



ANALYSIS OF VERMONT'S FOOD SYSTEM

Food Production: Hops and Beer

What can be done to overcome the challenges of producing hops in Vermont? How can Vermont's beer industry capitalize on its growing recognition for excellent products?

Vermont has more breweries per capita than any state in the country:

1 for every 23,175 residents!¹ It's not just the sheer number of local brews available that put Vermont on the map—it's their exceptional quality too. Many of Vermont's beers are getting national and international attention. [RateBeer](#), a social networking site for beer enthusiasts, identified [Hill Farmstead Brewery](#) of Greensboro as the number one brewer on their list of the "Best Brewers in the World 2013" out of a field of more than 12,000.² [Hill Farmstead's](#) owner and brewmaster Shaun Hill was recently featured in *Vanity Fair* magazine.³ [Lawson's Finest Liquids](#) of Warren also made the RateBeer list at number 55. The [Alchemist Brewery's Heady Topper](#), a double India Pale Ale (IPA), is currently ranked the best beer in the world on [BeerAdvocate](#).⁴ In the summer of 2012, the *Boston Globe* ran an article highlighting Waterbury as "The Best Beer Town in New England."⁵

Brewers and consumers are also paying attention to where their beer—and its ingredients—originate. Brewers are recognizing the opportunity to market their product with the high quality, stewardship, and attention to detail already associated with the Vermont brand. And beer enthusiasts have adopted the concept of terroir (a term more commonly associated with the regionality of grape varieties and their impact on the flavors of wine), or taste of place, to

differentiate their products.⁶ Several large U.S. brewers, such as [Sierra Nevada](#) and [Rogue](#), are offering "estate" beers, brewed with ingredients grown on their own land, and other brewers, like [Deschutes Brewery's Oregon Ale](#) and [Peak Organic Brewing Company](#) in Maine are producing beers with all local, or in-state, ingredients.⁷ Several Vermont brewers are now experimenting with recipes that draw all or a portion of their ingredients from within the state.

Adam Krakowski's research, supported by the [Vermont Historical Society](#), found that **Vermont used to be a top producer of hops in the mid-19th century, producing as much as 640,000 pounds in 1860, but pests, diseases, competition, and Prohibition ultimately eliminated this industry.**⁸ Today, Vermont is lacking much of the infrastructure and know-how needed to provide its breweries with sufficient and reliable quantities and qualities of hops.⁹ The [Vermont Hops Project](#), operated by [UVM Extension](#), and the [Northeast Hops Alliance](#) have both responded to increased interest among farmers and brewers and are developing outreach and applied research projects with several farmers in the Northeast.

GETTING TO 2020

Goals 7, 11, and 13 of the F2P Strategic Plan focus on increasing food production, including hops and beer production, for local, regional, national, and even international markets.

Goal 7: Local food production—and sales of local food—for all types of markets will increase.

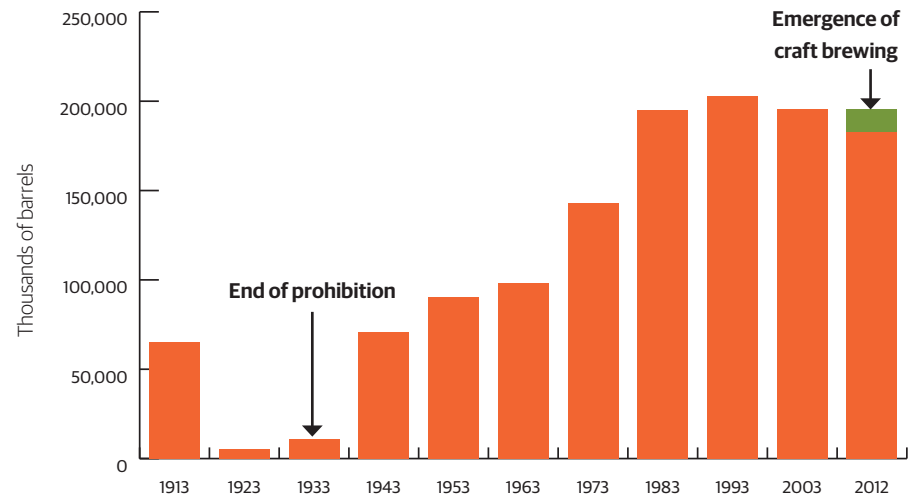
Goal 11: Vermont's food processing and manufacturing capacity will expand to meet the needs of a growing food system.

Goal 13: Local food will be available at all Vermont market outlets and increasingly available at regional, national, and international market outlets.

CURRENT CONDITIONS**🍷 Demand for Craft Beer is Rising**

Beer production in the United States increased rapidly after Prohibition was ended in 1933. The highest level of production—203 million barrels (over 6.3 billion gallons)—was reached in 1990 and production has decreased in nearly every subsequent year. In 2011, U.S. beer production equaled over 192 million barrels (5.9 billion gallons), down 5.6% from 1990 levels. Though sales for the standard domestic beer sector have been somewhat sluggish, interest in and demand for premium or craft beer is rising. Data from the [Beer Institute](#) and the [Brewers Association](#) indicate that craft beer production has increased over 82%, from 6.3 million barrels (195 million gallons) in 2005—equal to 3.2% of total beer production—to 13.2 million barrels (408 million gallons) in 2012, equal to 6.7% of total beer production (Figure 3.3.1).¹⁰

According to statistics from the *Beer Institute*, U.S. beer sales rose to nearly \$99 billion in 2011, largely on the strength of craft, premium, and imported beer.¹¹ Craft brewing now holds over a 6% share of the total U.S. beer market, up from nearly 5% in 2010, and market share continues to grow as focus shifts to higher-quality products.¹² In a recent article by the *Brewers Association*, a national craft brewing trade association, director Paul Gatz said, "It's becoming increasingly clear that with the variety of styles and flavors to choose from, Americans are developing a strong taste for high-quality, small-batch beer from independent brewers."¹³

Figure 3.3.1: U.S. Beer Production, 1913-2012

Source: Beer Institute, www.beerinstitute.org/statistics.asp?bid=200; Brewers Association, www.brewersassociation.org/pages/business-tools/craft-brewing-statistics/facts.

