# Vermont Wool Production

## Challenges and Pathways Forward

Vermont Sustainable Jobs Fund

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Vermont Sustainable Jobs Fund

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# PURPOSE

This report was developed by the Vermont Sustainable Jobs Fund (VSJF), a nonprofit committed to the sustainable development of Vermont's economy, to understand the current state of sheep farming and wool utilization in Vermont. While sheep production continues across the state, significant quantities of wool remain unused or undervalued. Building on VSJF's role supporting the Farm to Plate Strategic Plan and statewide rural economic development, this study connects food and fiber as complementary agricultural outputs, recognizing that many sheep farmers rely on meat markets to support fiber production.

The report seeks to:

- Assess how much wool is produced in Vermont annually and how it is currently used
- Identify bottlenecks that prevent wool from reaching viable markets
- Situate Vermont's wool sector within regional, national, and global wool markets
- Explore opportunities for value-added and waste-wool markets

Wool possesses significant inherent value as a commodity, much of which remains largely untapped. People in the sheep industry struggle to see the potential wool has because they say the economic costs associated with processing are high. Yet shepherding and the rotational grazing nature that is required to raise healthy sheep has tremendous benefits for soil health. Wool is a natural carbon store as the vegetation consumed through grazing is locked away in the fibers. These stores of carbon and nitrogen can be returned to Earth's systems through composting, making wool a highly sustainable material.

# METHODS

Data was collected through a statewide survey open for two months in fall 2025 yielding 74 responses. A complete view of survey responses is available here. About 20 in-depth interviews with farmers and processors support the findings. Respondents reported a total of 4,568 sheep (2,306 ewes, 181 rams, and 2,081 lambs), representing roughly 25% of Vermont's total sheep population reported in the 2022 USDA Census of Agriculture. As of the 2022 Census of Agriculture, Vermont had 676 sheep farms and 17,888 sheep, a relatively stable population since 2017, though with 28 fewer farms.[1] Survey respondents represent 10.9% of Vermont sheep farms. Some questions allowed multiple responses, resulting in totals greater than 74.

# HISTORY AND CURRENT BREED PRESENCE

PHOTO CREDIT: UVM SPECIAL COLLECTIONS

The prized Spanish Merino has dominated the global wool industry since exports beyond Spain began in the mid-18th century. Valued for its ultra-fine fibers, Merino wool offers next-to-skin softness alongside wool's inherent moisture-wicking, temperature-regulating, breathable, and odor-resistant properties. By the mid-1800's, 80% of Vermont's forests had been deforested, in large part to support the booming Merino sheep industry. At its peak there were 1.7 million Merinos in Vermont.[2] However, large-scale sheep farming was short-lived as a profitable endeavor in Vermont: international tariffs were lifted, and transportation infrastructure began to connect the Western United States with manufacturing capabilities of the Northeast. A large contributing factor for the bust in the historic Vermont sheep industry is related to the lower costs of producing western wool.

Because Merino sheep are more suited to the arid climates found in the West and the landscape provides for larger flocks, costs are lower making western wool less expensive. Further, Merino sheep are not bred to handle Vermont's wet climate; however, since the Merino boom, many farmers in Vermont have found breeds that are well suited for the region.[3] By considering climate when selecting breeds, farmers are able to cut down on the costs associated with hay feeding in the winter.

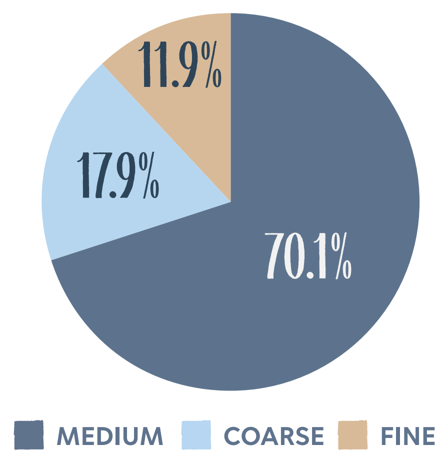
## Figure 1: VT Sheep Breed Word Cloud


The most common breeds from survey responses are shown with the largest text. It is standard practice to have crosses of different breeds where the desirable traits from two can be combined into one animal. Crossed breeds were entered separately to formulate the word cloud.

# VERMONT PRODUCTION

The majority of respondents identify their wool thickness as medium (70.1%). 17.9% identify their wool as fine and 11.9% identify their wool as coarse. These thicker fibers find their niche in Vermont's handcrafted markets which often incorporate other animal fibers such as alpaca and mohair to form blended yarns.

