STATUS OF FLAX FIBER IN NORTH AMERICA

REPORT BY THE NORTH AMERICAN LINEN ASSOCIATION

NORTH AMERICAN LINEN ASSOCIATION

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I. Introduction

Greeting Friends of Flax!

The North American Linen Association's (NALA) "Status of Flax Fiber in North America" report marks the first step in documenting the history, current state, and future of the flax fiber industry in North America. It was created to provide insight into the industry and support NALA's mission of revitalizing domestic long-line linen production. Through the research, survey, data analysis, and interviews, it is clear that there is a keen interest in not only resurrecting the industry, but seeing it surpass what it once was.

In NALA's first three years as an organization, we have been energized by every story about fiber flax production, whether a square-foot plot or a 50-acre trial, because we know the passion and commitment it takes to nurture and process a crop with such deep historical roots. We also know we are only scratching the surface - there are many other flax fiber farmers we are yet to be introduced to so we can learn from their experience and include them in future reports.

The time is right to set the seed for this industry in North America. Consumers are asking for low impact and durable natural fiber options. Brands and manufacturers increasingly seek resilient supply chains that minimize risk by incorporating reliable local and domestic sourcing and production options. Farmers are looking for rotational or alternative crops to mitigate financial and environmental risks, and are interested in augmenting their crop rotations with a plant that can provide both fiber and seed. The flax fiber industry needs more diversity in production regions to reduce overall market volatility when the primary region is impacted and to respond to increasing demand for fiber flax. The success of the flax fiber industry in North America depends on broad-based support across all levels of the value chain. Depending on the organization and its needs, this support may take the form of financing, technical expertise, and skilled labor, as well as specialized equipment and infrastructure.

Our hope is that this report enables flax fiber entrepreneurs and experts alike to develop successful business plans, grants, and investment rounds. It is the result of hundreds of volunteer hours and many generous sponsors - to whom we are extremely grateful.

If you found the Status of Flax Fiber in North America report valuable, please join NALA. Please contact us at hello@northamericanlinen.org to make a donation or for more information.

We look forward to growing together!

Annette

Annette Herboth
President of the Board

II. Executive Summary

PA Flax Square Yard Project flax
Image Credits: Fiona Barrett

Flax is an increasingly popular fiber used widely to make everything from linen for apparel and home textiles, to composites for industrial use. While fiber flax was once widely grown in North America, its production plummeted with the introduction of the cotton gin which vaulted cotton into popularity[1] and the introduction of synthetic fibers production after WWII.[2] Today, only oilseed flax for food and feed is produced at scale on this continent.

NALA is working with organizations, farmers, and companies in the US and Canada to revive the fiber flax crop's production in North America from the start, helping guide both farming and processing practices.

With this report, NALA is creating a baseline for the flax-to-linen industry in North America, documenting the current landscape of flax fiber production and processing as well as outlining challenges and opportunities. We also hope the report will inspire action from farmers, researchers, policymakers, funders, organizations, and brands to revive the domestic production and processing of this crop.

Key findings of this report include:

- Standards are in place or being developed that address chain of custody as well as sustainable production and processing practices. Certification to such standards will be key to substantiate claims and provide verification traceability from the field to the finished product. (Section IV)
- Production of fiber flax is very limited, with less than 200 acres (~80 hectares (ha)) of fiber flax grown in North America as of 2024, according to a 2025 NALA survey (Section V).
- Researchers at several US universities are conducting variety trials to test and develop production practices as well as the viability and quality of the resulting fiber. (Section IV)
- Flax-to-linen has deep historical roots in North America, but the infrastructure was lost with the development of the cotton and synthetic fiber sectors and needs to be built from the foundation up. Virtually all flax fiber production and processing equipment is having to be replaced or reinvented. (Sections IV and V)

Flax fiber prior to processing
Image credit: Adobe Stock

- At this time, Canada has one set of specialized harvesting equipment (puller/turner/baler) and the US has two sets. Neither country has commercial-scale fiber flax processing capability post-harvest, though there will be considerable growth in the next three years as three scutching mills and a refining operation come online. There is one commercial weaving mill. (Section V)
- Key challenges to fiber flax production include lack of available seed; agricultural research into both appropriate varieties and production practices; harvesting, breaking/scutching/hackling and spinning equipment; skilled labor and expertise; transportation and logistics; and private and public investment. All these barriers also serve as opportunities as the flax fiber sector expands to emulate production in areas of the world with a more advanced infrastructure. (Section V)
- There is a wide variety of markets for both long-line and tow (short) flax fibers. While long-line fibers earn higher prices, tow fibers are a complementary market, enabling companies to use the whole plant for different applications. (Section VI)

These findings reflect an urgent opportunity for North America to lead the renaissance of fiber flax production. With coordinated support, flax fiber can deliver a natural alternative to synthetic fibers while providing jobs and creating resilient local economies. Interest in flax fiber is expanding quickly. We urge farmers, industry, institutions, and government alike to support the production and processing of this natural fiber crop with research, grants, and collaborative partnerships that strengthen the entire flax fiber supply chain.

We also invite everyone in the flax fiber sectors to work together and with NALA to revitalize the North American rural economies, with investment and infrastructure being essential to progress.

III. Background On Flax

Image credit: Sharon Kallis

What is Flax?

Flax (Linum usitatissimum) is a bast fiber plant that can be grown for fiber or oilseed. Varieties grown for fiber are bred for long, strong, high-quality fibers while varieties grown for oilseed prioritize seed quality and quantity.

When densely planted for fiber, plants average three to four feet (0.9 to 1.2 meters) in height. In North America, fiber flax is usually planted in March to May and harvested approximately 85-100 days later in July and August, about one month after the flax begins blooming. The plant produces beautiful blue flowers that bloom for just a single day.

Image credit: Eliza Faulkner

What is fiber flax used for?

Flax fiber is used in a wide range of products, from fabrics for home furnishings (e.g., towels, bathrobes, sheets, blankets, bedding), children's products, and apparel of all kinds and styles. Even US currency banknotes are composed of a 25/75 percent linen-cotton blend.[3] It is also used in building materials, animal bedding, industrial twine and rope, paper, and more.

Long flax fibers - often called "long-line" and extending 20-40 inches (one-half to one meter) - are made into woven and knit fabrics primarily for apparel and household linens as well as in high end plastic composites and veneers. Short fibers - or tow (4-6 inches or 10-15 cm long), sometimes called short-line fibers - are used for products requiring reinforcement such as plastic composites, insulation, specialty papers, upholstery fabric, canvas, and twine.[4]

Attributes and Benefits

Flax is a strong and durable fiber. The strength of the fiber means that linen can last decades with proper care. Linen absorbs dye well and does not pill. A cellulosic fiber, it is similar to cotton, but stronger, stiffer, more sunlight resistant, and faster drying. Flax has a high natural luster and is often marked by irregular fiber bundles and texture. The natural color of flax can range from beige to light grey. Flax also has good thermo-regulating properties, providing coolness in hot weather and warmth in cool weather.[5]

In a study carried out on five representative samples of 100% linen, 100% cotton, 100% viscose, and 100% polyester, linen obtained the best results for ventilation and breathability, thermoregulation, and absorption and moisture management.[6]

Ocean of oilseed flax, Saskatchewan, July 2025
Image Credit: Alvin Ulrich

Fiber Flax vs. Oilseed Flax

Two primary types of flax are grown:

1. Fiber flax, used for linen and textile production, and
2. Oilseed flax, grown for its seed, which is processed into food, feed, and industrial products.

A single flax crop can yield both fiber and seed, and the flaxseed meal remaining after oil extraction is a valuable ingredient for livestock and human nutrition.

Flax straw remaining after oilseed flax harvest contains short bast fibers that, while not suitable for high-end linen, can be used in a number of ways rather than discarded or burned. When mechanically refined or processed, these fibers can be applied in short-staple fabric products like drapery, denim, and canvas, as well as paper, nonwovens, insulation, and biocomposites. Utilizing oilseed flax straw in this way provides an opportunity to add value to a byproduct of oilseed production.[7]

By capturing the fiber, farmers can monetize what was previously a zero-value byproduct, improving farm income while supporting the development of regional fiber supply chains. This food–feed–fiber integration strengthens the rural economy and contributes to more resilient, diversified cropping systems.

