Decline of the US Textile Industry*. Rowman & Littlefield Publishers, 2012, p. 70.
- [10] Minchin, Timothy J. *Empty Mills: The Fight Against Imports and the Decline of the US Textile Industry*. Rowman & Littlefield Publishers, 2012, p. 11.
- [11] U.S. Textile and Apparel Industries and Rural America. USDA. <https://www.ers.usda.gov/topics/crops/cotton-wool/background/us-textile-and-apparel-industries-and-rural-america.aspx>
- [12] Minchin, Timothy J. *Empty Mills: The Fight Against Imports and the Decline of the US Textile Industry*. Rowman & Littlefield Publishers, 2012.
- [13] Top UK high street brands selling clothes made through slavery. *Anti-slavery.org*. <https://www.antislavery.org/top-uk-high-street-brands-selling-clothes-made-slavery/> and Modern Day Slavery in the Fashion Industry. *The Fashion Globe*. <http://www.thefashionglobe.com/modern-day-slavery-in-the-fashion-industry>
- [14] Fast and flawed inspections of factories abroad. *New York Times*. <http://www.nytimes.com/2013/09/02/business/global/superficial-visits-and-trickery-undermine-foreign-factory-inspections.html?pagewanted=all&r=0>
- [15] *The Carolina Textile District*. <https://www.carolinatextiledistrict.com>
- [16] About. *Fibershed*. <http://www.fibershed.com/about/>
- [17] Alpaca 101. <https://alpaca101.com/types-of-alpacas/>
- [18] Shetland Wool. <https://www.shetland-sheep.org/about-shetlands/shetland-wool/>
- [19] This list only features mills that are accepting new clients and does not include on-farm mills that primarily process internally.
- [20] 6,000-year-old fabric reveals Peruvians were dyeing textiles with indigo long before Egyptians. *Los Angeles Times*. <http://www.latimes.com/science/sciencenow/la-sci-sn-oldest-indigo-dye-20160915-snap-story.html>
- [21] Indigo. *Fibershed*. <http://www.fibershed.com/programs/fiber-systems-research/indigo/>

Directory of Organizations, Institutions, and Resources

Professional producer organizations and associations

- [Kentucky Alpaca Association](#)
- [Kentucky Sheep and Goat Development Office](#)
- [Kentucky Industrial Hemp Association](#)
- [Kentucky Llama and Alpaca Association](#)
- [Kentucky Sheep and Wool Producers Association](#)

Regional educational institutions that offer fiber arts programs

- [Appalachian Center for Craft](#), Smithville, TN
- [Appalachian State University's Art Department](#), Boone, NC
- [Berea College's Weaving Studio](#), Berea, KY
- [Berea College's Art and Art History Program](#), Berea, KY
- [Haywood Community College's Creative Arts Program](#), Clyde, NC
- [John C. Campbell Folk School](#), Brasstown, NC
- [Penland School of Crafts](#), Penland, NC
- [University of Kentucky's College of Fine Art](#), Lexington, KY
- [Warren Wilson College's Fiber Arts Crew](#), Swannanoa, NC

Resources for funding and/or technical support

- [Kentucky Agricultural Development Fund \(KDAF\)](#)
- [Kentucky Center for Agricultural and Rural Development \(KCARD\)](#)
- [Kentucky Department of Agriculture](#)
- [Kentucky Sheep and Goat Development Office](#)
- [Mountain Association for Community Economic Development \(MACED\)](#)
- [United States Department of Agriculture and Rural Development \(USDA\)](#)

Regional fiber festivals

- [Carolina Fiber Fest](#), North Carolina
- [Kentucky Sheep and Fiber Festival](#), Kentucky
- [Kentucky Wool Festival](#), Kentucky
- [Local Cloth's Fiber Feel Day](#), North Carolina
- [Middle Tennessee Fiber Festival](#), Tennessee
- [Olde Liberty Fibre Faire](#), Virginia
- [Paducah Fall Fiber Festival](#), Kentucky
- [Shenandoah Valley Fiber Festival](#), Virginia
- [Smoky Mountain Fiber Arts Festival](#), Tennessee
- [Southeastern Animal Fiber Fair](#), North Carolina
- [Southern Highland Craft Guild Fiber Weekend](#), North Carolina

Kentucky establishments that carry natural fiber yarns and roving

- [A Yarn Crossing](#), Louisville
- [Crafty Hands](#), Bowling Green
- [Fiber Frenzy, LLC.](#), Berea
- [Knitwits](#), Crescent Springs
- [Magpie Yarn](#), Lexington
- [ReBelle](#), Lexington
- [Red Bug Yarn and Gifts](#), Murray
- [The Stich Niche, Inc.](#), Lexington
- [The Woolrey](#), Frankfurt