## FIGURE 2: QUALITY OF WOOL FIBERS



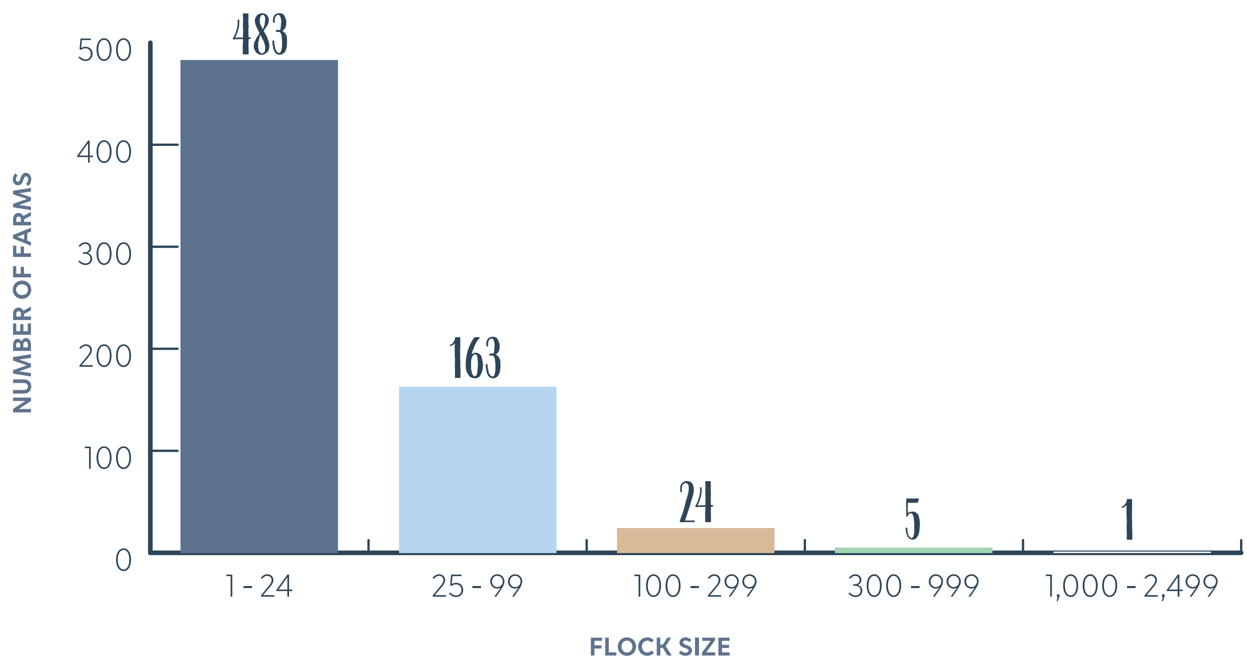

## TABLE 1: WOOL THICKNESS CATEGORIES

| Thickness Category | Average Fiber Diameter (Microns) | Breed Examples[4] | Wool Product Examples[5] |
|---|---|---|---|
| **Fine** | ≤17.70 - 22.04 | Merino | Baselayer clothing, knitwear, socks, yarns |
| **Medium** | 22.05 - 30.00 | Finnsheep, Corriedale | Yarns, blankets, sweaters, outerwear |
| **Coarse** | ≥31.00 | Romney, Border Leicester | Carpets, upholstery, mulch mats |

Most operations in Vermont are small-scale: USDA found 71.4% of Vermont sheep farms consist of 1–24 sheep, and only 4.4% exceed 300 sheep (Figure 3).[6] This aligns with findings from The Intervale's and Vermont Housing Conservation Board's 2025 feasibility analysis that commercial-scale production (i.e., with more than 400 ewes) is economically challenging.[7]

Two thirds of survey respondents state their flock size has maintained the same or grown in the previous year while one third report their flock size has decreased. Survey respondents report a median annual production of 82.5 lbs. of marketable wool (this equates to about 170 100g skeins of yarn) (Figure 4). Nine respondents (12.8%) report having 0 marketable wool from their sheep; this could be due to personal use of the wool or they may not have any developed market for their wool. Most farms produce under 200 pounds, with a few outliers who report producing 1,000 pounds of marketable wool.

