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## **Strategic Planning for the Vermont Apple Industry: Planning for Success in the 21st Century**

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# Strategic Planning for the Vermont Apple Industry: Planning for Success in the 21<sup>st</sup> Century



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## Strategic Action Plan for the Vermont Apple Industry and Supporting Partners

For over a century, large-scale agriculture in Vermont has been identified with three primary crops: milk, maple, and apples. Today, apples are grown on about 3200 acres in Vermont, and contribute \$20 million annually to the state's agricultural economy. Through the 1980s, Vermont apples were sold largely to wholesale, out-of-state markets, and were packed and shipped by in-state and out-of-state firms. By the 1990s, changes in world and national markets signaled a downturn in the Vermont apple industry, and by the end of the decade, many operations had closed or were facing significant difficulties. In 1998, the Vermont Tree Fruit Growers Association (VTFGA); Vermont Agency of Agriculture, Food and Markets (VAA); and University of Vermont (UVM) Extension held a summit to discuss problems facing the industry and seek solutions that could help it reposition itself for the new millennium. Several initiatives were implemented as a result of that meeting, and changes in local marketing opportunities and production systems in the 2000s helped to lift the state of the industry to its present state of success. However, Vermont's apple growers face new difficulties with navigating changes in marketing and production systems, while a decline in traditional support from UVM Extension and the Vermont Agency of Agriculture, Food, and Markets has reduced research, marketing, and outreach programs at a time when new knowledge is critical for growers' success.

The intent of the 2013 Vermont Apple Industry Strategic Action Plan is to identify strategies and action items that community

partners can implement to ensure to success of the industry and its place in the greater food system into the future. The plan was devised initially by the VTFGA, who are the primary beneficiaries of its success, and was redrafted based on solicited comments from community partners. It is not expected that the plan will remain a static document, but rather that relationships formed in the process will guide participants toward developing mutually acceptable goals and strategies that can be acted on.

A core consideration in the plan is that *the Vermont apple industry is a significant component of the state's food system*, whose economic impact is significantly greater than its relatively small number of producers might suggest. Apple orchards represent a unique niche in the food system in Vermont, in that they are included in multiple and diverse markets. Apples are identified in the Vermont Farm to Plate (F2P) Strategic Plan as one of only seven crops that are produced in sufficient capacity in the state to meet local consumption needs, and one of only three (with milk and maple) that generate substantial surplus from which major wholesale export to out-of state markets may be realized (Vermont Farm to Plate Strategic Plan Executive Summary, p. 13) [1]. This highlights the need to support and promote apple producers who sell out-of-state, and who generate significant clean, environmentally-sound economic activity. That apples lend themselves

to storage, and good facilities exist that provide near year-round access to supplies of fruit, suggests that they will continue to be one of the main agricultural products consumers purchase on a regular basis that is grown in the state. The other side of the Vermont apple industry, which is not mutually exclusive with wholesale sales, is the retail, farmstand, direct store delivery (DSD), and pick your own (PYO) market for local fruit. *This component of the industry directly serves the local foods focus that drives much of agriculture and food policy in the state.* Retail orchards also hold a unique role in their promotion of Agritourism activities, especially since harvest and PYO activity coincides with the fall foliage season which is a primary component of Vermont's tourism industry. Because apple production occurs in orchards that produce over decades, and whose initial return on investment typically occurs after over twelve years from establishment, the industry also inherently contains a level of permanence that ensures that it will continue to provide sustained activity within the agriculture and food economies.

This plan was informed primarily by discussion at the 2013 Vermont Apple Industry Strategic Planning Summit and subsequent apple grower and supporting partner comments. Details from that meeting are outlined beginning on page 31. Action items are outlined below by participant group, but efforts may be completed by multiple parties in order to capitalize on relationships between parties within the overall system.

*The Vermont apple industry is a significant component of the state's food system, whose economic impact is significantly greater than its relatively small number of producers might suggest. Apples will continue to be one of the main agricultural products consumers purchase on a regular basis that is grown in the state.*

## Action Items for Vermont Apple Growers and Support Partners to Strengthen the Industries' Position in the Vermont Food System

The suggested action items for the apple industry and its supporting partners are based on several concepts:

1. The apple industry is a very significant component of the specialty crop industry in Vermont, with total sales for a single crop product (roughly \$20 million annually) second only to maple.
2. Of non-ornamental food crops, Vermont's fruit industry, in which over 90% of acreage is devoted to apples, constitutes 28% of farmgate sales [2].
3. Vermont orchards represent a unique component of the state's Food System, and fill diverse marketing and production systems: from large wholesale operations that ship fruit around the world; to locally- and regionally-oriented farms that sell direct to stores farm markets, and through farmstands; to small pick-your-own operations that connect directly to consumers and support significant tourism activities.
4. Like other crop industries, Vermont apple growers face significant production and marketing challenges in light of changes to: climate; pest complexes; production systems; state and federal regulations; marketing systems; food safety practices; labor availability; and other key systems used in their businesses.
5. Support systems for the Vermont Apple Industry have declined disproportionately in comparison to other specialty crops in recent years, and the industry requires marketing, horticultural, pest management, food safety, and other expertise readily available in order to thrive in the present production and marketing climate.