Episode List of the *Woven Roots: The Appalachian Fiber Story Series*

Woven Roots Fiber Podcast # 1—Stories from the Field

Sam Hamlin interviews alpaca farmer, Alvina Maynard, sheep farmer, Kathy Meyer, and fiber entrepreneur, Ed Crowley. Alvina talks with Sam about why she became an alpaca farmer, her visions for the Kentucky natural fiber sector, and the innovative work that she does on her farm, River Hill Ranch. Kathy Meyer of Final Frontier Farm, talks with Sam about how she got into sheep farming and about discovering the value of her wool. Ed Crowley, a sheep farmer in Versailles, Kentucky shares about his dreams of opening a natural fiber mill.

For the full story, visit: <http://cfaky.org/breaking-beans-fiber-podcast-1-stories-from-the-field/>

Woven Roots Fiber Story and Podcast # 2—Alpaca, Fiber Farming, and the Emerging Slow Fashion Movement

Read the full story of Sam Hamlin's visit to River Hill Ranch and conversation with Alvina Maynard, alpaca farmer and fiber entrepreneur. Listen to an extended interview with Alvina Maynard on alpaca farming and her visions for a sustainable fiber sector.

For the full story, visit: <http://cfaky.org/fiber-podcast-2-alpaca-fiber-farming-and-the-emerging-slow-fashion-movement/>

Woven Roots Fiber Podcast # 3—Kenaf

This episode features interviews with three women about their innovative work with kenaf, crop grown across the world for fiber for thousands of years. Robin Mason, founder of Tree of the Field, talk about the future of kenaf and the sustainable energy sector. Elisa Owen, cofounder of EcoBridge Industries, speaks on the potential of kenaf to have big impacts on the production of biodegradable materials. Maggie Smith and Sam Hamlin visit Irene Thornsburg, who grew kenaf in the 1990s as part of a CFA program to support tobacco farmers in figuring out new economic opportunities.

For the full story, visit: <http://cfaky.org/woven-roots-fiber-podcast-3-kenaf/>

Woven Roots Fiber Story—A Dream of Indigo: Growing Natural Plant Dyes in South Central Kentucky

Sam Hamlin visits Hill and Hollow Farm in Edmonton, Kentucky. She interviews Robin Verson about her sheep and her crop of Japanese indigo. Robin shares about her natural dyeing studio and the art of turning yarns and fabrics beautiful colors with naturally-grown dyes.

For the full story, visit: <http://cfaky.org/woven-roots-fiber-story-a-dream-of-indigo/>

Woven Roots Podcast #4—Lan Mark Farm and the Feltloom

Sam Hamlin travels to Central Kentucky to hear from farmer, mill owner, and fiber innovator, Lanette Freitag of Lan Mark farm and Feltloom. Lanette tells the story about how she and her husband created a needle felting machine that has made a big impact on small-scale fiber production around the globe.

For the full story, visit: <http://cfaky.org/woven-roots-fiber-podcast-4/>

Woven Roots Podcast #5—Industrial Hemp

This episode features an interview with Preston Jones, Assistant Director of Pine Mountain Settlement School. Preston shares about the first year of hemp production at the Settlement School and on how hemp can help Eastern Kentucky farmers to diversify their production to create high-quality, value-added products for niche markets. Kristofer Nonn, Director of Design and Construction at the North Limestone Community Development Corporation talks about building Kentucky's first house hemp house, with walls made of Kentucky-grown hempcrete.

For the full story, visit: <http://cfaky.org/woven-roots-fiber-podcast-5-industrial-hemp/>

Woven Roots Podcast #6—Made in Kentucky: Carlisle's Textile Journey

Carlisle, Kentucky used to be home of two manufacturing plants for Jockey International, a textile manufacturer and distributor of underwear and sleepwear for men, women, and children. In 2004, the town was devastated by the closure of two Jockey plants. However, the economy of Carlisle is currently growing with a movement towards regional economic development and textile revitalization. Sam Hamlin talks with Tracy-Pratt Savage, Development Director in Carlisle-Nicholas County, about how they are revitalizing textiles in the area through innovative production that taps into high-end, niche markets.

For the full story, visit: <http://cfaky.org/woven-roots-episode-6-made-in-kentucky-carlisles-textile-journey/>

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