## FIGURE 3: VERMONT FLOCK SIZE: NUMBER OF FARMS




## FIGURE 4: POUNDS OF MARKETABLE WOOL PRODUCED ANNUALLY

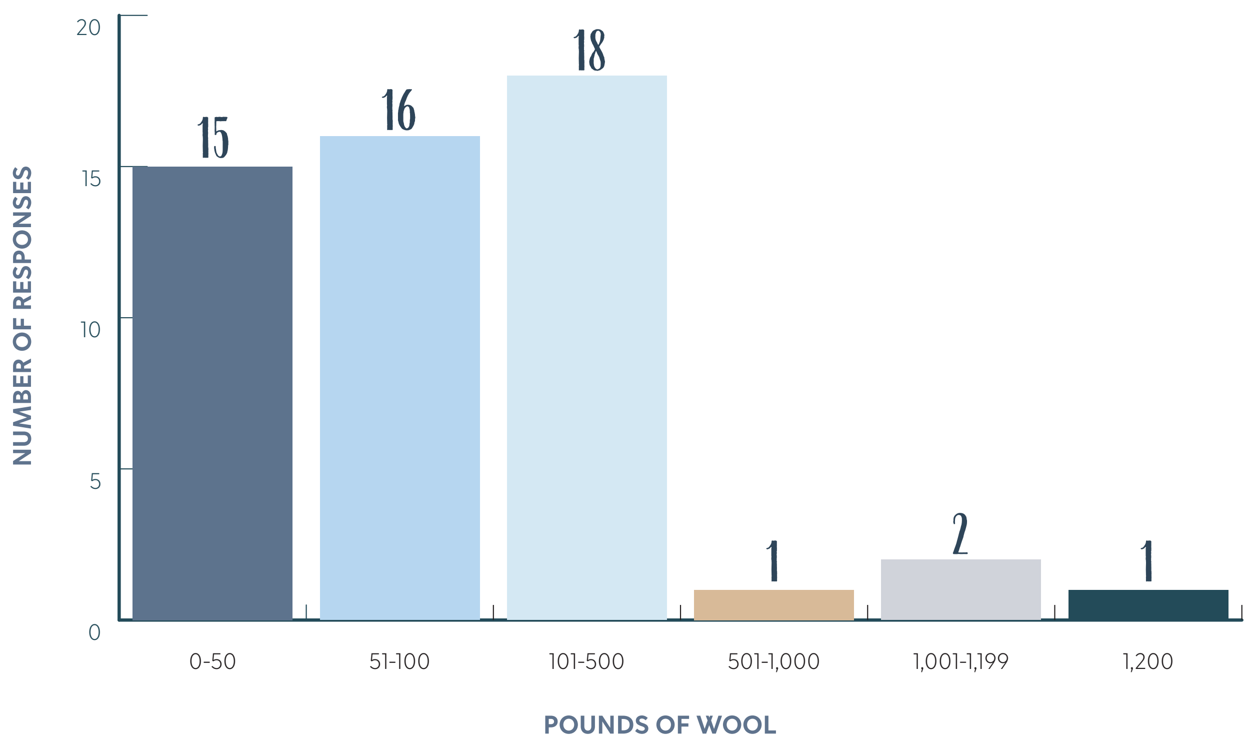


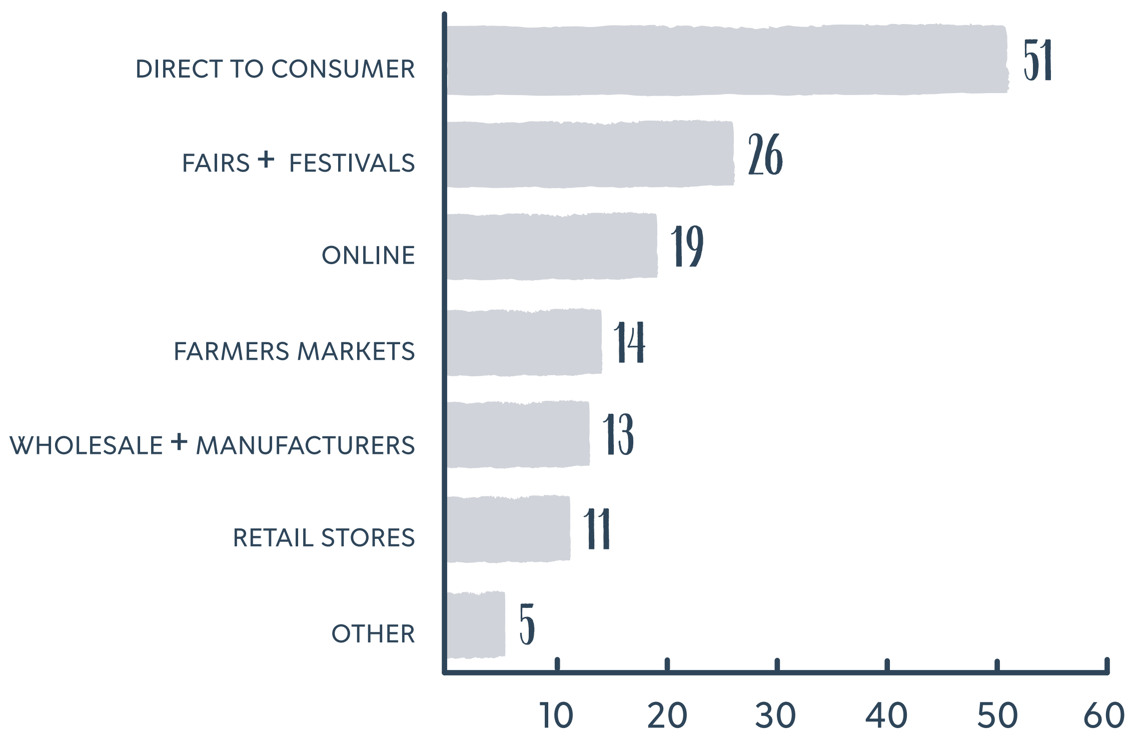

Figure 4 is based on survey responses. When ranges where given, the average was used.

Through interviews with the farming community, it is evident that most sheep farmers are able to utilize their wool because they have another source of income. Supplemental income sources come from lamb meat, other forms of livestock, active or retired full-time professional careers, or sheep related jobs such as shearing and butchering.

## VERMONT MARKET

Vermont producers primarily sell wool products direct-to-consumer, relying on storytelling, place-based branding, and quality (Figure 5). Retail sales are not as common due to decreased profit margins, availability of retail locations, and the complexities involved with accessing a retail location.