Therefore, the following action items are proposed for the Vermont Tree Fruit Industry and its supporting partners

### Vermont Tree Fruit Growers Association

- Encourage participation from membership in Board of Director activities. Develop a roster of candidates to fill officer roles in the event of turnover.
  - Appoint industry action committees to address topical needs of apple producers on a year-round basis:
    - Marketing
    - Legislative
    - Strategic planning: identify members to serve on boards of partnering groups,
- e.g. Vermont Farm to Plate (F2P) and Vermont Agency of Agriculture, Food and Markets (VAA) review boards.
- Develop strategic partnerships with service providers and other businesses
    - Contribute to F2P initiative as an active partner
  - Continue relationships with Vermont Hard Cider, Cold Hollow, and other processors to ensure good markets for off-grade fruit

- Commit full funding to U.S. Apple to help with H2A (immigration and labor), EPA, USDA issues at federal level.
- Work with distributors and processors to ensure fairness to Vermont apple growers.
- Continue to develop internal funding mechanism from within the industry to cover operation costs.
  - The number of producers is small but gross sales are high, therefore the organization will need to leverage more funds from each farm.
- Consider paid membership to VTFGA and increased benefits for increased fees, e.g. access to electronic listservs, trade publications.
- Increase grower education and marketing opportunities.
  - Bring in guest speakers on web marketing and social media for farm businesses.
  - Identify point-person to coordinate social media campaigns on Facebook/Twitter to promote VT Apples.
  - Coordinate with WCAX, as an affiliate of the University, to promote apples in fall on Across the Fence and other programs.
  - Maintain and increase support for Apples to iPods program that brings children & youth to orchards.

#### **New England Apple Association**

- Identify favorable and exclusive club apples unique to New England growers that may improve competitiveness.
- Work with regional distributors and processors to ensure fairness to Vermont apple growers.

- Explore expansion of markets through development of in-state processing facilities and fresh apple distributors.
- Work on sensible reform to Title 29, part 780 of U.S. CFR (Agricultural Labor Exemption Rules) to improve access to orchard labor.
- Coordinate with Department of Defense Fresh Purchase program to increase purchases of VT/New England fruit for school lunch programs.

#### **U.S. Apple Association**

- Continue work on H2A and other immigration/farm labor reform to reduce bureaucratic burdens and streamline of the process of acquiring needed workers.
- Continue work with U.S. EPA on pesticide registrations.
- Continue work with FDA/USDA on good agricultural practices (GAPS) other food safety initiatives.
  - Maintain crop-specific, scientifically-based standards.
- Continue independent research on economic benefits of industry and health benefits of apple consumption.
- Continue defense of U.S. Apple industry against exotic pests and product dumping through reasoned tariffs and/or quarantines.
- Coordinate with Department of Defense Fresh Purchase program to increase purchases of VT/New England fruit for school lunch programs.



## University of Vermont

### College of Agriculture and Life Science and Extension

- Maintain and improve on the work of the interdisciplinary UVM Apple Team.
    - Re-commit support for industry by hiring a base-funded IPM/Horticulture team leader within UVM CALS Plant and Soil Science Department to coordinate research and outreach for apple industry.
    - Include Extension component to above position, or hire separately a tree fruit/vineyard specialist to facilitate horticultural and pest management information delivery to apple and other specialty crop growers.
    - Include horticultural, food safety, and economics expertise in Apple Team programing
  - Maintain food safety faculty in research and training roles. Secure funding for on-farm food safety program in light of Food Safety Modernization Act (FSMA), GAPS, and other requirements that affect producers of all crops in Vermont.
  - Coordinate peer-to-peer grower mentorship through Center for Sustainable Agriculture or other programs.
  - Maintain and modernize apple research/demonstration orchards at UVM Horticulture Research Center to demonstrate modern production practices and facilitate applied research.
    - Include long-term planning to incorporate new planting systems/cultivars in trials.
  - Charge Extension Agricultural Engineer with addressing facilities needs for apple producers to meet storage, packing, GAPS and FSMA requirements.
- Coordinate New Farmer Project programs with Apple outreach staff to facilitate enrollment by developing/transitioning apple growers.