According to the [Vermont Brewers Association](#), Vermont has 27 breweries (Figure 3.3.2), including two new craft breweries that opened recently: *Grateful Hands Brewing* in Cabot¹⁴ and *Covered Bridge Brewing* in the Northeast Kingdom. Two of Vermont's largest beer producers, *Magic Hat Brewing Company* (South Burlington) and *Harpoon Brewery* (Windsor) are owned by out of state firms, and *Long Trail Brewing Co.* (Bridgewater Corners) owns both *Otter Creek Brewing / Wolaver's* (Middlebury), and the *Shed Brewery* (Stowe). Most of Vermont's breweries are classified as craft brewers (i.e., they produce less than 15,000 barrels, or 465,000 gallons of beer per year). **According to the Beer Institute, Vermont brewers produced 528,469 barrels, or 16,531,812 gallons, of beer in 2012 (equal to 0.26% of total U.S. beer production).**¹⁵

While the contribution of Vermont's brewers to overall U.S. beer production is small, the state's role in the craft brewing movement has been significant. Vermont was home to the late Greg Noonan, founder and brewmaster of the [Vermont Pub & Brewery](#) and author of several books on home and microbrewing, including the classic, *Brewing Lager Beer: The Most Comprehensive Book for Home- and Microbreweries*. Noonan is credited with helping to inspire many Americans to take up home brewing, and Vermont brewers often attribute this book to opening up a new market for craft beer.¹⁶

Craft Beer Glossary

Craft Brewer:

1. **Small:** annual production of beer is less than 6 million barrels.
2. **Independent:** less than 25% of the brewery is controlled or owned by an alcoholic beverage industry member who is not themselves a craft brewer.
3. **Traditional:** has an all malt flagship beer or has at least 50% of its volume in either all malt beers or in beers which use adjuncts to enhance rather than lighten the flavor.

Source: [Brewers Association](#) website

Types of Craft Brewers:

- 🔥 **Nanobrewery:** a brewery that produces less than 4 barrels of beer per year.
- 🔥 **Microbrewery:** a brewery that produces less than 15,000 barrels of beer per year.
- 🔥 **Brewpubs:** a restaurant-brewery that sells 25% or more of its beer on site.
- 🔥 **Regional Craft Brewery:** an independent brewery that produces over 15,000 barrels of beer per year and whose flagship or majority of volume is in 'traditional' beers.
- 🔥 **Contract Brewing Company:** a business that hires another company to produce its beers.

Types of Non-craft Brewers:

- 🔥 **Regional brewery:** a brewery that produces 15,000 to 6 million barrels of beer per year.
- 🔥 **Large brewery:** a brewery that produces more than 6 million barrels of beer per year.

Source: [Brewers Association](#) website

Figure 3.3.2: Vermont Breweries



The Vermont 27-Pack



www.14thstarbrewing.com



www.alchemistbeer.com



www.bobcatcafe.com



<http://coveredbridgebrew.com>



www.fiddleheadbrewing.com



www.harpoonbrewery.com



www.hillfarmstead.com



www.lawsonsfines.com



www.longtrail.com



www.madisonbrewingco.com



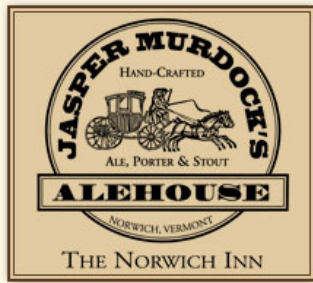
www.magichat.net



www.mcneillsbrewery.com



www.northshirebrewery.com



www.norwichinn.com



www.ottercreekbrewing.com



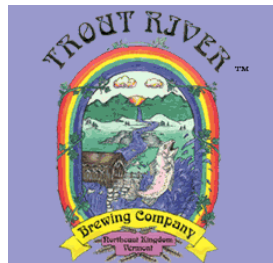
www.theperfectpearcafe.com



www.rockartbrewery.com



www.trappfamily.com



www.troutriverbrewing.com



www.vermontbrewery.com



www.zerogravitybeer.com



Vermont's small population also means that Vermonters have the best per capita access to breweries in the nation (i.e., approximately 1 for every 23,175 residents). A recent article, drawing from statistics from the [Brewers Association](#) and [Beer Institute](#), named Vermont the second-best beer state, after California, due to the high level of access to quality craft beer.¹⁷ A recent listing of the 10 largest craft brewers in the country included [Magic Hat Brewery](#) and [Harpoon Brewery](#).¹⁸ The 2011 [Vermont Brewers Festival](#), a wildly popular annual event, sold out a week ahead of time—a testament to the overwhelming interest in Vermont craft beer. **Additionally, the Vermont Department of Liquor Control reported \$23,726,357 in total revenue to state and local governments from liquor taxes in 2011** (includes all types of liquor).¹⁹ The trends in beer production and sales in Vermont are well in-line with those of the overall craft beer industry and suggest that craft brewing is becoming an important sector of Vermont's food system.

👉 Vermont's Hops Farmers are on a Steep, But Promising, Learning Curve

The quality of Vermont's craft beer industry, coupled with the localvore movement, has many brewers and consumers looking for local ingredients. The main ingredient in beer—malt made from barley—is also underdeveloped in Vermont, but another ingredient—hops—is seeing growth (See *Chapter 3, Section 3: Food Production: Grains* for more information about grain production in Vermont). These days, **hops are added to beer for three characteristics: bitterness, flavor, and aroma. Though beer-making requires a large amount of malt, hops can be added at a lower volume, while still making a significant taste difference.**

Currently, Vermont's brewers source the majority of their hops from domestic and imported hops suppliers. But a 2010 feasibility study commissioned by the [Vermont Agency of Agriculture, Food and Markets](#) and the [Massachusetts Department of Agricultural Resources](#) found that 94% (44 out of 47 respondents) of the brewers surveyed indicated that they would be interested in sourcing local hops if they were available.²⁰

Total U.S. hops acreage was 29,787 acres and production was more than 64 million dry pounds in 2011.²¹ Currently, nearly all commercial U.S. hop crops are grown in the

Pacific Northwest: 23,320 acres (78%) in Washington, 4,202 acres (14%) in Oregon and 2,265 acres (7.6%) in Idaho.²² But with increasing interest in sourcing local brewing ingredients, several regions of the U.S., including the Northeast, are making concerted efforts to evaluate the viability of growing hops locally. The Vermont and Massachusetts feasibility study had three important findings regarding the opportunity for hops farming in the Northeast:

- 👉 New England's climate is well-suited for growing hops,
- 👉 There is sufficient demand from the brewing community to support 100 acres in hop production in New England, and
- 👉 The information, technology, and equipment now exist to support small (1- to 10-acre) hop farms.²³

Vermont used to be a top producer of hops in the mid-19th century, producing as much as 640,000 pounds in 1860, but pests, diseases, competition, and Prohibition ultimately eliminated this Vermont industry.²⁴ But even during Prohibition Vermont had a role in supplying the Northeast with alcohol. In the 1920s, some Vermonters took up business as bootleggers, and many New Englanders



Planting hops in Alburgh.