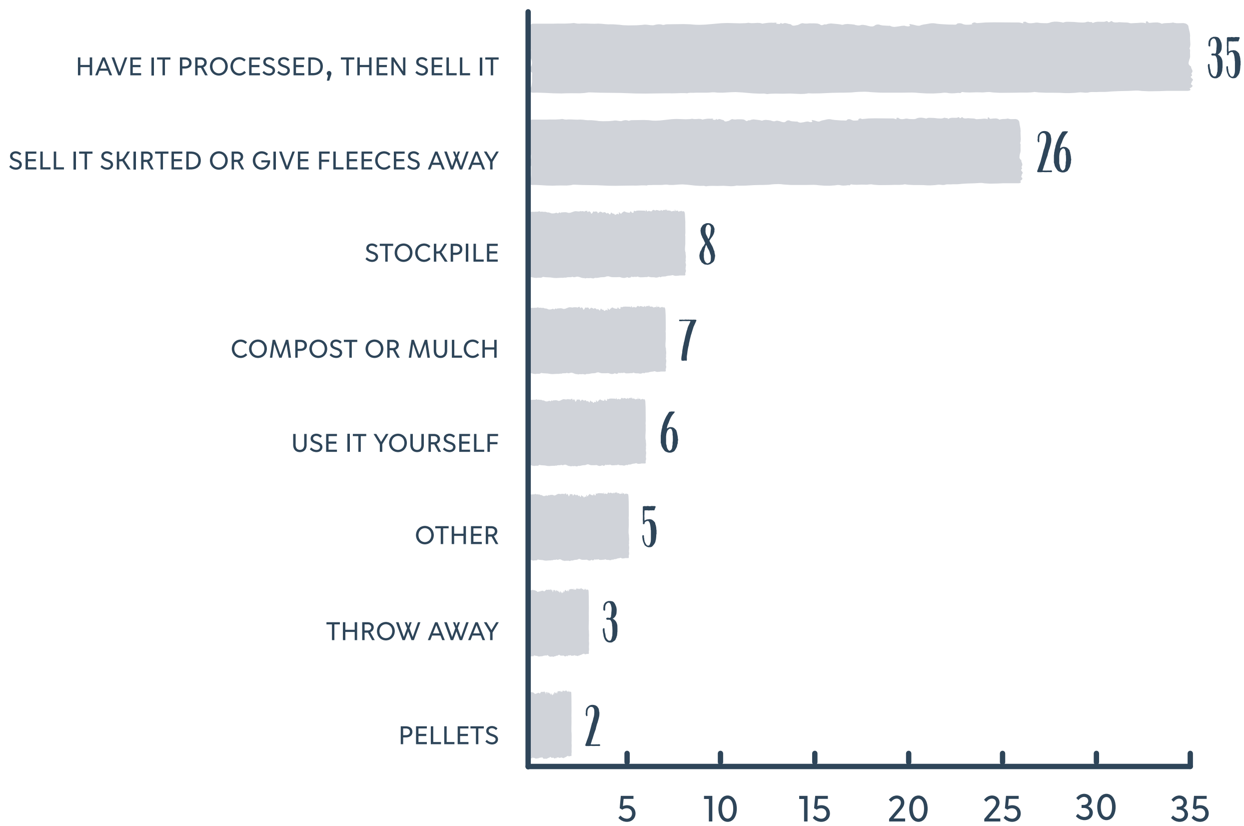
### FIGURE 5: CHANNELS WHERE PRODUCERS SELL WOOL




**NOTE:** Some responses to 'Other' were better aligned with specific channels and adjustments were made accordingly.

Many shepherds have multiple uses for their wool after shearing (Figure 6). According to the 2025 survey of Vermont shepherds, fiber growers will have the fleeces processed and then sell their product as finished goods (35 responses). It is also common for farmers to sell fleeces skirted or give them away (26 responses). Small farmers often hoard stockpiles in barns waiting to meet the minimums required for mill processing or wait for processing availability in general. During shearing and skirting there is always a portion of unusable wool that is not fit for milled processing. The inevitable discards find uses as compost, mulch, or pellet fertilizers.

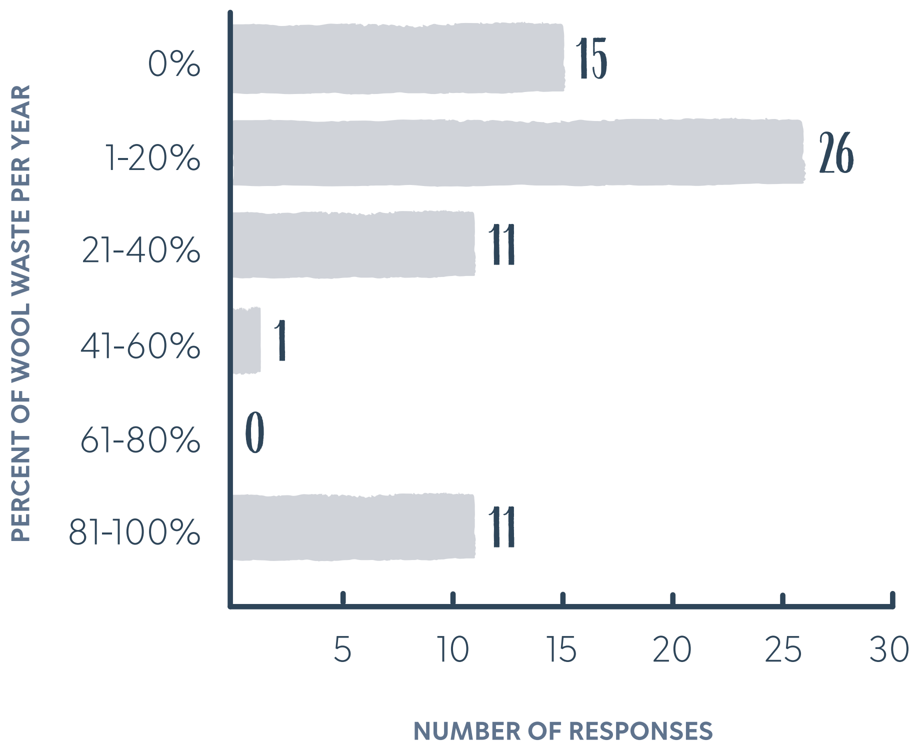
## FIGURE 6: WHAT HAPPENS TO WOOL AFTER SHEARING




**NOTE:** Figure 6 originally received 29 responses in the 'Other' category with write ins indicating people have multiple uses for their wool crop. The various uses mentioned were accounted for and added into their respective categories.