Currently, oilseed flax is produced on about 12 million acres globally with the largest areas of production in Kazakhstan, Russia, Canada, Europe, and China.[8] In 2022, Canada was the third largest flaxseed producer globally[9] and Saskatchewan's flaxseed production accounted for 85.6 per cent (194,027 metric tonnes or MT)* of Canada's total flax production in 2024.[10] In the US, flax was grown in North Dakota (64%) and Montana (36%)[11] for the seed and oil markets that year.

While its primary focus is to re-establish dedicated long-line fiber flax production in North America, highlighting linen's premium qualities, NALA is supportive of the oilseed sector finding value-added applications for the residual straw given the high volume of the crop grown on the continent.

Statistics Canada does not currently track fiber flax production, but it does track "flaxseed" - or oilseed - production. Statistics Canada reports that in 2024 there were 503,500 acres (203,760 hectors or ha) of seeded flax grown, which includes 417,800 acres (169,078 ha) (83.0%) in Saskatchewan, 40,300 acres (16,310 ha) (8.0%) in Manitoba, and 44,500 acres (18,008 ha) (8.8%) in Alberta.[12] This led to 10.16 million bushels or approximately 258,000 MT of flaxseed produced.[13]

The US Department of Agriculture (USDA) also does not track fiber flax but does track flaxseed production in the US. Flaxseed grown in 2024 totaled 2.42 million bushels (61,450 MT), down 18 percent from the 2023 production. The harvested area totaled 140,000 acres (~56,660 ha) in 2024, down 13 percent from 2023. Harvested acreage in North Dakota, the largest flaxseed-producing state, was estimated at 90,000 acres (~36,422 ha), down 13 percent from 2023. The average US yield for 2024, at 17.3 bushels per acre (~1.09 MT/ha), was down 1.2 bushels per acre (~0.07 MT per/ha) from 2023.[14] Flax acreage in the United States has steadily declined over the decades. For example, North Dakota's total flax acreage has declined from 890,000 acres (360,170 ha) (in 2005).[15]

**Note that units and conversions: Acres are converted to hectares (1 ac = 0.4047 ha). Flaxseed is converted from bushels to metric tonnes using 56 lb/bu. Yield conversions are expressed as MT/ha.*

Fields of Flax in Saskatchewan, Canada. Image Credit: Sonia/Adobe Stock

IV. Flax Production

Blooming flax field
Image Credit: Elen Athewise

While flax fiber is just starting its renaissance in North America today, it was once a widely grown and popular crop across North America. Between the 1840s and 1950s, there was a thriving fiber flax industry in Oregon, Minnesota, British Columbia, Quebec, and other North American locations.

During World War II, linen was a key strategic resource and this designation fueled the industry.[16] New facilities were constructed in North America to compete with European linen.[17] [18] Mechanical harvesters and improved processing equipment were developed in North America that were later adopted in Europe.[19] However, after the war, the government subsidies dried up and competition from synthetic fibers such as nylon became fierce. As a result, flax mills across the US and Canada closed.

On the following pages we look at fiber flax production globally, in Europe, and in North America.

Global

Fiber flax comprised only about 0.3% of the global fiber market in 2024, with around 0.3 million tonnes produced that year. Organic flax — grown according to one of the IFOAM Family of Standards - is grown but at a very small scale.

Approximately 70% of the flax used for fiber in 2024 was grown in Europe, with France being the largest producer. European flax is cultivated in a coastal band stretching from northern France through Belgium and the Netherlands. Other key flax-producing countries are Belarus, China, Russia, Egypt, and the UK.[20]

Figure 1: Global fiber production in 2024 (in million tonnes and % of global fiber production)

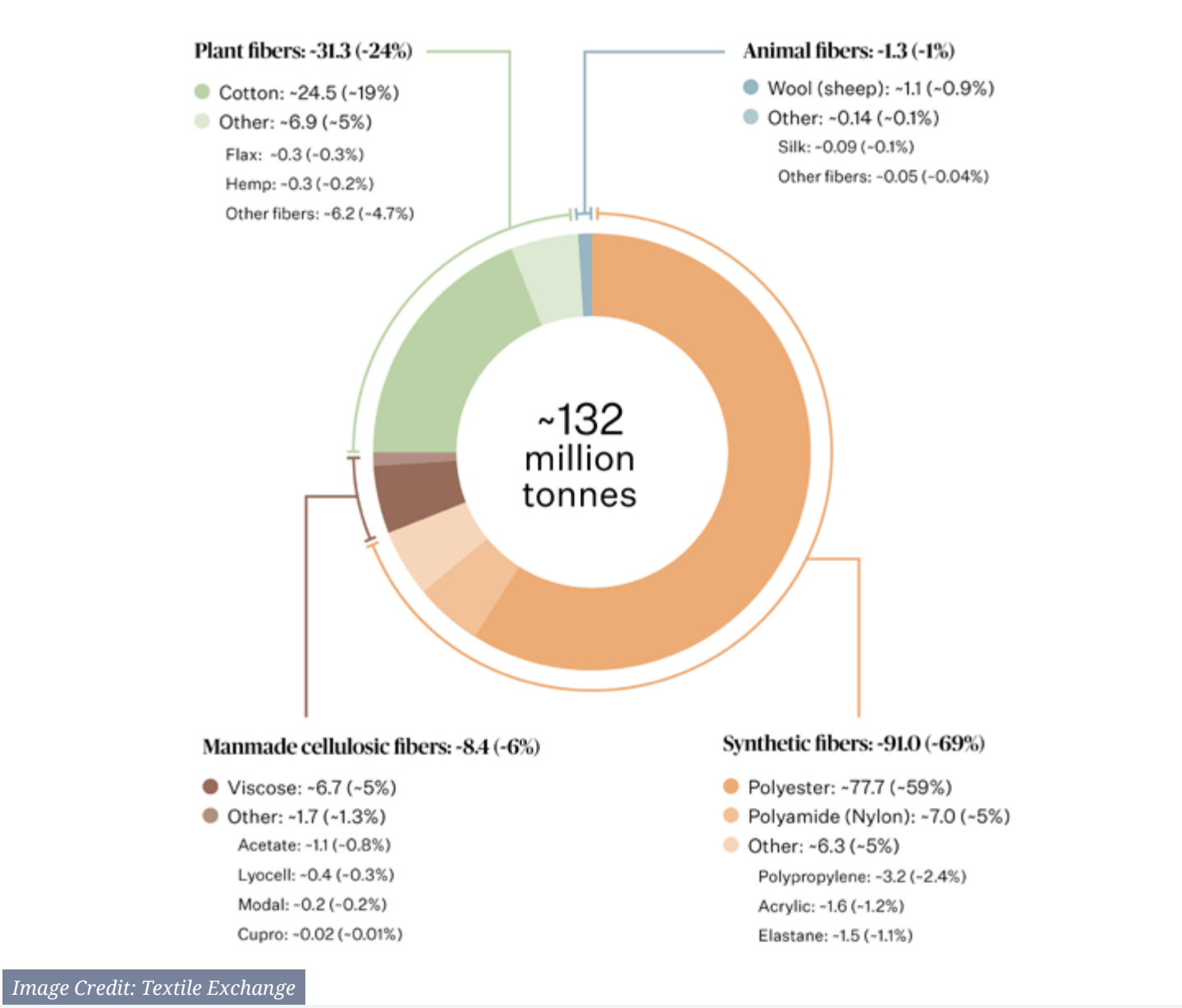


Image Credit: Textile Exchange

Europe

In 2024, 457,145 acres (185,000 ha) of fiber flax were estimated to be grown in Europe, with France accounting for 87% of that.[21] It was expected that ~494,210 acres (200,000 ha) of flax would be in production in Europe in 2025 with 17,000 to 19,000 tonnes processed each month.[22]

North America

Canada

Canada's fiber flax production represents minimal acreage, made up mostly of small plots. Roughly 6 acres (2.4 ha) of fiber flax were produced in Canada in 2024, according to a 2025 NALA survey.

United States

About 110 acres (45 ha) of fiber flax were produced in the US in 2024, according to the 2025 NALA survey. Of that, 10 acres (4 ha) were grown using organic practices on unsprayed or transitional ground. As is the case in Canada, most are otherwise very small plots (see Section V).

Fiber Flax Research at Universities: A Selection

Agricultural research for fiber flax in North America faces significant barriers. Limited availability of suitable seed and germplasm restricts the scale and scope of field trials. Specialized equipment for harvesting and processing—such as pullers, turners, and balers—is scarce, making practical experimentation difficult. In addition, few agronomists or extension programs have experience with fiber flax, and dedicated land for research trials is limited. Combined with constrained funding for this niche crop, these factors slow the development of regionally adapted varieties and best practices, creating a bottleneck for expanding fiber flax production.