PHOTO CREDIT: UVM Extension Northwest Crops and Soils Team

What Are Hops?

Hops, *Humulus lupulus*, are the female flowering cones of a perennial vining plant. Hops serve to season beer with unique characters and flavor, but also acts as a preservative by warding off bacteria. There are two primary types of hops, and many varieties within each category.

Source: BeerAdvocate's Hops Guide, <http://beeradvocate.com/beer/101/hops>

Bittering hops have higher concentrations of alpha acids and are responsible for the bitter flavor of beer (these are sometimes called alpha hops). Popular varieties include Chinook, Eroica, Galena, and Nugget.

Aroma hops have a lower concentration of alpha acid and are responsible for adding non-bitter flavors such as floral or citrus notes. Popular varieties include Cascade, Liberty, Mt. Hood, and Willamette.

(Definitions from www.eszlinger.com/beer/beerdefine.html and varieties from UVM Extension www.uvm.edu/~pass/perry/hopvars.html)

frequented northern Vermont's linehouses, which were unlicensed bars along the Canadian border (some of these bars had the border line running right through the middle of them). Vermont was a popular route for smuggling alcohol into the U.S. from Canada, where it was still legal. Many smugglers came through North Troy and Jay, and then down through Smugglers' Notch, running alcohol between Cambridge and Stowe, through Waterbury and Montpelier, and then into Barre.^{25, 26}

Today, Vermont is lacking much of the infrastructure and know-how needed to provide its breweries with sufficient and reliable quantities and qualities of local hops. At this time, there are only about 10 acres in hop production in Vermont,²⁷ and only about 40 acres in all of New England.²⁸ Peak yields are typically between 1,000 to 1,500 dry pounds per acre per year, but most Vermont farmers are in their first or second year of production and at the beginning of a steep learning curve, meaning current yields could be quite less. [Square Nail Hops Farm](#) (Ferrisburgh) produced 200 dried pounds of hops in 2012 from 1.5 acres. Co-owner Fletcher Bach attributes a lower yield to losses in harvesting and processing.²⁹ Kristofer Anderson of [Addison Hopyard](#) expects only 40 or 50 dried pounds of hops this year from his two-thirds of an acre.³⁰ A single small brewer may require 600 to 3,000 dry



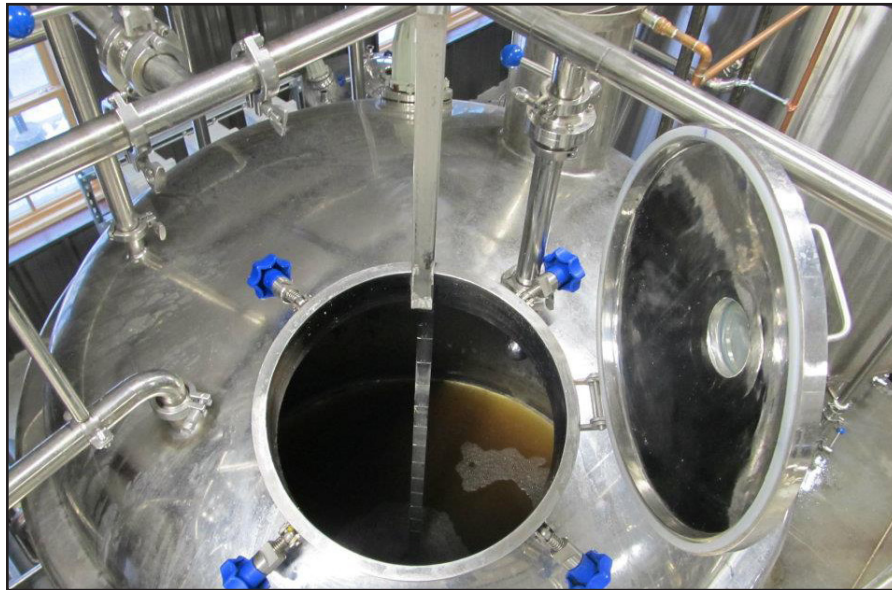
Vermont Hops.



Otter Creek Brewing displays pelletized hops at Septemberfest in Fayston.

pounds of hops in a year, indicating that total production of local hops has not begun to approach the level of potential demand.

In addition to low availability, other issues include quality and consistency. Brewers prefer pelletized hops delivered in compressed, nitrogen-flushed packets. A chemical analysis showing the acid profile of each variety usually accompanies every shipment so that the brewer can easily understand how the product will fit into their recipes. Vermont's brewers are interested in using local hops, but need to see quality and consistency improve first, as was explained in a recent [Seven Days](#) article: Two local brewers, Jennifer Kimmich of [The Alchemist Brewery](#) (Waterbury) and Renee Naduea of [Rock Art Brewery](#) (Morrisville) both cite too small and infrequent quantities of locally-grown hops, plus improper processing of the hops, as current barriers to using them; Allen Van Anda, former brewer at [Trapp Family Lodge Brewery](#), cites inconsistency in the local crop; and Shaun Hill, of [Hill Farmstead Brewery](#), cites improper packaging and a lack of chemical analysis.³¹ At present, farmers are still working out the kinks in delivering a product that meets brewers' specifications.



Brew tank at Fiddlehead Brewery.