While nearly a quarter of survey respondents identified using all their wool crop in an income generating way, 17% (11) report a majority of their annual wool crop is wasted (Figure 7).

## FIGURE 7: ANNUAL WOOL WASTE ESTIMATE




Farmers say the margins on yarns and finished knitted garments are often too low to justify all the work it takes to find and coordinate with a processor. Time is a large constraint here as well. Farmers are often busy maintaining the health of their flock and it is another whole job to set up online sales, attend markets or festivals, develop a marketing presence and keep up with these markets.

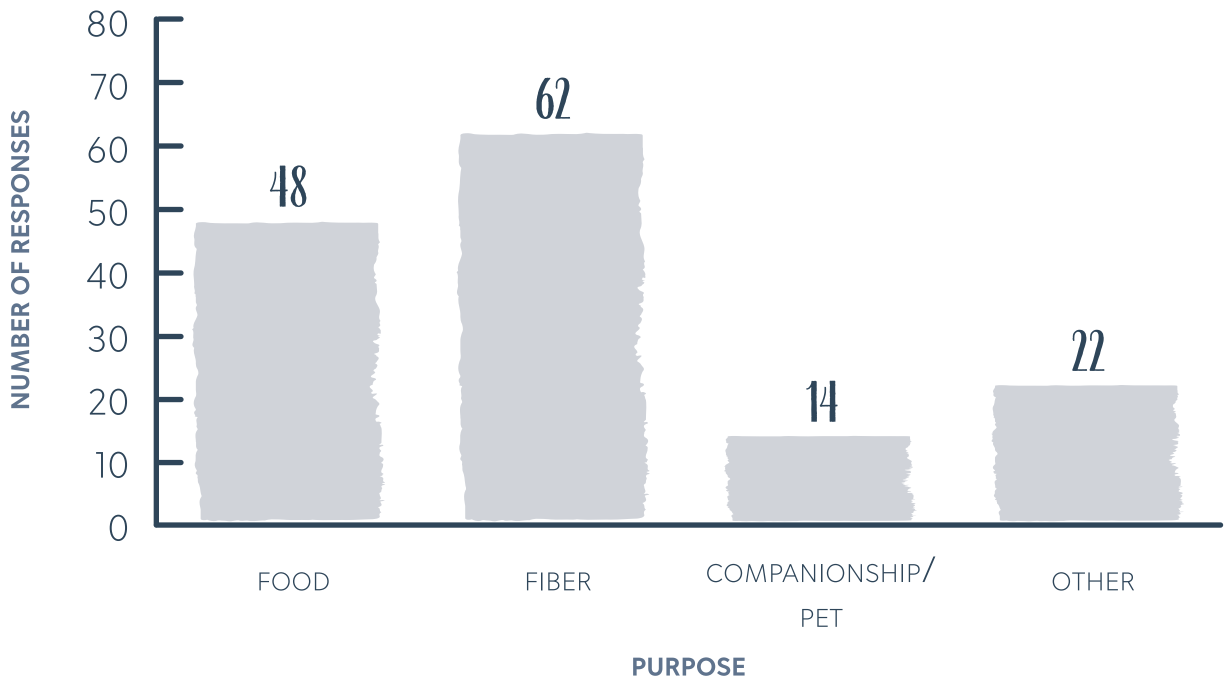
> *"I have explored many options but am always faced with poor returns for raw wool, difficulty in getting small batches processed and [marketing] the finished product...I would rather be in the barn."*
> - Survey respondent

PHOTO CREDIT: ALLISON DUBICK

# A FOOD AND FIBER CONNECTION

Survey results show that while fiber is the primary reason most respondents raise sheep in Vermont, food is a close second (Figure 8). Wool production and food production are inextricably linked. When local lamb prices are constrained by global competition, producers have less flexibility to invest in fiber processing, storage, or market development. In this way, global lamb markets indirectly shape the viability of local wool systems.

## FIGURE 8: WHY VERMONT FARMERS RAISE SHEEP




Meat has similar market patterns to fiber production from sheep: while domestic demand for lamb and mutton has remained stable, imported meat from Australia and New Zealand dominate U.S. markets.[8] Despite traveling thousands of miles, imported lamb often retails at lower prices than local product due to highly efficient, vertically integrated supply chains, large-scale processing infrastructure, and lower per-unit production costs.[9]

The lack of comparable processing efficiency locally results in a reliance of unique branding based on differentiation. Local meat and fiber producers market their products through quality, transparency, regional identity, and the combined value of food and fiber.

Lamb markets are generally perceived as stronger with higher margins than fiber; so much so that farmers who primarily produce meat often do not utilize their wool or opt for hair sheep to avoid shearing requirements. There are misconceptions around breeding that selecting breeding stock based on desired traits for meat or fiber are mutually exclusive.

The lack of attention given to fiber from meat farmers stems from beliefs that there is no market potential for coarser wool. However, research suggests that new industries are emerging that could change this.