A lot of fiber flax production knowledge disappeared with the loss of the plant's popularity in the 1940s. However, research is currently being undertaken at universities from coast to coast in the US. The focus ranges from genetics to yields and weed management. Below are brief overviews of some of the programs.

Cornell University

Cornell started a breeding program in October 2024 with three years of funding from USDA to develop high-yielding fiber flax varieties suitable for New York production for its traditional use for linen as well as biobased products. In May, 2025, Dr. Larry Smart's group started this work by planting more than 230 types of fiber flax from the USDA ARS collection to evaluate them for yield and flowering time. They have also been developing crossing methods and rapid methods to assess fiber quality.

In parallel, they planted almost five acres of three commercial cultivars from Terre de Lin in France provided by PA Flax Project – 'Damara', 'Bolchoï', and 'Aramis' - to gain experience in agronomy, harvesting, and baling, and to characterize expected yields. Their field was planted mid-May and was cut with a sickle bar mower in early October. The stems retted in windrows and were baled with a large round baler when adequately dry.

Image Credit: Cornell University

Breeding trials for fiber flax seed development, Oregon
Image Credits: John Morgan

NC State Flax Research

North Carolina State University Alternative Crops Program planted a fiber flax variety trial in the Fall of 2024. Researchers evaluated commercially available and new breeding lines for fit as a fall/winter crop in North Carolina. They were pleased with the crop performance and think it could be a potential winter crop for many row crop farmers in the region. The researchers are currently working with the PA Flax Project to plant a few acres of fiber flax for an early spring 2026 fiber flax field day.

North Dakota State University

North Dakota State University (NDSU)'s Extension Service at the Carrington Research Center in 2025 planted a fiber flax variety trial coinciding with their annual oilseed flax variety trials. This led to a collaborative flax event organized by Dakota Linen Company, AmeriFlax (North Dakota's flax checkoff organization), and NDSU. The event was well attended by farmers, agronomists, breeders, and other agriculturists.

University of Minnesota

The University of Minnesota has been researching and developing perennial flax to fulfill oilseed and fiber production (as well as other uses, e.g., cut flowers, herbaceous perennials) as an alternative to annual flax. The program has selected plants that can be harvested twice a year (after the first year of establishment) for an early summer and a late fall harvest. Perenniality (winter hardiness) ensures crop regrowth in successive years, thereby conserving soil losses in addition to providing heat/drought tolerance. Perennial flax fibers have similar characteristics to annual flax fiber in both fiber bundle composition and tensile strength. Perennial flax selected for fiber reaches one meter in height and produces stricks approximately 30 inches (76 cm) long.

Independent Breeding Program

Dr. Jennifer Gay Kling, a retired Senior Research Professor at Oregon State University and independent seed breeder, has played a key role in developing flax varieties specifically adapted to Pacific Northwest growing conditions. Since 2016, she has led a fiber-flax breeding program in Oregon focused on building a reliable, regionally-adapted seed supply for large-scale production. Her work targets a suite of traits essential for long-line linen processing, including increased plant height, high bast fiber content, strong fiber-to-shive ratios, uniform stem diameter, lodging resistance, winter hardiness, and overall field vigor.

She also evaluates traits such as retting behavior, disease tolerance, and dual-purpose potential for both fiber and seed yield. Through collaboration with organizations such as Fibrevolution and, more recently, Coast Fibers, Kling is helping establish the genetic foundation needed to support a revived regional linen industry. Her breeding efforts integrate agronomic performance with high fiber quality, enabling potentially scalable fiber flax cultivation across the Pacific Northwest.

Small Grower Narratives

As noted in the NALA survey results (Section V), the majority of flax fiber growers in North America are farming less than one acre. These small growers, however, are central to the revitalization effort by bringing visibility, education, inspiration and opportunity to their communities. Through NALA, we aim to provide a platform for their stories that will accelerate the movement and drive meaningful progress in investment and participation in this new-old industry.

Below are brief narratives of fiber flax growers in Canada and the US.

Alderley Grange

A former NALA board member, Carol Hyland is professional graphic designer, textile enthusiast, and farmer on Southern Vancouver Island in British Columbia, Canada. Since 2021, she has been growing fiber flax (Linore) for seed production in partnership with Field Five Farms, an operation known for producing specialty grains for local craft brewers and distilleries. The farm incorporates flax as a rotational crop between cash crops.

At her farm, Alderley Grange, Carol grows half an acre of flax for personal and educational purposes without the use of chemicals or synthetic inputs. She retts her flax bundles in a small oval agricultural tank, finding that this method provides greater control and consistency over field retting, which can be more time-consuming and weather-dependent. Carol focuses on flax fiber education and supports collective, small-scale processing initiatives that encourage local flax cultivation across western provinces. alderleygrange.com

Carol among her flowering flax fiber crop, 2024
Image credit: Alderley Grange

Carol enjoys providing fiber flax education to school visitors
Image Credit: Growing Young Farmers Society

> "I believe it's essential for people to understand the environmental impacts of fast fashion and microfiber pollution from synthetic materials, while also seeing that real, sustainable alternatives—like fiber flax—are emerging here in North America. I am committed to promoting and advocating for a thriving North American linen industry."
> - Carol Hyland

Natalie Reece

Natalie Reece began her journey in textiles with a background in microbiology, later discovering a deep passion for weaving. As she sought linen from North America, she quickly realized that none was available. Motivated by this gap, she decided to grow fiber flax herself.

Image Credit: Natalie Reece

Her first crop began modestly — a 10-by-10-foot plot in her neighborhood community garden in Minneapolis, MN. When a neighbor offered space on their farm about an hour outside the city, she expanded her efforts. Through hands-on experience, she has learned about the plant's needs, from managing weeds to refining irrigation practices. Natalie continues to harvest flax by hand, storing the straw in anticipation of a future US-based processing mill. Given that she has no interest in hand-processing all of her fiber, her focus remains on weaving and helping to build the infrastructure needed to support domestic fiber flax production.

> "Having access to first-stage processing mills for scutching and hackling as well as spinning mills, would enable me to dramatically expand my work. But this is not just work; it is about bringing change."
> - Natalie Reece

Now living in Minnesota, Natalie draws inspiration from the cultural history of bast fibers in both her home state and Wisconsin, where she grew up. She is an active member of the Minnesota Weavers Guild—the largest in the country—as well as her local Fibershed. Over the next five years, she hopes to help cultivate a network of small, regional producers who can supply straw for future processing facilities.

For Natalie, this work is not just about running a business; it's about creating meaningful change—reviving a local fiber economy, generating new opportunities for farmers, and strengthening the connections between growers, makers, and communities. She notes that "having access to first-stage processing mills for scutching and hackling, as well as spinning mills, would enable me to dramatically expand my work. But this is not just work; it is about bringing change."

She also emphasizes that NALA's strength lies in its members, who together represent the diverse fiber regions of North America. nataliereece.com

Production Standards

There are two primary standards in place that address both chain of custody and flax fiber production practices in North America: national organic standards and the Responsible Hemp Standard, which will be revised to become the Responsible Bast Standard in 2026.

Canadian and US Organic Standards

Organic flax is grown using methods and materials that have a low impact on the environment. Organic production systems prohibit the use of synthetic toxic and persistent pesticides and fertilizers, as well as genetically engineered seed and sewage sludge. Third-party certification organizations verify that organic producers meet strict federal regulations addressing methods and materials allowed in organic production.