While there are challenges, local hops production still appears to be a promising endeavor. Several Vermont brewers, such as Mark Magiera at [Bobcat Brewery](#) (Bristol) and Steve Polewacyk at [Vermont Pub & Brewery](#) (Burlington), are experimenting with local hops in their brews.^{32,33} And Matt Cohen, owner and brewmaster of [Fiddlehead Brewing Company](#) has begun production in small batches of Vermont Pale Ale, made with Cascade hops grown in the Mad River Valley. Despite the challenges to hops farming, there are several farms ramping up production in the coming years, such as *Square Nail Hop Farm* and *Green Mountain Hop Farm* (Berlin). Given the healthy status of Vermont's brewing industry and New England's suitable growing climate, high demand for local food and beverages, and the ingenuity of Vermont researchers, farmers, and brewers, Vermont appears to be ready to re-establish hops farming.

☀ Climate Change Impacts on the Hops Production

Two new reports from the [U.S. Department of Agriculture \(USDA\)](#) and a draft report from the [U.S. Global Change Research Program](#) indicate detrimental effects from climate change on most crops, livestock, and ecosystems that will vary somewhat by region:³⁴

- 🍏 Rising temperatures and altered precipitation patterns will affect agricultural productivity. Crop sector impacts from weather are likely to be greatest in the Midwest, and these impacts will likely expand due to damage from crop pests. As a practical matter, about 80% of U.S. hop production takes place in the Yakima Valley of Washington. One analysis suggests that decreased water supplies in the Yakima basin could negatively impact irrigated agriculture.³⁵ Anecdotal evidence from brewers is starting to indicate hop shortages due to warm weather in Washington,³⁶ while research from the Czech Republic suggests decreased yields of Saaz hops due to warmer temperatures.³⁷
- 🍏 Climate change will exacerbate current stresses from weeds, diseases, and insect pests on plants and animals; it will also alter pollinator life cycles, which will impact all types of crop and livestock production in Vermont.

- 🍏 Ecosystem services (e.g., maintenance of soil and water quality, flood control) that food systems depend on will be damaged.
- 🍏 Increased incidences of extreme weather events will impact food production around the world. Tropical Storm Irene—viewed as a harbinger of things to come—flooded 20,000 acres of farmland and impact 463 Vermont producers when it struck in 2011.

It is not clear how climate change will impact Vermont's nascent hops farmers: temperatures are predicted to increase but water shortages are not expected to be a problem.

ANALYSIS

While some farmers are interested in growing hops and several brewers are willing to experiment with the crop, there is an upfront outlay of capital and a steep learning curve to overcome if Vermont farmers are to successfully provide the brewing industry with a reliable local hop crop.

🔑 Research Strategies

Although hops was an historically important crop to Vermont, the complete loss of the industry—and its infrastructure—in the early 20th century has made hop production a new enterprise for Vermont farmers. When it comes to expanding production of beer using locally-sourced ingredients, key obstacles to overcome include developing an understanding of how best to grow hops at the commercial scale and how to deliver a product that meets brewers' specifications.

To address the challenges of growing hops commercially in Vermont, the *UVM Extension Northwest Crops and Soils Team* has created the [Vermont Hops Project](#), a one-acre research hopyard in Alburgh that aims to increase the knowledge of Vermont's hops farming community. The goals of the project, now in its second growing year, are to find hops varieties that grow well in the Northeast, that demonstrate resistance to diseases and pests, and that present desirable characteristics to brewers. For example, research is being conducted to find methods to combat persistent pest problems,



Bottles being rinsed on the assembly line.

PHOTO CREDIT: Rock Art Brewery

including the potato leafhopper and powdery mildew (*Podosphaera macularis*). Though strong pesticides and fungicides might successfully fight these problems, the treatment could also kill off other beneficial insects. Integrated pest management (IPM), which incorporates prevention, observation, and intervention in an effort to reduce the use of pesticides and preserve the biodiversity within hopyards, has been the preferred approach to dealing with disease in hopyards.³⁸ The Vermont Hops Project team is working with the [Northeastern IPM Center](#) to develop IPM strategies for hopyards.

Additionally, popular hop varieties are not available to the public, due to intellectual property rights, making it impossible to establish these varieties on Vermont farms. The Alburgh hopyard consequently includes many alternative varieties, including five varieties just released from a Northwest breeder. In addition, many of Vermont's brewers are interested in organic hops, which are not readily available anywhere in the country, so an organic component has been added to Vermont Hops Project. Finally, with a three year waiting period for a profitable harvest, the slow return on investment may be a challenge for many farmers. Many resources, including workshop and

conference proceedings, emerging best practices, a hops blog, and information about pests, are available on the Northwest Crops and Soils Team's [website](#).

In addition to the Vermont Hops Project, [Cornell Cooperative Extension](#) in New York now has a hops expert, Steve Miller, who will work with producers and beer companies to rebuild the New York hop industry.³⁹ *UVM Extension* and *Cornell* are partners in the [Northeast Hop Alliance](#), a coalition of hops growers, brewers, and others committed to exploring the feasibility of growing hops in the Northeast. The organization offers a variety of resources to its members, including educational opportunities, current research, and field trips.

While learning to produce high-quality hops is critical, another important part of the research is understanding the needs of brewers. Twenty-five pounds of Willamette and Galena hops from the Vermont Hops Project's experimental hopyard and 300 pounds of malted grains grown in Vermont went into recipes at *The Vermont Pub & Brewery* in the summer of 2012. While the beers have been enjoyed, brewer Steve Polewacyk

found that the grains contained too much protein, and the hops were not as flavorful as Pacific Northwest varieties.⁴⁰ These results have researchers exploring how to improve the brewing qualities of these crops.

Experimentation and collaboration with brewers will ultimately inform Vermont's hops farmers about how best to serve the brewing community. Kristofer Anderson of *Addison Hop Farm* explains, "Brewers certainly are looking at using local hops as an experiment for now, but as we build a track record of quality, hopefully they will gain confidence and look at local hops as one of their base ingredients for at least a few recurring beers."⁴¹ Matt Cohen, owner and brewer of *Fiddlehead Brewing Company*, says that having a small-batch capability in his brewery has allowed him to experiment.⁴² As experience is gained with using local hops, brewers will come to trust and rely on the local supply of hops from Vermont's farmers, thereby building a market that farmers can depend on.

In addition to hops and other starch sources (e.g., wheat, barley, and rye), brewers can source other local flavorings for their recipes, such as fruits, vegetables, herbs, spices, honey, and maple syrup.