### TABLE 2: CHALLENGES FACED BY FIBER AND MEAT FARMERS

| Fiber Farmers | Meat Farmers |
|---|---|
| ≋ High processing costs | ≋ High cost and access to USDA processing facilities |
| ≋ Lack of mills | ≋ Pre-sale coordination for on-farm slaughtered animals and hurdles surrounding on-farm slaughter |
| ≋ Low margins on finished goods | ≋ Competition from lower priced imported sheep and lamb products |
| ≋ Skirting: time constraint and lack of trained wool handlers | ≋ U.S. dietary norms typically do not include lamb |
| ≋ Lack of wool graders | |
| ≋ Market identification | |

# MARKET RESEARCH

Synthetic fibers dominate the fiber industry: 69% of global fibers produced in 2024 were comprised of polyester, nylon or other petrochemical derived fibers. In contrast, wool contributed to about 0.9% of global fiber production in 2024.[10] From 2000 to 2024, global wool production has declined 13.9% while polyester production has increased 36.1% in the past 4 years. Wool is estimated to be four to seven times more expensive to produce than synthetic fibers.[11] As a result, wool increasingly occupies a luxury and niche market, valued for performance and sustainability rather than price.

U.S. markets face steep competition from the world's leading wool producer, Australia. In 2022, Australia provided 227,960 tonnes of clean (scoured) wool, nearly a quarter of global supply with mostly Merino.[12] China (139,563 tonnes) and New Zealand (97,363 tonnes) followed as global leaders of clean wool production (Figure 8). In 2022, the United States produced 6,415 tonnes of clean wool comprising about 0.62% of the global production.

The North American wool yarn market was valued at $1.18 billion in 2024 , with projected growth of 3.8% annually by 2034.[13] This can be contrasted to the faster growing and larger synthetic yarn market (4.9% projected annual growth and $7.5 billion in 2022).[14] Consumer demand for sustainable and eco-friendly textiles stems from awareness and valuation of environmental impact while synthetics are driven by cost-effectiveness and a demand from the apparel industry.

## FIGURE 9: WORLD WOOL PRODUCTION BY COUNTRY, 2021

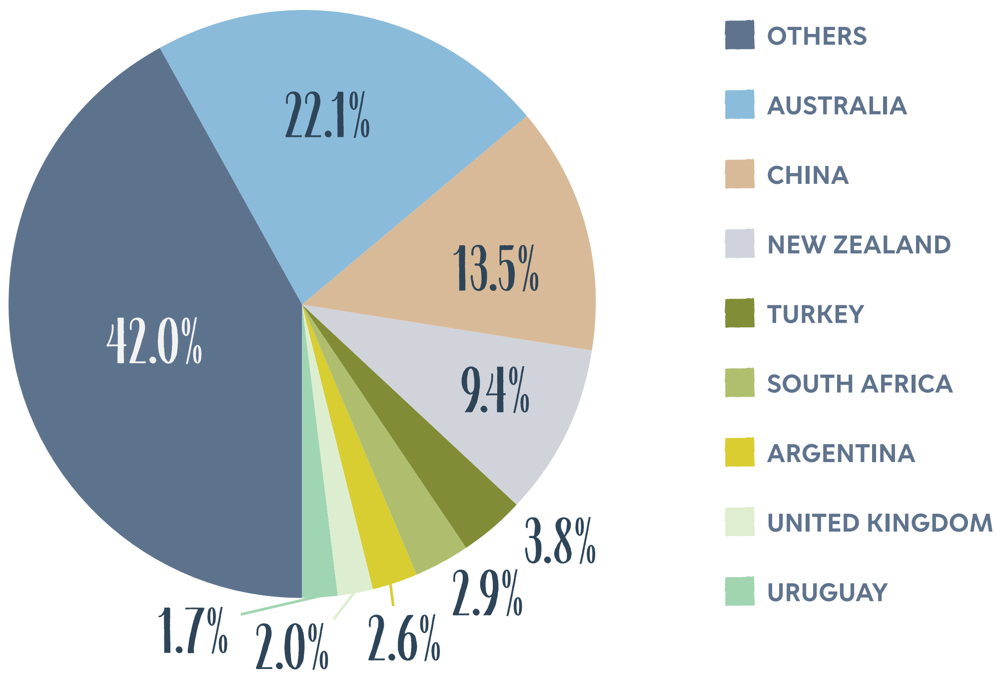



Figure 9 is based on the International Wool Trade Organization (IWTO) Market Information Sample Report, 17th Edition. U.S. world production is included in Others, and represents approximately 1.43% of Other and 0.62% of the global market contributions.

In the United States, the wool market is projected to grow from $419 million in 2025 to $555 million by 2032 (4.1% CAGR), driven by demand for high-quality sustainable clothing. Woven wool products represent roughly 41% of the market, reflecting demand for durable apparel and upholstery. The other 59% is comprised of non-woven and other wool products.

Merino wool dominates among wool types with approximately 47% market share, driven by demand for next-to-skin garments and activewear. Less dominant market shares consist of: Mohair, "Other" sheep breeds, Angora, Cashmere, Alpaca, and others.[15]

Today, artisan markets are where Vermont producers thrive as demand for handcrafted goods from rural regions increases.[16] Increased demand for artisan quality provides opportunities for small and medium enterprises.

# A NEED FOR MORE PROCESSING MILLS

Wool mills and the availability of processing remain the largest challenge for sheep farmers. Wait times for custom processing orders can take 12-18 months. This time delay is difficult for farmers to manage, and they end up stockpiling their wool waiting for mill availability and to gather enough wool to meet mill minimums.