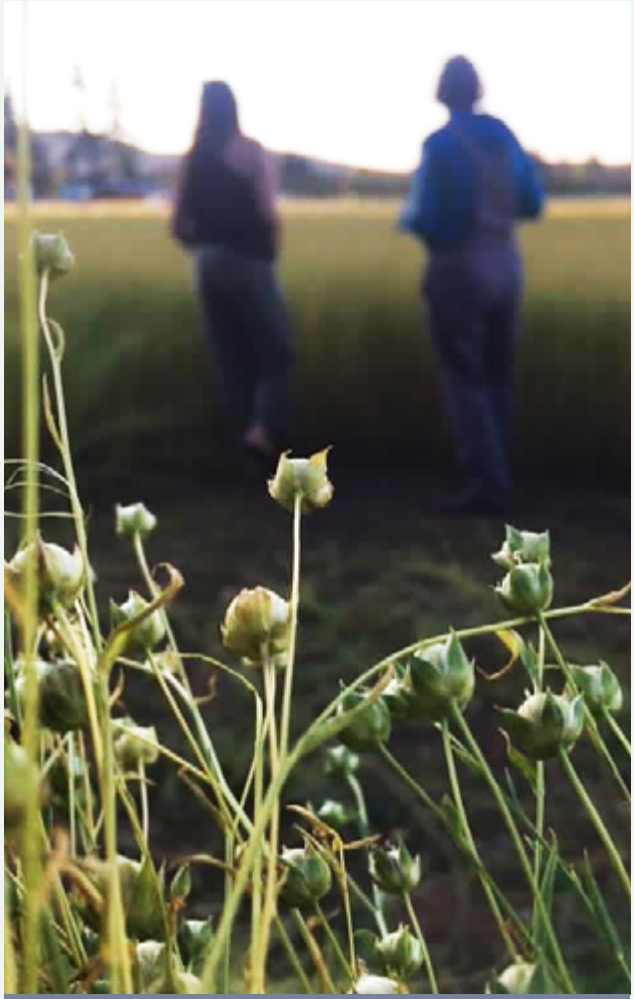
In the US, the USDA's National Organic Program (NOP) sets the standards for organic agricultural production while in Canada that is the role of the Canadian Food Inspection Agency (CFIA). Internationally, IFOAM is the worldwide umbrella organization for the organic agriculture movement and has developed internationally applicable organic "norms" that can be used directly for certification.

Responsible Hemp/Bast Standard

The Responsible Hemp Standard is the first global chain-of-custody program for hemp that certifies supply chains for the crop's many industrial uses, including textiles, nonwovens, food, composites, and animal feed.

In 2026, the scope of the standard will be expanded and renamed the Responsible Bast Standard. It will include both a Responsible Flax Standard and a Responsible Linen Standard under its umbrella, addressing flax fiber cultivation and linen processing.

The standard focuses primarily on fiber production but does include a provision addressing the bleaching stage of processing. In addition to enabling full traceability, it requires a reduction in nitrogen fertilizer use, prohibits the use of Highly Hazardous Pesticides, and includes universally-accepted human rights and labor criteria.



Weavers gather at dusk to learn about local fiber flax. Field Five Farm, August 2023, Saanichton, BC, Canada Image Credit: Alderley Grange

V. Overview of the North American Linen Supply Chain

Image credit: Adobe Stock

Because of the lack of data about flax grown for fiber in North America, NALA conducted a survey in the summer of 2025 to ascertain how much fiber flax was grown in 2024 as well as how it is being grown, harvested, and processed. We received 48 responses to our survey and 46 of those are growing flax for fiber.

Of the 46 respondents growing flax for fiber, 30 (65%) are growing less than 100 square feet or (9.29 m^2). The survey results suggest that less than 200 acres (81 ha) of flax are currently being grown for fiber in North America today. The majority of the respondents to our survey (69%) have been growing fiber flax for less than 10 years.

The process of creating linen from flax includes many post-harvest processing stages. To scale fiber flax production in North America the necessary infrastructure needs to be built for each of these processing stages.

Below we walk through those stages, address the challenges, and identify what is currently the status in North America for each stage. Note that each of these challenges represents an opportunity for improvement and investment.

Fiber Flax Production and Processing Stages from Field to Finished Product

There are multiple production and post-harvest processing stages before flax becomes a finished textile or nonwoven product. Below we provide a brief overview of the production and processing stages for fiber flax for both textiles and nonwovens:

Textiles

Planting, growing, pulling, turning, retting, baling, hauling, breaking, scutching, hackling (long-line) or combing/carding/cottonizing (short-line), drawing and drafting, spinning, weaving or knitting, finishing (including bleaching and/or dyeing), cutting, sewing, and final assembly.

vs

Nonwovens

Planting, growing, pulling, retting, baling, hauling, breaking, shaking, cleaning, carding, and non-woven web formation and bonding, and final assembly.

Figure 2: The Flax to Linen Stages (see also "Definitions")

Seed

One of the primary barriers to revitalizing fiber flax production in North America is the limited availability of suitable seed. Most fiber flax seed is produced in Europe, where recent years have seen reduced yields and constrained supply.[23] Other international sources are limited, making access to high-quality seed a critical challenge for growers.

Developing a reliable domestic seed supply is essential for the long-term success of fiber flax in North America. Investment in seed breeding, production, and distribution will provide the foundation needed to expand cultivation, improve regional fiber flax industry, fiber quality, and support a sustainable regional fiber flax industry.

Flax Seed Varieties Grown In North America

According to the survey conducted by NALA, the most popular flax seeds planted for fiber in North America today are the Linore variety, which was grown by 25 respondents. Linore is a flax variety developed by Oregon State University in 1962. Fibrevolution has since expanded production of this variety to a commercial scale for distribution across North America. As an open-source variety with no associated patents or royalties, Linore is more accessible and widely available than many other flax cultivars. Other varieties grown by our survey respondents include Avian (17), Lissette (5), Natalie (5), Aramis (4), Christine (2), Damara (2), Bolchoi (2), Marilyn (2), and Emeraude (2). Varieties mentioned only once include Cascade, Ariane, Golden Omega, lewisii, Linore/ Agatha, perenne hybrids, Appar, Maple Grove, Liral Crown, and unnamed and proprietary varieties.

Harvesting

For long-line flax production, plants are typically pulled rather than cut at harvest. Pulling removes the plant intact, keeping it in one piece, which supports more uniform retting. Although the roots contain no fiber, leaving the plant uncut allows moisture loss and microbial breakdown to occur evenly along the length of the plant, resulting in more consistent retting and easier downstream processing.

Historically, hand-pulling was standard practice in traditional European flax production, and modern mechanized pullers replicate this process to maintain fiber integrity. For North American growers aiming to produce premium, long-line flax fiber suitable for spinning, pulling remains essential to achieving the desired strength, fineness, and continuity of the fiber.

Harvesting in North America

The vast majority of our respondents, 43, are hand-pulling to harvest their flax. Three respondents are combining/cutting. Only one respondent is using a flax pulling machine. Two did not indicate how they are harvesting.

To NALA's knowledge there is only one set of harvesting equipment (puller/turner/baler) in Canada (Biolin) and two sets in the US (Coast Fibers and PA Flax).

Garth Kahl, of Independent Organic Services, harvesting flax with a puller in Oregon, 2023.
Image Credits: John Morgan

Retting

Following harvest, fiber flax needs to go through the retting stage, a process which encourages the partial decomposition of the plant. Decomposition of the pectins that bind fibers to the other parts of the stems or leaves allows for the easy extraction of the fibers from the stem.

Water retting consists of soaking the harvested flax in a tank of water and allowing it to partially decompose. Water retting typically works faster than dew retting.

Dew retting consists of laying the flax on the ground in the field after harvest and allowing the natural moisture from dew to partially decompose the pectins over time. Today, for water sustainability and logistical reasons, dew retting is the most popular methodology of retting globally.

Weathering, or wintering, is a version of retting where the farmer leaves the plant standing, unharvested, in the ground over the winter to partially decompose.

Retting in North America

Of the respondents to our survey, 31 are water retting their flax, 20 are dew retting their flax, and two are weathering their flax. Six respondents are both water and dew retting. One had not yet retted the flax they are growing. None of our respondents are using enzyme or chemical methods to ret their flax.

A field of flax undergoing dew retting, Oregon 2018
Image Credits: John Morgan

A European flax bale entering the breaking and scutching line, scutched flax fiber exiting the scutching line, scutched flax passing through a hackling line, and hackled flax fiber ready for spinning.
Image Credit: Shannon Welsh

Breaking and Scutching

Once the plant is retted, the fiber must be separated from the inner woody core. Breaking crushes the woody core of the plant, scutching scrapes the woody core and short fibers away from the long fibers, and hackling combs the long fibers into a neat strick that is ready to be spun into yarn.[24]

A major challenge in scaling fiber flax production in North America is the lack of processing infrastructure. Essential steps such as scutching and hackling—critical for separating and preparing long-line fibers—are largely absent in the region due to the demise of the historical linen industry. Without commercially available first-stage processing, farmers cannot scale up field production as there is no way to get the fiber they grow to market. This lack of local processing capacity also leads to higher costs, limited access, and delays in producing quality fiber.