🔑 Natural Resource, Physical Infrastructure and Technology Strategies

Hops farming and brewing are dependent on the establishment of potentially expensive infrastructure, often within newly constructed or renovated facilities. Both endeavors require capital outlay, adoption of new technologies, and construction or renovation of facilities.

While breweries have been part of Vermont's food system landscape for years, it is not without challenges that new facilities are constructed, or existing facilities are expanded. The biggest challenge is usually financing, but, according to Sean Lawson of [Lawson's Finest Liquids](#) (Warren), with the increased interest in microbrewing, there can be a backlog in equipment order fulfillments of as much as 4-6 months.⁴³ Once financing is in hand and the equipment is purchased and delivered, setting up or expanding equipment in a microbrewery is fairly straightforward.

Building a hopyard is an undertaking that may represent a capital outlay for the beginning hop farmer of about \$10,000 per acre,⁴⁴ plus equipment and processing facilities. Most of the production infrastructure can be easily sourced, such as trellises



Mobile hops harvester at Square Nail Hop Farm.

and irrigation systems. Harvesting, however, presents some challenges. According to *UVM Extension* engineer Chris Callahan, harvesting basically consists of four steps: 1) cutting down the bines, 2) removing the cones (either by hand or together with the leaves in mechanical harvesters), 3) sorting the cones from the leaves, and 4) drying the cones from about 75% moisture content to about 8%.⁴⁵ Callahan says hops farmers have four mechanized options:

- 🍷 Purchasing a Bine Implement (e.g., the [Bine 306Q](#)) for \$13,000
- 🍷 Purchasing and importing a [Wolf Harvester](#) (a stationary unit) for \$35,000-\$40,000
- 🍷 Building your own mobile or stationary unit (\$10,000-\$30,000, including labor)⁴⁶

The Vermont Hops Project recently built a [mobile unit](#) (a model designed and built by Callahan), but it is important for hops farmers to have ready access to a harvester (or friends to help them harvest by hand), since harvesting at exactly the right time is critical for hops quality. Owning a mechanized harvester can be a worthwhile investment for the hops farm, though the economics of harvesting options have not yet been worked out by the Vermont Hops Project research team.⁴⁷ Improving efficiency of harvesting and processing is part of the learning curve too. Fletcher Bach, co-owner of *Square Nail Hops Farm* notes one of the biggest challenges to small-scale hops farmers is reducing crop loss during harvesting and processing and increasing quality of the finished product.

While the harvest method is an important consideration for hops farmers, there are additional mechanical needs: once dried, the hops need to be pelletized, baled, bagged, and vacuum-sealed. Pelletizing presents another equipment challenge, as this process tends to overheat the final product, which can negatively impact product quality by changing the acid and flavor profile.⁴⁸ However, there are some brewers who are willing to work with non-dried hops, referred to as “wet hops.” Either way, prior to shipment, chemical analysis also needs to be performed on the finished product. Hops farmers can purchase this equipment and do chemical analyses themselves, and there are also laboratories across the country that will conduct this testing, such as [Hopunion](#) in Yakima, Washington and [Atlantic Hops](#) in New York.

🍷 Sales and Distribution Strategies

Federal law mandates three tiers in the sale of alcohol: producers, distributors, and retailers. Under this system producers can only sell their product to distributors, these distributors, in turn, can only sell their product to retailers, and only retailers may sell to consumers. There are exceptions to this rule, however, including brewpubs, which are simultaneously producers and retailers, and several states have amended their laws to allow for different distribution pathways.⁴⁹ **Vermont is one of only several states that allow brewers to self-distribute their product (i.e., a single entity can be both a producer and distributor, though they are treated as separate businesses).** Several of Vermont’s brewers operate their own distribution companies, such as *Hill Farmstead Brewery*, *Lawson’s Finest Liquids*, and *Alchemist Brewery*.

Self-distribution allows brewers to control how their product reaches the market (e.g., the freshness of their products). It also allows brewers to be more selective when choosing retail outlets, often selecting retailers based on the professionalism of their establishments and the quality of service from well-informed retail staff. As Scott Kerner, co-owner of [Three Penny Taproom](#) in Montpelier explains, people come to Vermont, and to *Three Penny Taproom*, for the freshest beer from small breweries.⁵⁰ By allowing Vermont’s brewers to bring the freshest product to market, either by establishing a brewpub or controlling the distribution of their own product, Vermont’s beer industry maintains a high level of quality, in turn increasing demand and driving sales. Further, with the ability to self-distribute, Vermont’s smaller brewers are not subject to being lost within the long list of offerings from larger distribution companies.

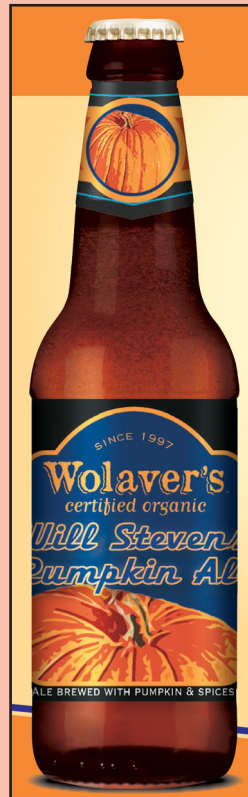
The ability to self-distribute has been one key to the success of Vermont’s breweries.

Several of Vermont’s smaller brewers are focused on keeping their product in Vermont, while others have expanded distribution to all of New England and beyond. The difference between the two approaches is driven by business models and owners’ ideals, and both serve a purpose. Good beer served only in Vermont is a tourist draw, and selling only in Vermont ensures customers are getting the freshest product, particularly when using ingredients with short shelf lives. However, good Vermont beer served outside of the state, particularly in high-density areas like New York City and Boston, supports business expansion, and creates broader interest in the Vermont brand. Both approaches to distribution serve to increase demand for Vermont beer.

Wolaver's Fine Organic Ales

Wolaver's Fine Organic Ales has been providing libations to New Englanders since 1997. One of the first certified organic beers in the country, Wolaver's is part of the larger [Otter Creek Brewing](#) and currently offers a selection of six organic brews. In addition to using organic ingredients, Wolaver's has partnered with several Vermont producers to create an Organic Farmer series of beers, which boasts local ingredients like pumpkin, wheat, and barley that are sourced from Vermont farmers. The brewing company encourages sustainability near and far, and recently collaborated with a small, nonprofit coffee farm in the Dominican Republic that was founded by a Vermont couple. Wolaver's is now featuring the shade-grown, fair trade coffee in its Coffee Porter and donating part of the profits to educational and agricultural projects on the Latin American farm.