New mini mill, Aurora Spinnery, has custom processing as their heart mission. Other mini mills in Prince Edward Island gave Kristen Gallagher the trade advice that mills need their own product line as a revenue stream. Heading this advice, Aurora Spinnery has found success in their first 2 years of operation.

Vermont's small scale sheep farmers need mills that offer custom processing. However, the fees for custom processing don't generate enough income for mills to stay financially viable. Inferred from feasibility and value-added studies of wool mills, mills are most viable when integrated into branded products with mill labor and risk covered through product sales.[17] A mill must have its own product line to sell as its main income source to be able to subsidize custom processing. Mills must then balance available capacity to produce their own product and be able to process fiber for producers.

What will most likely leave many Vermont farmers looking for a new processor is the closure of Junction Fiber Mill's custom processing service. Junction Fiber Mill, in White River Junction, started operations in 2021 as a custom processor and has since found great success with their own lines of yarn such as Roots, Making Tracks and Farm Fresh which have filled their milling capacity.[18] This popularity has pushed them to make a sustainable choice for their business and end their custom processing service as of August 2025. Junction Fiber Mill still utilizes Vermont wool in their Farm Fresh line which provides a spotlight on Vermont and New England Farms and honors their values for place-based fiber movements. Meanwhile, wool for the Roots and Making Tracks lines are sourced from reliable quantities and qualities from Western United States sources.

# KEY FINDINGS

- Vermont produces quantities of wool that remain under-utilized
- Processing capacity and cost is the primary bottleneck
- There is a need for more mills offering custom processing in small batches
- Mills must balance production of their own product line while still maintaining open capacity for custom processing
- Markets for medium and coarse wool applications need investigation

## Yarn and Finished Goods Opportunities

Two prominent directions forward stood out while interviewing farmers; both require investments in milling infrastructure in Vermont. These pathways are needed for the utilization of wool in traditional commodity markets for yarn.

1. **Need for custom processing mills** so small farmers can more easily get their fleeces turned into yarn or processed further into wearable garments. The farmers can then sell their own branded products. Market research into what products and channels are best for farmers to tap into will help unlock more potential from wool markets.

2. **Aggregation of Vermont wool** which can be turned into a local yarn capitalizing on the branding power of Vermont. Along with more milling activity in the area, entrepreneurial minded individuals are needed to take initiative and responsibility of collaboration.

There are existing finished goods manufacturers who have taken on this role, such as the knitted garment producer Muriel's of Vermont.[19] Laura Jacoby of Muriel's sources wool directly from producers and assumes the responsibility of organizing the processing and milling requirements. Muriel's garments are then marketed as locally sourced from New England.

It is more common for local products to be tagged with the New England branding name rather than Vermont as manufacturers cannot limit their sourcing based on borders. Those willing to participate in a business model like this must be willing to sever all prior interest and authority over the product at the point of sale with the aggregator. Wool is an extremely unique animal product which holds identifying characteristics such as color and feel into the finished product. This, combined with the small-scale nature of sheep farming in Vermont, creates sentimentality and desire for farmers to get their own wool back.[20] Producers such as Muriel's must find farms willing to pool their wool into a blended product with others from the region and this requires expansion beyond state borders.

PHOTO CREDIT: KELLY NOTTERMAN

# MARKETS FOR UNDERUTILIZED WOOL: PELLETS AND INSULATION

## Pellets

In 2018 the University of Vermont Extension highlighted scouring and milling as major bottlenecks in the wool supply chain, which spurred interest in alternative value-added products that bypass traditional textile processing. One such opportunity is the pelletization of unused wool for agricultural applications; turning a byproduct of sheep production into a commercial scale soil amendment.

Pelletizing wool avoids the supply chain steps that historically add economic value (and cost) to wool fiber by eliminating the need for scouring, carding, and textile mill processing. Wool pellets can be used as a slow-release fertilizer and soil amendment, returning nitrogen and carbon to the soil while improving physical soil properties such as water retention.[21]

## Market Context

Wool pellets are an emerging market which fits into the larger natural organic fertilizer market. In North America the organic fertilizer market was valued at $1.59 billion and has a high projected annual growth rate of 12.9% by 2032.[22] Animal origin fertilizers are expected to dominate the market in coming years with increasing technology advancement trends. The U.S. represents over 70% of the North American market for organic fertilizer. Wool pellets were found to be a viable fertilizer for organic vegetable farming which shows promising growth for Vermont in this sector.[23]

Current trends in organic fertilizers make wool pellets a promising investment opportunity for Vermont. Pelletization at scale requires capital investment and coordinated aggregation of wool supplies. German company floraPell, uses patented technology to produce pellets at scale. The German market for wool pellets has less price fluctuation compared with domestic pellets due to the scalability achieved with industrial pelletizing machinery.

The majority of what is available for sale in Vermont and the New England region is small bags from 8oz. to 2 lbs. of pellets. floraPell is able to sell at quantities of 600kg (~1,322 lbs).[24] Price per kg varied among different quantities sold; floraPell has an average of 7.63 Euros/1kg (this equates to $3.74/lb). Domestically, prices for wool pellets are higher, around $8.00/lb.

These prices suggest that scaling pellet production could dramatically improve competitiveness with other natural fertilizer options. If production can achieve economies of scale similar to European operations, wool pellets can become a viable commodity product beyond small gardening markets.