Scutching in North America

Forty-five respondents (98%) reported hand-scutching their flax, often alongside other methods. In addition, two respondents are using small machines (throughput of 1–10 kg/hr), and one is reportedly using commercial-scale machinery (throughput of 200–1200+ kg/hr). These findings highlight the limited availability of appropriate scutching equipment.

Today, there is one small-scale scutching mill and equipment producer in Canada (TapRoot Fibre Lab) and one scutching mill in California (Golden State Linen). Canflax (Canada) and three US companies—Coast Fibers, Dakota Linen Company, and PA Flax—are actively working toward the development of commercial-scale scutching mills.

To demonstrate the flow, images above show a flax bale entering the breaking stage of a scutching line, scutched flax fiber exiting the scutching line, scutched flax passing through a hackling line, and hackled flax fiber ready for spinning or other fiber-based applications. The above photos were taken in Europe.

Mechanical Refining

Mechanical refining of flax fibers begins after scutching, which removes the bulk of the woody shive. The primary step, hackling (combing), draws fibers through progressively finer metal combs to align them, remove remaining impurities, and produce long, uniform line fibers suitable for spinning. These refining steps, also called softening, opening, or cottonizing, further separates and softens the fibers to improve pliability and spinnability. These refining steps ensure that flax fibers meet the quality and consistency requirements for spinning and other fiber applications.

TapRoot Fibre Lab's linen yarn spinning machine. Image Credit: TapRoot Fibre Lab

Flax being prepared for processing on bast fiber line. Image Credits: Renaissance Fiber

Mechanical Refining in North America

Renaissance Fiber in Mocksville, NC, is adapting its mechanical refining line, originally designed for degummed hemp, to also process fiber flax. The new bast fiber system focuses on fiber length control, fiber fineness, and fiber adhesion, producing cotton-staple and potentially longer fibers for blending with other natural fibers. Adjustable refining settings will be tested for flax compatibility, with trials concluding by Q2 2026. With success, the line will support flax and other bast fibers by mid-2026.

Spinning

The spinning of long-line flax fiber (0.5 to 1.0 m or roughly 20 to 40 inches) requires specialized spinning equipment that is different from and much less common than spinning equipment used for short fibers. For many decades, cotton dominated the world market for yarn and fabrics. When synthetic fibers became popular in the 20th century, producers extruded and cut the majority of their fibers to match the diameter and length range of cotton fibers —approximately 3/4 to 2 inches (19–51 mm)—so the same cotton spinning equipment could be used. Over time, this has resulted in most of the world's spinning equipment being designed to spin fibers that have the dimensions of cotton. The majority of the remaining spinning systems are set up for spinning wool.

Spinning in North America

Addressing long-line spinning capacity remains a critical gap in the North American linen supply chain. To NALA's knowledge, only one small-scale linen yarn spinning operation - TapRoot Fibre Lab in Canada - exists, and there are no industrial-scale long-line spinning mills anywhere in North America. In addition, linen yarn is typically wet-spun, a capability no North American spinning mill offers.

Pennsylvania-based Tuscarora Mills is currently North America's only known commercial linen weaving mill
Image Credits: Tuscarora Mills

Weaving

Flax is a durable, strong fiber which are excellent qualities but they influence the weaving process. The naturally inelastic and stiff fiber requires more careful handling than weaving cotton or wool.

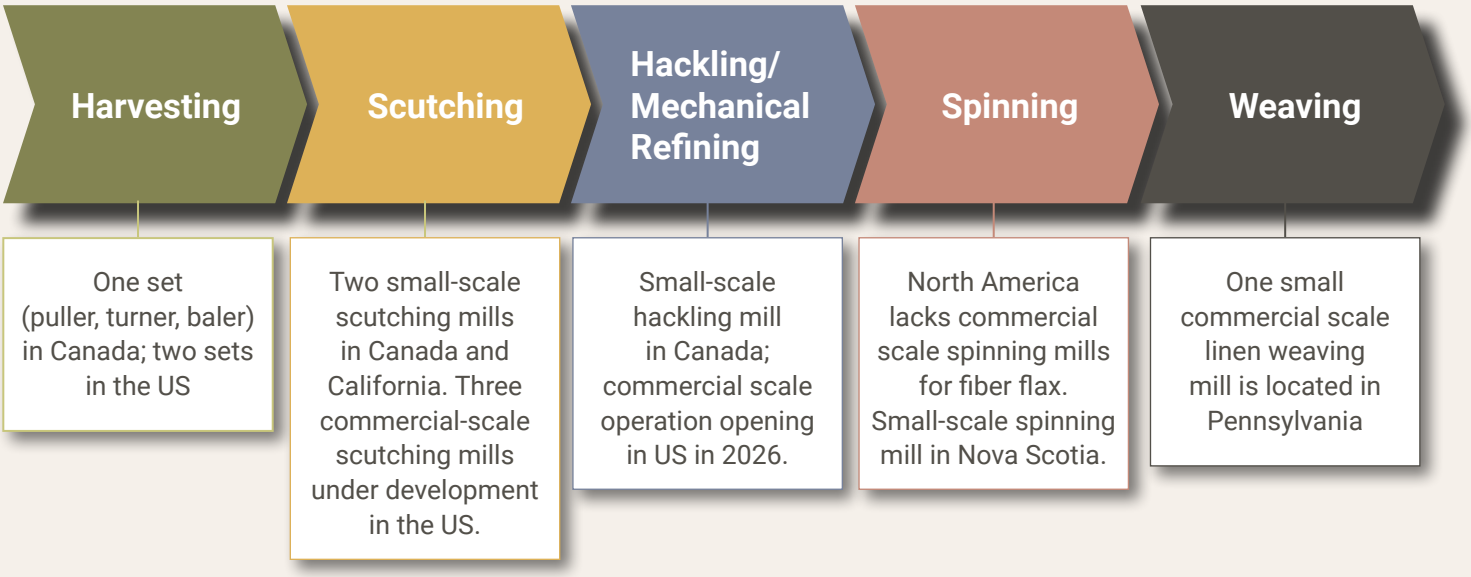
To prepare and weave high-quality linen fabrics requires highly skilled technicians and careful attention to the process and machinery. Maintaining a higher humidity level is essential to impart strength and to more easily control the linen yarn. The yarn's inelasticity requires precise and consistent tension to avoid breakage and fabric irregularities. Similarly, slower weaving speeds may be needed to maintain quality and reduce breakage.

While linen can be woven on the same types of looms as cotton, wool, or other fibers, the unique qualities of linen require more skilled and careful handling, which results in a premium quality material.

Weaving in North America

Currently, Tuscarora Mills in Pennsylvania is the only known commercial linen weaving operation in North America.

Figure 3: 2025 Status of Fiber Flax Supply Chain Infrastructure in North America



Challenges and Opportunities in the Fiber Flax Sector

Given the nascent nature of the fiber flax sector in North America, there are several challenges facing the industry, including finding skilled labor and expertise after decades without production, transportation and logistics on a massive continent, and investment from both the private and public sectors.

However, these challenges can become opportunities for those seeing the successes already witnessed in other fiber flax regions.

Skilled Labor and Expertise

The North American fiber flax industry faces a shortage of skilled labor and technical expertise, both of which are essential for successful cultivation, harvesting, and fiber processing. Decades of dormancy in the industry have resulted in much of this expertise disappearing, leaving few agronomists, processors, or farm workers with experience in growing and handling fiber flax.

Together, these factors restrict the growth of a skilled workforce, inhibit efficient production, and slow the development of a sustainable North American fiber flax industry.

Transportation and Logistics

Fiber flax production in North America faces significant challenges due to the continent's vast geography and limited infrastructure. Moving harvested flax from dispersed farms to processing facilities requires careful coordination, specialized handling, and access to reliable transport networks.

With few local processing hubs and limited equipment for handling long-line fiber, transportation can be costly, time-consuming, and prone to delays. These logistical constraints restrict the ability of farmers and processors to scale operations efficiently and make it difficult to develop a cohesive, regional fiber flax supply chain.

Investment

To develop a fiber flax industry in North America, there needs to be investment from the public and private sectors as well as support from government programs. The success of the US cotton industry is a good reference for what can be achieved when policy, resources, and investments are directed. Unlike major commodity crops, fiber flax today receives minimal government research and development support, constraining the development of regionally adapted seed varieties and agronomic practices, as well as processing infrastructure.