To learn more about Wolaver's organic beer visit: www.wolavers.com.



Wolaver's Organic "Will Stevens" Pumpkin Ale

While getting beer into consumers' glasses is relatively without challenge, getting hops to market is a significant issue in sourcing more ingredients locally: the hops have to be dried to a specific moisture content, pelletized to a specific density, and analyzed for their chemical profile to meet the beer industry's brewing standards. The quality and characteristics of the ingredients have to be consistent from batch to batch. As Matt Cohen, owner and brewmaster of [Fiddlehead Brewing Company](#) explains, the quality needs to match or exceed that of hops coming from established farmers in the Pacific Northwest or Europe, without costing more than those sources. Additionally, Cohen says that a local hops product is more appealing when it represents a unique flavor and is distinguishable from typical flavors that can be purchased in larger quantities at

lower and more stable prices from other suppliers.⁵¹ **Vermont hops farmers should focus on aroma hops, which are used in smaller quantities for flavoring and for which brewers are accustomed to paying higher prices.**

In addition to quality, a critical issue in producing more beer with Vermont-grown hops is simply availability. Currently, individual hops farmers are growing one or two acres of hops, and collectively only 10 acres throughout Vermont,⁵² and most are reporting lower-than-normal harvests due to start-up challenges.⁵³ For now, these farmers may only be able to produce enough hops to supply one or a few small brewers. It will take a few years for availability to match demand, but, according to *UVM Extension* Agronomist Heather Darby, there are markets for a high-quality Vermont hop crop and there won't be an issue selling it once it's available.⁵⁴

Vermont's hops farmers may also like to look outside of Vermont for distribution, as brewers in other regions may be interested in purchasing hops grown in Vermont. *Square Nail Hops Farm* in Ferrisburgh is selling most of their 2012 harvest—200 dried pounds in total—to [Six Point Brewery](#) in Brooklyn, though their 2010 and 2011 harvests went to *Bobcat Brewery* in Bristol.⁵⁵

Marketing and Public Outreach

Three of Vermont's strongest industries come together in the case of local hops and beer production: farming, craft brewing, and tourism. Vermont's beautiful working landscape and its excellent beer already draw many thousands of tourists to the state; together, the two can be a significant draw as well. Brewery tours are a popular tourist destination, as are farm tours, so there is some opportunity to combine the two so that the Vermont visitor can, for example, see a hops farm, smell the local hop varieties, and taste the brews made from each variety or farm.

One of the appeals of brewing beer with Vermont-grown ingredients is the opportunity to experience and market a "taste of place," a practice commonly used by winemakers. This is perhaps the most important consideration for brewers as they begin to include and seek market support for local ingredients. The Vermont Brewers Association already has a "[passport program](#)" for visiting all of Vermont's breweries. Additional information on locally-sourced ingredients could be included on websites, packaging, and marketing materials, including the passport program, to build support for these

products. Of special consideration is the opportunity to differentiate the qualities of aroma hops varieties grown in Vermont, as aroma hops offer very distinctive flavors to beer.

There are several well-attended beer festivals held in Vermont, including the [Vermont Brewers Festival](#), [Killington Brewfest](#), and [Siptemberfest](#), among others.

These festivals currently feature Vermont's brewers, but they could grow to feature Vermont's hops farmers. Brewers and farmers could partner together to present tastings of beers featuring different varieties of Vermont-grown hops. Other marketing and tourism opportunities include creating an annual hops harvesting festival, or hops farmers could host on-farm events such as local food dinners featuring beer brewed using their own hops.



— Regulation and Public Policy

An important part of growing the demand for Vermont beer and locally-grown hops are educated customers with a taste for these products. While many Vermonters and beer enthusiasts are excited about Vermont's beers, there are new flavors and higher prices to learn to appreciate. For example, many of the Vermont beers that are currently winning awards have a strong hops flavor (i.e., bitterness), often accompanied by strong notes of citrus or pine. These tastes can be surprising to the palette and are not appreciated by all beer drinkers. Additionally, these beers often contain higher alcohol content, are served in smaller glasses, and cost significantly more than some more popular American beers. For example, a 10-ounce glass of locally-made craft beer can cost as much as \$5 to \$8, while a pint of mass-produced beer, such as *Pabst Blue Ribbon*, can cost \$2 to \$3.

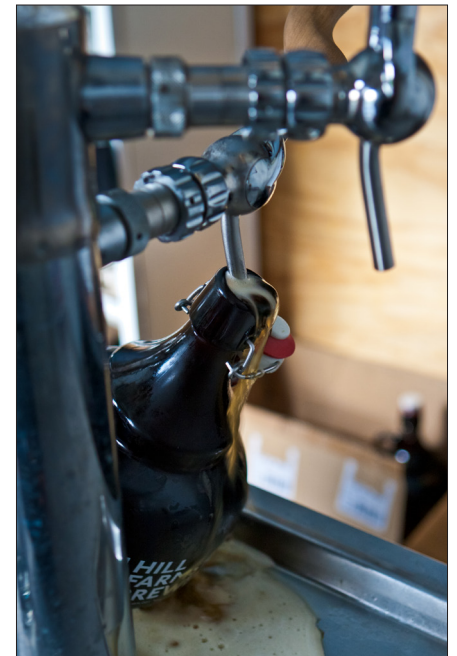
Educating the customer is, in part, the role of well-informed and experienced retail staff, from which consumers can learn about the brewing methods and ingredients used in their selections. Brewers can play a part in educating the customer base by

brewing recipes that highlight Vermont's hops' flavors and featuring information on the sourcing of their ingredients in marketing and informational materials. As customers come to appreciate and enjoy the distinctive qualities of each style of beer and the various ingredients and care that go into them, they will seek these products out in increasing volumes.