### UVM Apple Team

- Resume long-running transdisciplinary outreach program, including IPM, horticulture, food safety, economics, and other issues. Serve as a clearing house for UVM Extension information for VT apple growers.
  - Develop an interactive, two-way email list to facilitate grower-to-grower communication.
  - Provide outreach on latest techniques for managing pests (esp. apple scab) and avoiding resistance development to spray materials.
  - Utilize Continuing Education or other online resources (eXtension, webinars) to assist with program delivery.
  - Invite web marketing experts to meetings/publish stories in outreach publications on improving farms' websites.
  - Increase access to outreach materials through use of social media
- Conduct cultivar and rootstock evaluations to the best extent available, given limitations on club cultivars. Develop variety collection of best old/antique, traditional, and new/experimental cultivars for evaluation by growers (tall spindle plantings allow this to be done in relatively little space).
  - Consider evaluations of non-*Malus* tree fruit that may provide growers with profitable diversification options.

- Develop research programs that address needs of Vermont fruit growers. Topic areas may include:
  - management of apple replant disease;
  - increased fire blight incidence;
  - management of orchards in light of extreme weather events;
  - production and marketing trends to adapt to changes in regional food systems;
  - adoption and management of modern orchard architecture and tree training systems;
  - management of new and invasive pest species;
  - use of reduced-risk pesticides, biopesticides, biological control strategies, and advanced IPM techniques to enhance orchards sustainability;
  - financial assessment of alternative orchard practices.
- Conduct research supporting development of hard cider industry:
  - Identification of cultivars best-suited to multiple hard/ice cider styles and quantify their present production capacity in Vermont.
  - Assessment of integrated pest management (IPM) strategies that reduce orchard inputs, decrease costs, minimize environmental impact, and increase availability of cider fruit to processors.
  - Study of horticultural strategies geared specifically toward high-value processing apples: dwarf vs. semi-dwarf trees; trellis systems; groundcover management; orchard/tree nutrition; annual croplod management; harvest timing.
  - Conduct economic analysis of cider apple production and procurement for multiple orchard types (e.g. high-value specialty

fruit; low-input, high quantity 'base' fruit' preharvest dropped and hail or otherwise damaged fruit from present orchards managed for fresh fruit markets). Develop enterprise budgets for cider fruit options.

- Collaborate with Nutrition/Food Sciences faculty to develop flavor wheel for fermented cider products and dissect components of *terroir* for apples and apple products.
- Expand expertise by collaborating with regional experts on production issues of concern to regional growers.

### Vermont Agency of Agriculture, Food, and Markets

- Work with Federal delegation to urge sensible reform to immigration and labor rules that affect fruit and vegetable growers (e.g. H2A, Title 29, part 780 of CFR (Agricultural Labor Exemption Rules)).
- Allocate base-level funding for marketing programs of all VT specialty crops.
- Conduct annual marketing programs for all Vermont specialty crops through a coordinated effort, e.g. *Vermont Harvest*. Include representatives from each specialty crop industry in campaign development and delivery.

### Vermont Apple Marketing Order

- VAMO provides a legislated link between the apple industry and the Secretary of Agriculture. The industry actively chose not to sever that relationship in 2010 when VAMO was initially suspended, and asks VAA to maintain it.
- The VAA secretary shall actively convene the Vermont Apple Marketing Board or its replacement under VAMO annually to meet

with industry and comply with requirements of the order.

- Commit funding to U.S. Apple Association to help with H2A, EPA, USDA issues at federal level. Recognize that these critical issues affect all specialty crops, and that they cannot be addressed adequately at the state level.
- Develop orchard signage program to direct customers to orchards and farmstands.

### Specialty Crops Block Grants Program

- Establish specific VT SCBGP website. List past and present funded projects and progress reports in a timely manner.
- Change policy on only supporting new/unique projects for SCBGP. Some programs, such as marketing programs, are an annual, on-going expense that VAA discourages for SCBGP funding but which are crucial to maintaining competitiveness of specialty crops.
- Establish specialty crops marketing advisory boards with representatives from all specialty crops producer organizations.
- Target a percentage of funding toward marketing programs for producer organizations.
- Commit funding to U.S. Apple Association to help with H2A, EPA, USDA issues at federal level. Recognize that these critical issues affect competitiveness of all specialty crops, and that they cannot be addressed adequately at the state level.

### Working Lands Enterprise Initiative

- In the initial round of WLEF funding, the Board was overwhelmed with requests. Increase staffing to facilitate timely grant

review process to reduce delays and improve project implementation timeline.

- Post a list of funded proposals and associated progress reports to WLEF website in a timely manner.
- VTFGA will work with partners to ensure continued and increased funding for WLEF.