Kimberly Hagen has been the driving force behind making a large-scale pellet operation in Vermont a reality. Hagen's research with University of Vermont Extension in 2018 explored pellets as an option for underutilized wool and her research in 2022 found wool pellets to be a viable alternative to conventional organic fertilizers. Hagen has been in close contact with the manufacturers of the pelletizing machinery, floraPell, and successfully imported a small quantity of pellets in the fall of 2025. These pellets, priced at $5/lb., nearly sold out at a single event (VT Sheep and Wool Festival), indicating the demand for pellets is present in Vermont.

Pelletizing is most promising for wool that is unused or cannot be milled. Tapping into the fertilizer market is a viable way for the coarse quantities of Vermont wool to be utilized. Wool pellets are a way to commercialize wool from farmers that do not wish to make investments into milling requirements for current wool utilization. This process needs collaboration and incentives for producers to aggregate their presently wasted product. Pelletizing wool on a large scale is still in development and requires more funding for the industrial machinery needed to pelletize at a scale that is economical.

## Insulation

Sheep wool insulation represents another promising high-value use for wool fiber that avoids traditional textile processing bottlenecks. The University of Vermont Extension's 2018 study identified wool fiber insulation as a key value-added product category that could leverage coarse, low-value wool into a marketable product with strong environmental and performance attributes.[25]

**U.S. Insulation Companies using Sheep's Wool:**
Natural Wool Insulation
Havelock Wool Insulation

The U.S. sheep wool insulation market was valued at approximately $200 million in 2024 and is projected to reach $350 million by 2033 (6.5% CAGR).[26] Despite stronger environmental, thermal, and fire-resistant performance, wool insulation struggles to compete with cheaper synthetic alternatives. The market is largely limited to environmentally conscious consumers willing to pay for the added value of a green product.

For Vermont to pursue the growing sheep wool insulation market, local supply coordination is required to capture value from coarse fibers along with infrastructure investments to develop manufacturing capabilities.

# BUILDING BLOCKS FOR COLLABORATION

Several organizations and initiatives are actively engaged in growing markets for Vermont wool products.

The Vermont Sheep and Goat Association (VSGA) is active in providing resources for farmers to learn and connect with one another. Neighboring states have similar groups such as New York's Empire Sheep Producers Association, New Hampshire's Sheep and Wool Growers Association and the New England Sheep & Wool Growers Association based in Massachusetts. The American Sheep Industry Association (ASI) is a national organization that has members who work alongside state associations to provide educational opportunities and workshops.

Fibershed is a nonprofit organization dedicated to developing regional, climate-beneficial fiber systems that reconnect textile production to place, soil health, and local economies. A "fibershed" is defined as a geographically bounded textile system, similar to a watershed, that encompasses fiber production, processing, dyeing, manufacturing, and end-of-life cycles. The Western Massachusetts Fibershed has been active in facilitating a pelletizing operation where farmers can pay $5/lb. and lend their labor to help turn undesirable wool into pellets. Existing fibershed groups in Vermont and New England can be used as a collaboration asset going forward.

Increased communication among these state and regional focused organizations would expand opportunities for shared utilization of outside experts who may offer educational experiences or markets. For example, members of Vermont and New York with the help of ASI have had shared information sessions that explored product options available for medium thickness wool. Sessions like this get shepherds excited about the potential of their medium weight wool and connect them with people who can help actualize that value. Collaborative sessions should continue and explore more product offerings possible with medium wool. The responsibility for this kind of collaboration falls on the volunteer led members behind the VSGA and the willingness of neighboring organizations to participate.

The VSGA has brought in outside experts for learning opportunities with financial support from the American Sheep Industry. Collaborating and sharing events with neighboring states may help alleviate some of the costs associated with bringing in experts which can lead to more frequent information sessions. Assessing the willingness for paid attendance can also bring more educational workshops into the area.

VSGA members say that there are not frequent events held in Southern Vermont and when VSGA does hold southern meetings, turnout is reported as low. Partnerships with industry professionals such as shearer, butcher, and shepherd Mary Lake can help broaden workshops and knowledge sharing to shepherds who are not VSGA members. For example, Mary conducts travelling workshops throughout the state by utilizing a shepherd's farm and her turnout for events in the South was stated as comparable to Northern Vermont.

# GOING FORWARD: CONCLUSIONS AND NEXT STEPS

Vermont's sheep and wool sector produces meaningful quantities of fiber, yet a significant portion remains underutilized due to processing limitations, high costs, and market access challenges. Coordinated investment in infrastructure, education, and market development will allow Vermont's sheep farmers to better capitalize on wool production, reduce waste, and strengthen the state's small-farm economy while advancing environmental sustainability.

**Key pathways forward:**

- **Expand access to small-scale custom mills.** Support new mill operations and provide incentives for existing mills to offer custom processing for local farmers.
- **Aggregate Vermont wool for local branding and market development.** Create regional yarn lines that capitalize on Vermont and New England identity. Encourage farmer collaboration to meet minimum processing volumes and maintain consistent quality.
- **Develop markets for currently unused or low-value wool.** Fund wool pelletization at scale for agricultural and soil amendment applications.
- **Enhance educational and collaborative networks.** Strengthen state and regional organization partnerships for workshops, skill-building, and shared resources.
- **Encourage integrated fiber-food systems that recognize wool and meat as complementary products.** Increase storytelling on the inherent sustainable value that sheep provide with their regenerative services and products.

**The Vermont Sustainable Jobs Fund would like to thank the dozens of Vermont farmers and shepherds who participated in the survey and/or took time out to be interviewed for this project.**

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