Some investment challenges include:

Insufficient Infrastructure Investment
Specialized equipment for harvesting, processing, and spinning—such as pulling, scutching, and hackling machines—is costly and largely unavailable in the region. Limited access to capital, coupled with the niche status of fiber flax, makes it challenging for farmers and entrepreneurs to invest in the infrastructure, equipment, and training necessary to cultivate and process the crop at scale. Without government incentives or grants, private investors are often reluctant to fund new processing facilities, leaving a critical bottleneck in the supply chain.

Fragmented Policy and Support Programs
There is no coordinated framework at the federal or state level to support fiber flax production, marketing, or infrastructure development. Farmers and small-scale producers must navigate fragmented programs, limiting their ability to scale production efficiently.

Market Development Constraints
Limited government support for promotion, trade, and certification programs reduces the visibility and competitiveness of North American fiber flax in domestic and international markets.

Patient Capital Required/Capital Intensive
The term “patient capital” refers to projects needing significant time to provide a market return. Although this doesn’t take away the financial validity of projects, many private investors are looking for quick returns on their investment, making fiber flax processing projects tough to attract common capital. Scutching mill projects take millions to get funded and often take a few years to generate revenue.

Stooked flax at a PA Flax event. Image Credits: Sandra Marquardt

VI. Fiber Flax and Textile Market Overview

Image Credits: Adobe Stock

Long-Line and Tow Market

Once one of the world's most common textiles,[25] flax today represents less than 0.3% of global apparel fibers in use[26] due in part to competition from cotton and synthetic fibers. Flax is experiencing a resurgence of interest. Western Europe, where the majority of today's fiber flax is grown, faces both climate instability and a lack of sufficient land to expand production. As such, the fiber flax industry is looking to North America for new sources of raw materials.

The following pages provide an overview of both long-line and tow purchasers and pricing, as well as an overview of the use of fiber flax for composites.

Long-Line Purchasers

In 2024, China was the largest purchaser of flax fiber globally, importing 429,674,884 lbs (194,897,249 kg) of fiber, which includes 160,481,723 lbs (72,793,285 kg) from France and 103,562,148 lbs (46,975,000 kg) from Belgium.[27]

Because spinning long-line flax requires specialized spinning equipment, the major buyers of long-line flax are companies with spinning systems capable of handling long fibers. Labor is a major cost in spinning long-line fibers, and China now strongly dominates the long-line spinning industry. Other countries purchasing significant quantities of long-line fiber for spinning include Russia, Belarus, Egypt, Ukraine, and India.

Long-Line Fiber Price

The global average price of fiber flax, yarn, and linen varies. Actual prices that producers receive are often kept semi-secret and depend on factors such as quantity, the duration of time the fiber can be supplied, the reputation of the seller, the location, and the consistency and quality of the fiber. In Europe, domestic and foreign spinners may go directly to large flax fiber brokers/traders or producer groups to negotiate prices and quantities.

France, Belgium, and the Netherlands are the major exporters of flax fiber.

In recent years, unfavorable weather in that region had reduced supply, and long-line fiber prices had risen to as high as $4.08/lb (€9/kg) in March, 2024. By October, 2025, increased availability meant the average post-scutching price amounted to $2.96/lb (€6.52/kg).[28]

By examining UN Comtrade data from 2024, we calculated average worldwide prices, which do not yet include North America. Our analysis showed that the global average price for fiber flax (HS code 5301) was approximately $1.57/lb ($3.47/kg). In comparison, flax yarn (HS code 5306), which requires further processing, has a higher average price of $7.35/lb ($16.20/kg). Finished flax fabric (HS code 5309) has an average price of $7.80/lb ($17.20/kg). In our members' experience, prices for finished fine linen fabric are often quite different from this worldwide average.

Tow Market

When fiber flax straw is processed for long-line fiber, 30 to 60 percent of the fiber will be "tow." Tow is made up of early fibers produced when the plant was young and late fibers produced at the end of the growing season. Additionally, tow fibers can also be produced during the scutching process when long fibers break into short tow fibers.

Tow fibers were traditionally used to make thicker, coarser yarns for rougher fabrics, for stuffing and wadding in furniture, for specialty paper and for ropes and nets. In more recent decades, tow fibers have been increasingly used as a lighter-weight, more environmentally friendly replacement for fiberglass.

Since tow fibers and fiber bundles are often the length and diameter of wool fibers, wool spinning equipment can be modified to spin flax tow. Tow fibers can also be "cottonized" with mechanical, chemical, or other methods to make the dimensions of the tow fibers similar to cotton that can be spun in blends with cotton or synthetic fibers.

Tow Purchasers

Buyers of flax tow are many and varied throughout the world and even in North America there are thousands of potential buyers. The potential demand is growing quickly as companies and their customers search for alternatives to glass and synthetic fibers. Some spinners and plastic composite makers are already buying tow fibers but most potential buyers want an assured supply of consistent fibers before they start buying and using. In Europe, tow fibers are often bought by flax fiber brokers who have access to equipment that can blend various small lots of tow fibers together to make large consistent lots that can be supplied every month. This greatly enhances the marketability of small lots of tow fiber to large users like insulation makers and car part manufacturers.

Plastic composite manufacturers, wool spinners, cotton spinners, geotextile and erosion control product manufacturers, stuffing, wadding and mattress makers, filter companies, soundproofing material manufacturers are all potential users of flax tow. Unfortunately, at this time, there is a lack of flax fiber brokers in North America that could buy small lots of tow and blend and resell them in consistently supplied large lots of tow.

Tow Price

Like long-line fibers, the price of tow fibers can vary widely depending on volume, length distribution, cleanliness, fiber diameter distribution, location, color, strength, seller reputation, consistency of supply, end use, etc. The least expensive tow fibers generally come from inconsistent, unretted, or slightly retted straw with 30–40% shive and are used to make specialty paper. In the experience of our members, prices for these tows range from $0.23 to $0.36/lb ($0.50 to $0.80/kg).

The most expensive tows are very consistent, generally come from well-retted straw, and contain less than 2% shive. These are used to make cottonized fiber or higher-end plastic composites, with prices ranging from $0.82 to $1.59/lb ($1.80 to $3.50/kg). Most fiber for other end uses would command prices somewhere in between. DNFI reports an average price of $0.92/lb ($2.03/kg) for short fiber in mid-2025.[29]

Fiber flax composite samples.
Image Credits: Patrick Flaherty, PF DesignLab

Flax Fiber Composite Market

Flax fiber is used in the natural fiber composite market where flax fibers dominate over other natural fibers due to superior mechanical performance. Although not directly competitive with carbon or glass incumbents, surprisingly flax fibers have lower densities than both glass and carbon making their utilization compelling. In addition, they have superior vibration damping properties and can provide competitive pricing to their synthetic counterparts. The European market has shown early adoption in sports equipment and automotive applications for these reasons. In fact, flax has been introduced into the automotive industry as major companies like BMW look to incorporate natural fiber composites to replace glass fibers in their future models.[30]

Lingrove in California produces Ekoa®, a flax veneer that can replace exotic rainforest woods.[31]

VII. North American Fiber Flax Processing Industry Leaders

A wide range of products are derived from flax fiber. Image credit: Yevhenii

While the industry is in its nascent stages in North America, there are new companies joining the effort at an increasing pace, with a small but expanding number of companies in North America developing commercial processing (scutching and fiber refinement) capacity suitable for long-line fiber flax.

The following is a selection of some companies advancing the North American fiber flax supply chain. This is not an exhaustive list; as the industry expands, we anticipate adding more companies in future reports.

Biolin Research Inc. in Saskatchewan, Canada, operates a pilot straw processing plant to learn how to produce high-quality and high-yield flax fiber from fiber flax. Emerging regional players such as Coast Fibers (Oregon), Dakota Linen Company (North Dakota), the PA Flax Project (Pennsylvania), and Canflax (Quebec) are actively building new capacity for textile-focused long-line fiber processing, with plans to establish scutching mills in their states and provinces by 2028.

Renaissance Fiber is developing a mechanical bast fibers refining process in North Carolina to tailor bast fiber properties to match cotton staple metrics, and Tuscarora Mills (Pennsylvania) is already weaving a variety of linen and linen-blend fabrics.

Together, these efforts signal a renewed and growing North American bast fiber infrastructure, capable of supporting both dedicated fiber flax production and the valorization of oilseed flax straw at scale.