### Marketing Division

- VAMO and Act 48 direct VAA to coordinate marketing efforts for commodities in order to reduce “unreasonable and unnecessary waste.”
- Work with regional distributors and processors to ensure fairness to Vermont apple growers.
- Explore expansion of markets through development of in-state processing facilities and fresh apple distributors.
- Improve marketing and visibility of apples as a Vermont product like maple and cheese.
- *If DigInVT.com is to be the primary VAA vehicle for online consumer-producer information, include producers in its development:*
  - Improve site marketing, it is presently little-known among orchard customers.
  - Include traditional marketing: many potential customers just want to eat, and don't want a 'culinary tourism experience'.
  - Only 46% of Americans have smartphones, and many don't use them to guide decisions on basic food purchases. Marketing programs shall include multiple media, including print, broadcast, and other campaigns. Implement those marketing programs

at rest stops, hotels, B&Bs to improve marketing to tourists.

- Utilize hybrid marketing models: include QR codes on printed materials to facilitate transfer of customer to web interface.
- Maintain and increase support for Apples to iPods program that brings families to orchards.
- Coordinate with Department of Defense Fresh Purchase program to increase purchases of VT/New England fruit for school lunch programs.
- Collaborate with Vermont Life and WCAX/other media outlets to promote orchards in fall.
- Identify a point-person to coordinate social media campaigns on Facebook/Twitter to promote VT Apples and other produce.

### **Vermont Sustainable Jobs Fund**

- Include growers and producer organizations in development and implementation of F2P strategic planning, particularly the fruit and vegetable section.
- Work with VTFGA to identify apple industry representatives for the following committees: technical assistance; aggregation & distribution; peer to peer collaborative.
- Work with regional distributors and processors to ensure fairness to Vermont apple growers.
- Explore expansion of markets through development of in-state processing facilities and fresh apple distributors.
- Connect with growers through Flexible Capital Fund.

### **Vermont Housing and Conservation Board**

- Continue Farm Viability Program, and enhance outreach to more VT apple growers to enroll in the program.
- Consider programs to improve quality and affordability of adequate housing for farm labor, esp. H2A workers.
- Maintain Vermont Agriculture Development Program; provide outreach to growers through VTFGA to identify infrastructure and other needs.
- Support appropriate conservation lease arrangements for orchard lands. This is especially important given the unique site requirements of orchards and the long-term (20+ years) nature of orchard plantings.

## Background: The Scope of the Vermont Apple Industry

Vermont's apple industry has been a significant component of the state's overall agricultural and rural economies for over 150 years. As we head fully into the 21<sup>st</sup> century, apple growers and industry support partners face challenges and opportunities that will help define the industry and position it for continued future success. This strategic plan should be considered a starting point for the industry to use to assure that success.

*Apples represent, depending on the year, the 2<sup>nd</sup> or 3<sup>rd</sup> most-valued specialty crop in Vermont after maple and roughly tied with vegetables, with an average \$11 million in direct farmgate receipts and an estimated \$20 million in overall cash value to the Vermont economy [3].* Apple orchards are planted on approximately 3200 acres in all counties in the state except Essex. Farms reporting apple production in the 2007 USDA Census of Agriculture totaled 264, but commercial production is concentrated among about 70 farms in the state [2]. Vermont has the 3<sup>rd</sup> highest orchard acreage among the New England states, the 2<sup>nd</sup> greatest yield per acre, and ranks 2<sup>nd</sup> in total production with just under 1 million bushels (42 lb units) produced annually. However, Vermont growers receive the lowest utilized price per bushel among New England states for their fruit [3]. This is likely due to several factors, including: a greater dependence on wholesale markets than some other New England states, with most packing and brokering facilities located out-of-state; lower in-state population with lower disposable incomes to market locally vs. other states, especially in southern New England; and great

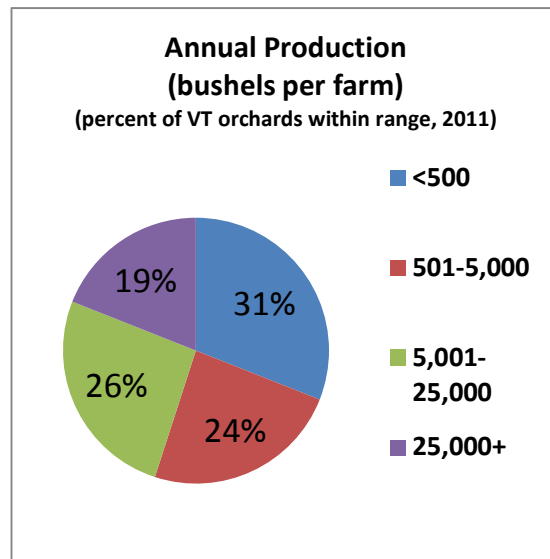


Figure 1: Annual production of Vermont orchards. Graphic: T. Bradshaw.

fluctuation in annual pricing which reflects variations in crop supply and competition with orchards in other regions and countries.