— Education Strategies

Beer production—and alcohol production in general—is a highly regulated and taxed industry. The federal excise tax on beer was established to fund the Civil War.⁵⁶ In 1990, the federal excise tax on beer went from \$9 to \$18 per barrel, although there are exceptions offered to smaller brewers (brewers who make less than 2 million barrels per year pay \$7 per barrel on the first 60,000 barrels, then \$18 per barrel after the first 60,000 barrels).⁵⁷ In addition to the federal excise tax, there are state excise, sales, and local options taxes. All taxes are ultimately passed on to the consumer: According to one study, all taxes on the production, distribution, and retail of beer amounts to 40% of the retail price paid by customers for beer.⁵⁸ Whether taxation has an impact on consumption is unclear, and there are numerous studies pointing to both sides of the argument.

Establishing a brewery requires a number of administrative details, including a long list of possible permits and certifications.⁵⁹ Sean Lawson, owner and brewer of *Lawson's Finest Liquids*, says that a single entity providing a "one-stop" experience for the start-up brewery regarding permitting, regulations, and taxation information would be very helpful, as this takes a lot of energy to navigate alone.⁶⁰



Filling a growler at Hill Farmstead Brewery

PHOTO CREDIT: Bob Montgomery

Fair taxation and technical assistance with permitting and certifications are both key to supporting the growth of Vermont's breweries. Another current issue is the ability for brewers to sell their product online, as wine makers are allowed to do, so that product from small breweries can be sold directly to customers who are out of state. Currently, Vermont law does not allow brewers to sell their product online.

GETTING TO 2020

Vermont's craft beer industry is in a strong—and growing—position. There are several ways to support growth of this industry, particularly in the case of marketing, distribution, and regulation. As for hops farmers, the greatest needs are in the areas of research, equipment and technology, and marketing. Strengthening demand for Vermont beer made with locally-grown ingredients will encourage more hops farmers to get established and expand production.



Sampling of beers at Vermont Pub & Brewery.

PHOTO CREDIT: Vermont Pub & Brewery

Table 3.3.1: Objectives and Strategies for Expanding Vermont's Hops and Beer Production

OBJECTIVE	STRATEGY
<i>Research Strategies</i>	
To establish best practices for growing hops in Vermont.	Support continued research on growing hops in Vermont—including understanding the implications of climate change on hops production in Vermont; encourage collaborations with brewers to identify the best hops varieties for brewing, and shared learning through publically-available resources, conferences, workshops, and farm tours.
<i>Natural Resource, Physical Infrastructure, and Technology Strategies</i>	
To build the infrastructure needed to develop a viable hops sector in Vermont and New England.	Develop affordable small-scale harvesters and pelletizers, or offer economical fee for service mobile units, for Vermont hops farmers.
<i>Marketing and Public Outreach Strategies</i>	
To increase tourism to Vermont by combining the draws of farming, craft beer, and local food.	Expand Vermont's craft beer tourism and marketing efforts, such as beer festivals, brewery tours, beer trails and the passport program, to include promotion of hops farms. Develop campaigns on websites, packaging, and marketing materials that describe the local hops varieties used in each brew.
<i>Regulation and Public Policy Strategies</i>	
To support growth in Vermont's brewing industry.	Create an online clearinghouse of all permits and certifications required for a brewery in Vermont; offer technical assistance for navigating the establishment of a new brewery in Vermont; and explore options for internet sales of beer, as with wine, so that brewers can sell product directly to out-of-state customers.

End Notes

1 Calculation based on 27 breweries and a Vermont population of 625,741.

2 RateBeer, Best Brewers in the World 2013, www.ratebeer.com/RateBeerBest/bestbrewers_012013x.asp.

3 Spike Carter, "An Interview with Shaun Hill, Brewmaster at Hill Farmstead, the "Best Brewery in the World,"" *Vanity Fair*, April 25, 2013, www.vanityfair.com/online/daily/2013/04/shaun-hill-brewmaster-hill-farmstead-slideshow_item6_7.

4 BeerAdvocate, Top 250 Beers, <http://beeradvocate.com/lists/top>.

5 Gary Dzen, "The Best Beer Town in New England," *The Boston Globe*, September 9, 2012, www.bostonglobe.com/2012/09/08/the-best-beer-town-new-england/wj3Zc8yFWaXluggRV2wkaM/story.html.

6 Rosalie J. Wilson, 2009-10 Feasibility and Market Research Study for Commercial Hop Production in New England, September 20, 2010, www.vermontagriculture.com/buylocal/documents/Hops_Feasibility_Study_2010.pdf.

7 Jon Abernathy, "Sourcing and Growing Local," *The Hop Press*, March 19, 2011, <http://jonabernathy.hoppress.com/2011/03/19/sourcing-and-growing-local>.

8 Adam Krakowski, "A Bitter Past: Hops Farming in 19th Century Vermont," 2011 Winter Hops Conference, February 8, 2011, www.uvm.edu/extension/cropsoil/wp-content/uploads/A-Bitter-Past.pdf.

9 Corin Hirsch, "Resurrecting Hops," *Seven Days*, August 3, 2011, www.7dvt.com/2011vermont-hops.

10 Beer Institute, "Brewers Almanac, 2011," Annual Total Domestic Production 1860 to 2011, (page 6), June 2011, www.beerinstitute.org/statistics.asp?bid=200.

11 Beer Institute, "New Data Show Retail Beer Sales Rose 2 Percent in 2011; More than \$98 Billion in Retail Revenue Anchored by Boost in High-End Beer Sales," February 14, 2012, www.beerinstitute.org/BeerInstitute/files/ccLibraryFiles/Filename/000000001230/Beer%20Industry%20Retail%20Revenue%20Up%20in%202011.pdf.

12 Brewers Association, "Craft Brewing Hops 13 Percent," March 26, 2012, www.brewersassociation.org/pages/media/press-releases/show?title=brewers-association-craft-brewing-volume-hops-13-percent.

13 Ibid.

14 Associated Press, "New Brewery to Open in Cabot, Giving Vermont 26," *Burlington Free Press*, September 7, 2012.

15 Beer Institute, "Brewers Almanac, 2011," Per Capita Consumption of Beer by State 1994 - 2010, (page 21), June 2011, www.beerinstitute.org/statistics.asp?bid=200.

16 Janet Essman Franz, "Tap Dancing: Greg Noonan Wrote the Book on Microbrewing—Really," *Business People—Vermont*, February 2007, www.vermontguides.com/2007/02-feb/pub.html.

17 Jason Notte, "10 Best Beer States of 2011," *Main Street*, August 2011, www.mainstreet.com/article/lifestyle/food-drink/10-best-beer-states-2011.