Biolin Research Inc.

Located in Saskatoon, Saskatchewan, Biolin Research Inc. carries out a wide range of research activities to learn how to produce high-quality commercial-scale fiber and shive from both fiber flax and oilseed flax that will have multiple possible applications, including linen textiles. They have also done considerable work with grading and testing of flax straw and fiber for quality in conjunction with ASTM and other groups.

Canflax

Founded in 2023, the Quebec-based company Canflax is helping to pioneer the revival of the flax industry in North America. Its goals include scaling production to around 3,000 acres (~1,214 ha) and opening the first scutching mill in Quebec by 2028.

Canflax links farmer output with industry need by offering turn-key market access to Quebec farmers with high-quality fiber flax varieties, harvesting services with pullers, turners, and balers, primary transformation, and market access. It owns and distributes specialized European harvesters across North America. It also offers a retting service, pulling, monitoring, and turning the crop as needed to produce the highest quality retted fiber and net the highest return for the farmer.

Canflax adds value to existing fiber crops by offering turn-key project management to new flax and hemp projects across North America with access to European harvesting and transformation technology, expertise, and access to the luxury fiber market.

Coast Fibers

After eight years of advancing local flax fiber and linen production in Oregon, Coast Fibers was founded in 2024 by the team behind Fibrevolution—a pioneering Oregon-based organization dedicated to reviving the flax and linen industry through the development of a sustainable, regionally integrated fiber and textile supply chain. Joining forces with a fellow agricultural entrepreneur, Coast Fibers brings to life its vision of a fully operational flax fiber processing facility and an integrated supply chain—from seed to finished fabric.

Fibrevolution's extensive experience in flax cultivation, seed variety development, and research of first-stage fiber processing laid the foundation for Coast Fibers' mission to revitalize and expand fiber and textile production on the US West Coast and across North America. Oregon was historically a national leader in linen production and has a proven track record of producing high-quality flax fiber, making it an ideal location for rebuilding this industry. Their first-stage processing facility is scheduled to be operational in the Willamette Valley of Oregon in 2027, marking a major step toward re-establishing a regional, sustainable linen industry.

Pennsylvania Flax Project

The Pennsylvania Flax Project (PAFP) was founded in 2020 with a mission to re-establish the commercial-scale fiber flax industry in Pennsylvania and the greater Mid-Atlantic region. In the spring of 2025, PAFP planted 30 acres (~12 ha) of fiber flax in Chester, Montgomery, and Lancaster counties. This initiative marked a milestone, becoming the first mechanically harvested fiber flax in Pennsylvania.[32] Looking ahead, PAFP plans to establish a cooperatively owned scutching mill in 2028 that will be able to process roughly 3,000 to 5,000 acres (1,214 to 2,023 ha) of flax each year.[33]

The organization also has a robust educational program working to revitalize the culture of flax in the Mid-Atlantic region. It offers hand processing events, speaking engagements, and celebrations in the fiber flax fields of Pennsylvania, and its Square Yard Project is one of many similar initiatives around the world. Participants are guided through planting and tending fiber flax in their own gardens and gather for processing events.

Dakota Linen Company

North Dakota already accounts for the vast majority of US flax acreage due to its unique, cooler growing season climate that is ideal for flax cultivation. With farmers already being familiar to flax, robust state incentives for value-added agriculture, and ideal soil/climactic conditions for flax production, Dakota Linen Company aims to transform agriculture in the high plains by providing another valuable broad-leaf cash crop for agricultural crop rotations that can create wealth for farmers and rural communities.

Renaissance Fiber

Renaissance Fiber is a pioneer of advanced processing of bast fibers, with a primary focus on hemp and expanding potentially into flax. Its proprietary process integrates both degumming (a wet process) and refining (a mechanical process) to unlock the full value of the fibers.

While the company's main expertise lies in degumming and refining hemp, it has also experimentally processed flax, bypassing traditional retting to produce lustrous linen fibers. This will be further evaluated through direct performance comparisons and eventually scaled.

A core innovation of Renaissance Fiber is developing a mechanical bast fibers refining process, tailoring fiber properties—including fineness, length uniformity, and fiber adhesion—to match cotton staple metrics. This enables seamless blending and spinning of bast fibers such as hemp and flax using short-staple yarn spinning technology, which represents over 90% of global installed capacity. By making bast fibers compatible with the most widely used yarn spinning equipment, the company aims to dramatically expand the relevance and adoption of sustainable natural fiber alternatives.

In 2026, Renaissance Fiber is completing a first fit-for-purpose bast fiber refining line in Mocksville, NC, designed for precision manipulation of fiber metrics. This line's adaptable settings will allow for optimized processing for either hemp or flax, with the ability to produce both short- or long-staple fibers at scale.

Tuscarora Mills

Based in Bedford, Pennsylvania, Tuscarora Mills weaves quality fabrics, often on vintage looms, using natural materials for American markets and consumers. This includes European-spun flax yarns in both natural and white resulting in durable textiles for apparel, home, and industrial use.

The team at Tuscarora Mills looks forward to sourcing these high quality yarns from the US.

Hand-printed linen fabrics by textile brand Lake August
Photo Credit: Lake August

VIII. Call to Action

To resurrect the fiber flax sector in North America, it will take a village - it will take the full spectrum of partners from farm to finished product to work together across boundaries, sharing and collaborating at every step.

Below we provide recommendations for everyone along the flax supply chain, from farmers to researchers, industry partners, funders, policymakers, and even the general public.

Recommended Actions for Leaders

- **Farmers / Growers**
  - Produce flax using environmentally responsible practices
  - Consider leveraging standards that address chain of custody, traceability, and environmentally responsible practices.
  - Work collaboratively between regions and industries
- **Industry Partners**
  - Commit to supporting North American flax fiber production
  - Invest in the industry at both the production and processing stages
  - Encourage your supply chain to leverage standards that address chain of custody, transparency, and environmentally responsible practices.
  - Become a NALA member to support advancing the industry
  - Support research, investment, and promotional efforts
- **General Public / Advocates**
  - Support entities producing flax fiber in North America throughout the supply chain
  - Expand networking and collaboration opportunities with organizations in the natural fiber space
- **Funders & Policymakers**
  - Provide grants and loans for agronomic research, processing facilities, and education
  - Keep the value chain in North America. This supports the rural and industrial economy and reduces the impact and cost of transportation miles
  - Recognize and include flax fiber as a specialty crop within federal and state specialty crop lists to support its development and eligibility for agricultural funding programs
- **Researchers**
  - Undertake research into fiber flax breeding for varieties suitable to North American production
  - Study low- or non-toxic methods of flax production

IX. NALA: Progress Made and Vision for the Future

The North American Linen Association (NALA) was founded on the idea that a collaborative trade association could accelerate the flax fiber industry faster than individuals working in isolation. Since its establishment in September 2022, NALA has made great strides:

- Implementing foundational operations
- Developing valuable resources, policy positions, and educational and networking opportunities
- Growing membership and partnerships
- Increasing awareness and visibility of the vast potential of the flax fiber industry in North America
- Building a supportive community of flax fiber enthusiasts across the continent.

NALA's vision is to revitalize the flax fiber industry in North America.

There is a long history of flax being a highly valued agricultural and domestic crop in North America from the early days of North American exploration into the mid-20th century. As you will see in the report, today, fiber flax is grown all across North America in back yards, universities, farms, and private test plots. North America has the conditions, the land mass, and the will to re-establish what was once a thriving industry.

We understand that to create a successful industry, we need to address every step in the supply chain, from seed to shirt. Our mission and strategy focuses on:

- **Flax Fiber Agriculture**
  - Developing preferred production practice guidance
  - Researching flax fiber production in North America
  - Introducing farmers to the benefits of and opportunities for growing flax for fiber
- **Processing Infrastructure**
  - Defining scope and priorities regarding flax processing and manufacturing
  - Providing cross-collaboration with processors of both fiber and oilseed flax to build capacity
- **Textile & Industrial Manufacturing**
  - Offering consumer and industry education around flax fiber benefits and characteristics in support of developing a North American supply chain
- **Flax Fiber Co-Products**
  - Identifying value streams for converting flax fiber and oilseed fiber waste into co-products to provide added value to farmers

NALA's values are the filter through which we work. We are committed to protecting the planet and people in all we do. We believe that natural fibers, grown responsibly and respectfully, will lead to a more equitable and sustainable future. And we feel that's a story worth sharing through education and awareness.