The Vermont apple industry is diverse in operation size and primary market channel. About half of Vermont orchards are small operations, with 55% producing less than 5000 bushels annually [4]. Those orchards generally market most or all of their crop through retail channels including farmstands and PYO. The other 45% of orchards produce greater than 5000 bushels, with about 20% growing in excess of 25,000 bushels per year. Over half of the entire apple crop is produced by five or six operations which market primarily through

*Apples are the 2<sup>nd</sup> or 3<sup>rd</sup> most-valued specialty crop in Vermont after maple and roughly tied with vegetables, with an average \$11 million in direct farmgate receipts and an estimated \$20 million in overall cash value to the Vermont economy*

wholesale or DSD channels. The DSD market is a relatively recent redevelopment of an older sales model, and represents a hybrid between wholesale and retail marketing, where the grower sells to a third-party retailer, but utilizes their own resources to store, pack, broker, and ship their fruit. This has been a successful strategy for some orchards to adapt to changes in the wholesale industry, including the loss of in-state packing and brokering operations since the early 2000s.

## **History of the Vermont Apple Industry**

Apple orchards have been an important component of Vermont farms since settlement times. On early Vermont farms, apples provided fruit, cider, and livestock feed primarily to the farm families. By the mid-1800s, commercial production on specialized farms began, especially in the Champlain and lower Connecticut River valleys and on exposed hilltops where the dangers of spring and fall frosts were reduced. By the 1890s, the Champlain Valley region of Vermont was recognized as one of the most important production areas for apples on the North American continent. Major winter freeze events

in 1917-18 and again in 1933-34 caused many trees to die, especially when planted in marginal areas. At this time, selection was taking place on orchards to determine varieties which were suited to the cold conditions that killed off many less-hardy selections including Baldwin and Winter Banana, while McIntosh in particular survived those test winters well. Marketing and shipping requirements of the wholesale industry that was developing further winnowed apple variety selection to those that best suited the climate of Vermont, so that by the 1960s, McIntosh and its progeny, Cortland, Empire, and Macoun, were the dominant varieties grown in the state. By the 1980s, approximately 70% of the Vermont crop was McIntosh, and virtually all of the apples commercially grown in the state were of those four varieties [5].

Vermont growers have long produced fruit for out-of-state markets in population centers in the northeast U.S., as well as other regions in the east as well as for export markets, especially in the U.K. In the 1950s, the Shoreham Cooperative Apple Packers' Association (SCAPA) invested heavily in modern refrigerated storage and packing facilities. Storage rooms at the Shoreham Coop included state-of-the-art controlled atmosphere (CA) systems. This technology uses modified atmospheric conditions in long-term cold rooms that, by replacing atmospheric oxygen with nitrogen or other inert gases, prevents fruit respiration and holds the fruit for many months in storage so that the marketing window may be expanded from a few to as long as twelve months, thus allowing growers to sell fruit year-round [6]. By the 1980s, 450 thousand bushels of Vermont fruit were marketed through the Shoreham Coop alone, and other packing operations in the Connecticut Valley and Grand Isle County packed and shipped even more fruit. This period was the

peak of wholesale apple shipping for Vermont growers. [5]

*By the 1980's, approximately 70% of the Vermont crop was McIntosh, and virtually all of the apples commercially grown in the state included McIntosh, Cortland, Empire, and Macoun.*

### **Industry Support Networks**

Support systems grew up around the Vermont apple industry as it developed into a major producer of fruit in the eastern U.S. in order to best promote the science and industry of fruit culture and support the economic activity that it provided. In 1896, the Vermont Horticultural Society (VHS) formed and held its first meeting in South Hero; this organization continues to exist today as the Vermont Tree Fruit Growers Association (VTFGA), with roughly the same membership enrollment (~50 active grower members) as it had in 1905 when more than 1.2 million bushels of fruit were produced in the state. Today, the VTFGA continues to promote the interests of apple growers in Vermont, primarily through sponsoring an annual members' educational meeting and though marketing and outreach efforts funded by its members and through competitive grants. The VHS, and later VTFGA, have long cooperated closely with research and outreach staff from the University of Vermont (UVM), and that collaboration continues, with coordinated orchard replanting at the UVM Horticulture Farm and establishment and maintenance of a statewide weather station network just two

projects that the two groups have shared in recent years.