18 Paul Toscano, "The 10 Biggest US Craft Breweries," *CNBC.com*, September 17, 2010, www.cnb.com/id/39233398/The_10_Biggest_US_Craft_Breweries.

19 Vermont Department of Liquor Control, "2011 Annual Report," page 7, January 1, 2011, www.state.vt.us/dlc/annualreports/2011.pdf.

20 Rosalie J. Wilson, 2009-10 Feasibility and Market Research Study for Commercial Hop Production in New England, September 20, 2010, www.vermontagriculture.com/buylocal/documents/Hops_Feasibility_Study_2010.pdf.

21 USDA National Agricultural Statistics Service, "National Hop Report," page 1, December 21, 2011, <http://usda01.library.cornell.edu/usda/current/hops/hops-12-21-2011.pdf>.

22 Ibid.

23 Wilson, Op. cit.

24 Adam Krakowski, Op. cit.

25 Scott Wheeler, "Prohibition Along the Northern Vermont Border," www.vermonter.com/northlandjournal/prohibition.asp.

26 http://en.wikipedia.org/wiki/Smugglers_Notch.

27 Personal communication with Rosalie Madden, *UVM Extension* and Vermont Hops Project, October 1, 2012.

28 Chris Fleisher, "Tough Year for Vermont Hops," *BrewsReporter.com*, September 1, 2012, <http://www.brewsreporter.com/tough-year-for-vermont-hops>.

29 Personal communication with Fletcher Bach, Square Nail Hops Farm, September 19, 2012.

30 Personal communication with Kristofer Anderson, Addison Hop Farm, September 19, 2012.

31 Corin Hirsch, Op. cit.

32 Ibid.

33 Corin Hirsch, "Hops and Change," *Seven Days*, May 30, 2012, www.7dvt.com/2012vermont-pub-brewery-local-beer.

- 34 USDA, *Climate Change and Agriculture in the United States: Effects and Adaptation*, USDA Technical Bulletin 1935. Washington, DC, 2012, www.usda.gov/oce/climate_change/effects_2012/effects_agriculture.htm. Scott Malcolm et al., *Agricultural Adaptation to a Changing Climate: Economic and Environmental Implications Vary by U.S. Region*, USDA Economic Research Service, Economic Research Report No. (ERR-136), July 2012, www.ers.usda.gov/media/848748/err136.pdf.
- 35 Ernie Niemi, *An Overview of Potential Economic Costs to Washington of a Business-As-Usual Approach to Climate Change*, Climate Leadership Initiative (University of Oregon) and ECONorthwest, February 2009, www.ecywa.gov/climatechange/docs/O21609_ClimateEconomicsImpactsReport.pdf.
- 36 Kathleen Ryan, "Climate Change Bad News for Brews," *The Durango Herald*, November 23, 2011, <http://durangoherald.com/article/20111124/NEWS01/711249920/-1/s>.
- 37 Martin Mozny et al., "The Impact of Climate Change on the Yield and Quality of Saaz Hops in the Czech Republic," *Agricultural and Forest Meteorology*, June 2009, 149(6-7): 913-919, www.sciencedirect.com/science/article/pii/S0168192309000392.
- 38 Savana Kittell-Mitchell and Heather Darby, *Potato Leafhopper Damage in Hopyards*, 2011, www.uvm.edu/extension/cropsoil/potato-leafhopper-damage-in-hopyards.
- 39 Amanda Garris, "State's First Hops Specialist on Tap to Promote New York Beer Production," *Cornell Chronicle*, 2011, www.news.cornell.edu/stories/June11/HopsSpecialist.html.
- 40 Corin Hirsch, "Hops and Change," *Seven Days*, May 30, 2012, www.7dvt.com/2012vermont-pub-brewery-local-beer.
- 41 Personal communication with Kristofer Anderson, Owner, *Addison Hops Farm*, September 19, 2012.
- 42 Personal communication with Matt Cohen, Owner, *Fiddlehead Brewing Company*, September 29, 2012.
- 43 Personal communication with Sean Lawson, *Lawson's Finest Liquids*, September 29, 2012.
- 44 Personal communication with Rosalie Madden, *UVM Extension* and Vermont Hops Project, October 1, 2012.
- 45 Personal communication with Chris Callahan, Callahan Engineering and UVM Extension, September 27, 2012.
- 46 Ibid.
- 47 Ibid.
- 48 Personal communication with Rosalie Madden, *UVM Extension* and Vermont Hops Project, October 1, 2012.
- 49 Three-tier (alcohol distribution), http://en.wikipedia.org/wiki/Three-tier_%28alcohol_distribution%29
- 50 Personal communication with Scott Kerner, Co-owner, *Three Penny Taproom*, September 19, 2012.
- 51 Personal communication with Matt Cohen, Owner, *Fiddlehead Brewing Company*, September 29, 2012.
- 52 Personal communication with Rosalie Madden, *UVM Extension* and Vermont Hops Project, October 1, 2012.
- 53 Chris Fleisher, Op. cit.
- 54 Personal communication with Dr. Heather Darby, *UVM Extension* and Vermont Hops Project, September 21, 2012.
- 55 Personal communication with Fletcher Bach, *Square Nail Hops Farm*, September 19, 2012.
- 56 Beer Serves America, Beer Excise Tax Payments, www.beerservesamerica.org/taxes/default.aspx.
- 57 Alcohol and Tobacco Tax and Trade Bureau, Tax and Fee Rate, www.ttb.gov/tax_audit/atftaxes.shtml.
- 58 Beer Institute, "Beer Tax Facts: The Economic and Societal Impacts of State and Federal Taxes on Beer," 2008, www.beerinstitute.org/beerInstitute/files/cclibraryFiles/Filename/000000000742/BeerTaxFacts_2008update.pdf.
- 59 State of Vermont Permit and License Information, "Small Business Fact Sheet – Operation of a Small Brewery," March 2011, www.anr.state.vt.us/dec/permit_hb/sheetBWbrew.pdf.
- 60 Personal communication with Sean Lawson, Owner, *Lawson's Finest Liquids*, September 29, 2012.



ANALYSIS OF VERMONT'S FOOD SYSTEM

Food Production: Hops and Beer

Credits

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farm to plate
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farm to plate
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