Figure 4: NALA Vision, Mission, and Values

OUR VISION

Bring together interest groups from all stages of the supply chain to revive the North American flax fiber industry including linen, nonwovens, composites and co-products.

OUR MISSION

Lead the transition toward a resilient and sustainable flax fiber industry in North America rooted in environmentally responsible practices and focusing on the development of:

1. Commercial Flax Fiber Agriculture
2. Flax Fiber Processing Infrastructure
3. Textile & Industrial Manufacturing
4. Flax Fiber Co-Products

OUR VALUES

GROWTH

Committed to growing the flax fiber industry to commercial scale by supporting environmentally responsible agricultural practices resulting in a sustainable fiber, textile and co-products industry.

STEWARDSHIP

Encourage a stewardship economy through growing a natural fiber industry that values the environment and its people, supporting environmentally responsible practices, and livable wages.

RECIPROCITY

NALA is a trade organization built to lift up and facilitate multiple interest groups, and is representative, responsive, and beneficial to all members. Additionally, through the development and promotion of environmentally responsible agriculture and products, NALA's activities intend to provide mutual benefit to the environment and its people.

RESILIENCE

Build resilient flax fiber production in North America, supporting collaborative and strategic responses to challenges, and diversifying the global marketplace.

EDUCATION

Provide awareness, education, and networking opportunities regarding environmentally responsible flax fiber agriculture, processing, and manufacturing.

X. NALA Flax/Linen Definitions

Bast fiber: Plant fiber from the phloem (inner bark) or bast surrounding the stem of certain plants, such as flax, hemp, and jute.

Breaking: The mechanical process of crushing straw or stalks (usually with rollers), which have normally been aligned, to begin the process of separating the fiber from the shive, hurd, trash and dust.

Carding: The process of passing short fibers (3/4 inch to 6 inches or 15 mm to 150 mm) between very tightly spaced rotating cylinders of varying diameters that are covered with tiny teeth (i.e., a "card" or carding machine) that can separate, scrape, clean and/or align individual fibers or fiber bundles to produce clean aligned or non-aligned fibers.

Combing: The process of passing a continuous aligned band of fiber through a series of pins that regularly insert and withdraw through this band of fibers in a "comb" or combing machine to remove short fibers. It is a way to make more homogeneous, thinner, and stronger yarns with natural fibers like flax, cotton and wool.

Cottonizing: A process for fibers that have been treated mechanically, chemically, or in other ways, to make the length and diameter roughly similar to cotton fibers (i.e., ¾ to 2 inches long or 2 to 5 cm and 10 to 20 microns wide).

Decortication: A mechanical method of separating the flax fiber from the woody part of the plant by breaking, beating, or crushing, during which the stems are initially split and often partially shortened.

Dew Retting: Laying swathes of flax straw in the fields as they are pulled (also called ground retting).

Drafting: The terms drafting and drawing are often used interchangeably to describe the same physical process of attenuating (thinning and lengthening) a continuous band of fibers called a sliver.

Drawing: Normally combined with the process of drafting in a machine that divides and re-combines continuous bands of fiber to make the bands thinner and more consistent in diameter and density so they can be spun into higher quality yarns.

Divider or Divisor: The machine that evens out and/or thins the layer of flax straw about to be broken and scutched.

Ground retting: See Dew Retting.

Hackled tow: Short flax fibers produced by the hackling operation.

Hackling: The process of passing scutched fiber through a series of finer and finer pins to separate any remaining shive and short tow fiber and trash from long-line fiber.

Long-line fiber: Scutched fiber that is longer than 20 inches or 50 cm. Most long-line fibers are subsequently hackled.

Non-woven: A construction of fibers, usually fabric-like, that is made by entangling, gluing and/or melting fibers together in ways that are usually much cheaper than weaving or knitting a similar weight of fiber. Typical nonwovens made from flax fibers include erosion control mats, insulation batts, pot and hanging basket mats, and mats used in making compression molded plastic composite items (e.g., dash and inside door panels in cars).

Pectin: A water-soluble binding agent found in flax that holds the plant's fibers together in the stalk.

Definitions (continued)

Puller: A machine that harvests flax stems by pulling the stems out of the ground.

Pulling: The harvesting of flax stalks by pulling them out of the ground, rather than cutting them as is usual with other crops.

Retting: The decomposition of pectins that bind fibers to the other parts of the stems or leaves, usually by the action of enzymes produced by bacteria or fungi. Dew retting is the technique most often used but retting in water in tanks and ponds is also common among artisans and in countries where labor costs are relatively low.

Rippling: The process of removing seed pods from harvested flax stalks.

Scutcher: The machine used to scutch flax. The term is also applied to the person who operates the scutching machine.

Scutching: The process of scraping long-line fiber to remove tow and extraneous matter such as shive, earth, pebbles, and weeds.

Shive or Shiv: The woody matter of flax stalks that is removed during breaking and scutching.

Sliver: A band or strip of loose, untwisted textile fibers produced by a carding machine.

Swath or Swathe: The row or layer of stems produced when stems growing out of the ground are cut off or pulled out of the ground. In most swaths of grain or grass, the ends of the stems are distributed unevenly, and stems are aligned in the direction of movement of the cutting machine. This is unlike when flax is pulled where the stems in the pulled flax swaths are aligned at right angles to the direction of the motion of the flax pulling machine such that all ends of the stems are in an even line at the edges of the swath.

Ton: A unit of weight, equivalent to 2000 pounds. Also referred to as a ton or short ton.

Tonne: A metric tonne (1,000 kg) is equivalent to approximately 2,204.6 pounds or 1.102 short tons (US).

Tow: Short flax fibers, usually shorter than 20 inches or 50 cm. An adjective is often put in front of the word “tow” to describe which process produced it because different processes produce different qualities of tow. For example, “breaker tow” is produced during the breaking process; “scutching tow” is produced during the scutching process; and “hackling tow” is produced during the hackling process.

Turner: A machine used to turn swaths of flax straw during the dew retting process.

Turning: The process of turning over the flax straw lying on the ground while retting to ensure the color and retting is uniform throughout the swath.

Water retting: The process by which the pulled flax stems are collected from the field, the seeds are removed, and the straw is submerged in a body of water; the bacteria present in the water then degrade the pectin and the fibers are released.

Weathering, or wintering: A version of retting where the farmer leaves the plant standing with either the seeds harvested or unharvested, in the ground over the winter to partially decompose before being collected in the spring.

XI: NALA Board Members 2025-2026 and Special Recognitions

2025 Executive Committee

- Annette Herboth, President
  Founder, Twill Design & Consulting
- Fiona Barrett, Vice President
  Researcher at Regentextiles
- Meara Butler, Treasurer
  General Manager of Fairsing Vineyard
- Sandra Marquardt, Secretary
  President of On the Mark Consulting
- Shannon Welsh, NALA Executive Director
  Co-Founder of Coast Fibers

2025 Board Members

- Alvin Ulrich, Owner of Biolin Research Inc.
- Arin Gintowt, Partner and President at Eliza Faulkner Designs and Founder and President of Canflax
- Carol Hyland, Partner of CS Creative Inc.
- Kristina Foley, Founder of Food Shelter Clothing
- Spencer L. Marchand, Vice President
  Founder and Chairman of Dakota Linen Company
- Zoica Miesen, Founder and CEO of Stitch Lightly

2026 Executive Committee

- Annette Herboth, President
  Founder, Twill Design & Consulting
- Spencer L. Marchand, Vice President
  Founder and Chairman of Dakota Linen Company
- Pamela Weiler, Ph.D., Treasurer
  Extension Educator
- Sandra Marquardt, Secretary
  President of On the Mark Consulting

2026 Board Members

- Patrick Flaherty, Owner of PF DesignLab
- Sage Shelton, Owner of Liberty Linen Co.
- Alvin Ulrich, Owner of Biolin Research Inc.
- Shannon Welsh, Co-Founder of Coast Fibers
- Eric Singular, President of INCCert and Partner of Horizon Specialty Seeds

Special Recognition for the 2026 Status of Flax Fiber in North America

- Lead authors:
  Alvin Ulrich, Annette Herboth, Fiona Barrett, Meara Butler, Sandra Marquardt, and Shannon Welsh
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  Macey Krieger,
  Oregon State University Intern
- Report design:
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- Cover Photograph:
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XII. Endnotes

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Pulling flax in Oregon
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