UVM was established as the state land grant University upon passage of the Morrill Act in 1862, and became a primary center for agricultural research in the state. The formation of the Vermont Agricultural Experiment Station in the wake of the Hatch Act of 1887 further facilitated active research programs on apple production issues by the 1890s. McIntosh trees were established in the Experiment Station orchards by 1888 [7], and general study of apple culture and recommended production practices was well-established by the early 1900s [8]. In 1913, the Smith-Lever Act established the federal Cooperative Extension system, which was charged with disseminating relevant research and applied teaching on subjects relating to agriculture, home economics, public policy, and other topics from the Experiment Stations to rural communities. The legislated funding of the Extension system was unique, in that it provided non-discretionary funding to each state, but required that those funds be matched with state monies to ensure successful buy-in from local communities and ensure that the system remained relevant to the industries and populations in each state. In 1947, UVM Extension hired its first tree fruit horticulturalist, C. Lyman Calahan, who served the apple industry until his retirement in 1980. His work was continued through his succeeding horticulturalists Drs. Joe Costante (1976 – 1996) and Elena Garcia (1997 – 2005), who were joined by pest management specialist Dr. Lorraine Berkett in 1983 to form the core of the '*UVM Apple Team*', an interdisciplinary group of research and outreach professionals that served multiple needs of the Vermont tree fruit industry, and was awarded the recognition by UVM Extension in 2003 as a model program for



*providing interdisciplinary programming to commercial growers.*

Vermont apple growers have also historically forged strong ties with state government. In 1904, the Vermont legislature passed Act 15, which appropriated funds annually to the VHS to promote and develop horticultural interests in the state [9], and programs within the Department (later Agency) of Agriculture supporting the apple industry continue today. In 1917 George Aiken, a young, talented fruit grower from Putney, was elected as president of the Vermont Horticultural Society. This move into industry politics sparked an interest that led to a successful political career when he was elected to the Vermont House in 1931, followed by a climb up the political ladder where he served as Lieutenant Governor (1935 – 1937), Governor (1937 – 1941), and U.S. Senator (1941-1975) where he held many important committee assignments. By the 1970s the Department maintained staff dedicated to marketing commodities within and outside of the state, and coordinated programs including marketing campaigns, grading standards, and export market support were conducted for the betterment of the industry. In the 1980s William Darrow Jr., owner of Green Mountain Orchards in Putney, served two terms as Vermont's Commissioner of Agriculture, and during his tenure (1985), the Vermont Agricultural Marketing Order (VAMO) was passed by the state legislature [5].

*Vermont's agriculture marketing rule was intended to coordinate marketing and support programs for commodity producers in order to maximize efficiency and reduce waste among producers of similar products.* This rule established the Vermont Apple Marketing Board (VAMB), which is chaired by the Commissioner

(now Secretary) of Agriculture, and comprised of six apple growers appointed by the Chair. The funding mechanism for the board is based on a surcharge levied on "all US #1 [grade] apple sold at wholesale after September 2, 1985." Rates varied by year, never to exceed eight cents per bushel but typically held at five to six cents. Enforcement language included in the rule allows for civil action against producers who do not pay their required amount into the fund. Collected funds are dispersed according to a budget drafted by the Secretary and voted on by board directors annually, and may cover "out in-state and out-of-state advertising, promotion, and publicity programs that are designed to maintain or enhance present markets or create new markets for apples." (V.S.A. Title 6, Chapter 24, § 250-256, <http://www.leg.state.vt.us/statutes/sections.cfm?Title=06&Chapter=024>).

As Vermont's apple industry became a wholesale producer of fresh fruit, infrastructure to support the storage, packing, and shipping of apples developed in the state. In 1946, SCAPA built their central refrigeration building in Shoreham, with funds from participating area growers in the Cooperative. The SCAPA facility was well-suited to wholesale packing and shipping of Vermont fruit, with its modern, CA storage rooms; efficient packing lines; proximity to the state's largest concentration of orchards in Shoreham, Orwell, Cornwall, and other surrounding towns; and good road access via VT RT 22-A to markets to the north and south. By the 1980s, SCAPA counted 23 grower-members, 18 CA rooms and 4 regular air cold rooms, over 50 employees, and was a major shipper of fruit in the eastern U.S. Other Vermont growers built their own packing operations as well, with orchards in Putney, Westminster, South Hero, Shoreham, and other areas packing and shipping fruit from their orchards and facilities.



## 1990s: An Industry Shakeup

By the last decade of the 20<sup>th</sup> century, the apple industry in Vermont, and to a similar extent, nationwide, was experiencing a downturn in fortunes precipitated by several factors. In the late 1980s concern over Alar, a plant growth regulator used to improve ripening and prevent preharvest fruit drop, was increasing in the U.S., with some studies suggesting that it was a powerful carcinogen. Many grocers and processors refused to accept Alar-treated fruit, and some states (but not Vermont) banned the use of the material. In 1989, a coordinated marketing campaign sponsored by a national environmental group was implemented which effectively forced the manufacturer of the material to withdraw its use from the food production market [10]. However, apples and apple products were implicated as likely carriers of carcinogens, and the public campaign against the material, which highlighted risks to children in particular, and led to a dramatic decline in demand for apples and apple products for several years [11]. This drop in market demand was difficult to handle for many orchards, and presaged an increasing problem experienced in the 1990s.

Fruit production worldwide began to increase during the 1980s, and production expanded rapidly in the next decade leading up to 2000. From 1990 to 2000, world apple production increased by over 50%, and total fruit production increased by about 40% [12]. During this time, world population grew by only 15%, and consumption of apples did not increase to provide adequate demand for this new supply. For northeastern growers, their traditional McIntosh and Cortland apple began to compete with Gala and Fuji apples from the southern hemisphere, and no longer was expensive CA storage the key to providing fruit year-round.

Other fruit also began to push apples to smaller sections of the grocery display, and growing apples for the wholesale market as Vermont orchardists knew it became a much greater challenge. At the same time, increased competition in the global market also pinched southern hemisphere growers who were operating on slim profit margins and sought new management and marketing techniques to maintain relevance in the global market, and thus a race to the bottom appeared to be on [13, 14]. New apple varieties were necessary to adapt to changes in taste among consumers, but with traditional orchards requiring five or more years to reach production, the industry was slow to adopt the necessary changes required to compete in the new marketplace alongside fruit from outside of the U.S. [15]. Suddenly, growers in regions that had settled on a predominant cultivar suited to the climate and production system, i.e. McIntosh in Vermont, had to rediscover which of the hundreds of potential new (and sometimes old) varieties would be suited for production on their farms.

Locally, troubles at SCAPA that stemmed from poor wholesale conditions led to infighting among members and management turnover at the packing facility. In the early 1990s, the Coop's largest grower, Cornwall Orchards, was no longer able to weather the economic storm, and it went out of business. This one farm represented a large proportion of the total SCAPA crop, which left the facility oversized to handle the remaining growers. Through the 1990s, SCAPA's decline continued, and its doors were shuttered in 2002 with the facility in disrepair, and the area's remaining growers scrambling to find alternative storage and packing facilities for their fruit. A similar fate met the Vermont Apple Company facility in Westminster around the same time, which left

the state without a major packing facility, and growers began to ship fruit to packing houses in Massachusetts and New York.

*As Vermont apple growers struggled in the 1990s and, to some degree, into the early 2000s, so too did the support systems from UVM and Extension and the Vermont Agency of Agriculture they had relied on.*

The VTFGA maintained its membership with remaining growers, whose ranks had thinned by about 20% over the decade, but the mission of the organization had diluted somewhat. By the mid-2000s, VTFGA existed primarily to facilitate an annual meeting with the UVM Apple Team for its growers who required regular educational credits for their pesticide licenses. Other roles, including marketing, advocacy, and research and technical support were largely handled by other groups, such that the organization became consumers of information more than active participants. However, those other support systems were facing their own struggles.

Faced with reductions in federal, and later state spending, UVM Extension faced fiscal shortages that led to restructuring in 1990 to focus on specialized topic areas rather than general support within each county in the state. In 1992, several professional and clerical positions within Extension were cut, and while the Apple Team survived, the tone of Extension changed overall, as it became a leaner operation

that began to focus more on project-oriented support and rely more on external grants for its faculty to support their programs. In 2005, another round of cuts was made to the organization, and this time, the Apple Team was directly affected, with the Tree Fruit Horticulturalist position, filled since 1947 when Lyman Calahan served as Vermont's first full-time Extension horticulturalist, was eliminated. The primary reason cited for this particular position cut was that apples as a commodity were overrepresented in Extension, with two full-time faculty supporting only 70 commercial orchards, despite the industry's economic significance to the state [16]. This move severely impacted the ability of the UVM Apple Team to provide comprehensive support services to its growers, and several programs were limited as a result, including publication of monthly newsletters, research programs on adaptations of new apple cultivars and rootstocks to Vermont conditions, and regular consultations

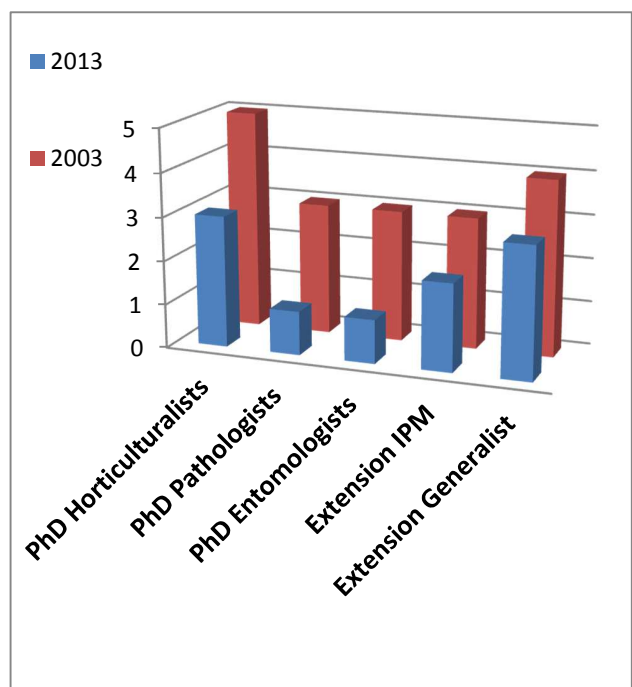


Figure 2: University tree fruit Extension specialists in New England, 2003 - 2013. Graphic: T. Bradshaw.

with growers on their farms to hear their concerns and address their needs in a timely fashion[17]. In response to grower concerns, the UVM College of Agriculture and Life Sciences partially funded a technician position for one year to assist growers with finding resources for their production questions from other regional Universities, and many growers turned to Cornell and other programs to answer their questions.



Green Mountain Orchards was established in Putney, VT in 1914 by William Darrow, Sr. Now managed by the third and fourth generations of the Darrow family, GMO has long been an important part of the Vermont Apple Industry. The orchard grew in the twentieth century, often by leasing other area orchards, including the nearby George Aiken farm. Like many orchards at that time, GMO primarily marketed its apples wholesale, and had their own storage and packing operations at the farm, but fruit are sold by a third-party broker. At the turn of the twentieth century, the Darrows shut down their packing facility and shifted much of their marketing toward retail and pick-your-own sales. The orchard also has a large planting of blueberries, and was one of the first commercial producers of highbush blueberries in the northeast. Photo: Green Mountain Orchards.

Apple growers have generally found programs at other universities to be receptive to their questioning, but those programs also face a similar budgetary climate as at UVM. Many programs require subscription charges to receive general newsletters and information, and may face consultant fees charged to out-of-state growers. Furthermore, because Vermont growers are not part of the political constituency of those programs, they do not serve on advisory boards, nor does UVM Extension administration have a say in how positions are allocated regionally when retirements or position cuts are made and new hires filled. For example, northern New England universities have lost horticulturalists in both Vermont and New Hampshire, and plant pathologists in the same states (and Maine does not have a pathologist devoted to apples to lose) since the early 2000s, and overall tree fruit Extension positions in New England have declined 44% from 2003 to 2013. Many specialists also have been required to include other crops, including grapes, small fruit, or vegetables, in their responsibilities, or accept other split positions such as managing a Plant Diagnostic Clinic, on top of their tree fruit outreach role. Cornell is presently completing a complete reorganization of its eastern New York fruit program, on which many Vermont growers rely for information, in the wake of the recent retirement of one of the nation's preeminent plant pathologists who long has assisted Vermont producers. With the looming retirement of the area fruit Extension agent who has served the fruit growers in the upper Hudson and Champlain valleys, who now will see his territory increase without a corresponding increase in support staff, that expertise is in question for Vermont growers. This concern will only increase in the future, as faculty retirements are expected to increase in the next ten years, and hiring of new positions has not

kept pace to ensure maintenance of industry needs [18]. In 2011, Dr. Lorraine Berkett, Integrated Pest Management (IPM) Specialist and the sole remaining Extension faculty with the UVM Apple Team, retired from Extension. She has since continued with research and outreach projects based on extramural grants, but her retirement will be complete soon, and no plan for her replacement has been announced by the University.

*Since 2011, there has been no base-funded Extension or outreach specialist at UVM devoted to the needs of the fruit industry, and in 2013, remaining support for apple research and outreach projects was eliminated from the UVM Extension and Agriculture Experiment Station Plan of Work*

In spring 2013, remaining support for apple, as well as grape, research and outreach projects was eliminated from the 2014-2018 UVM Extension and Agriculture Experiment Station Plan of Work [19]. This measure was taken without input from affected industries, and at a time when this strategic plan was being developed. The deliberate elimination of support for fruit specialists is a result of the retirement of Dr. Berkett at a time when the University is facing financial difficulties, and position freezes through attrition are a tactic used to cover short-term cash flow problems.

This move is concerning to growers, however, who feel that critical research and outreach support for their industry could be eliminated for good, unless the University makes a new commitment to support them.

Changes within state government also led to reductions support systems for apple growers. In 2009, Steve Justis, a long-time marketing specialist with the VAA who specialized on apple programs, retired. At the same time, Secretary of Agriculture Roger Albee recognized that funding for the VAMO was declining, and could no longer pay its base commitments, which by that time were whittled down to paying state dues to the U.S. Apple Association. Two factors contributed to the insolvency of the fund. First, the statutory funding mechanism for the program is based on packed, U.S. #1 grade apples shipped to wholesale markets. As wholesale growers and their bushels declined in number, and remaining wholesale fruit began to be packed and shipped by out-of-state firms, receipts naturally declined. Second, although the rule as written provided for an enforcement mechanism by the Agency of Agriculture, no growers were held accountable to pay into the program by the Secretary, and thus compliance essentially became voluntary. With Massachusetts packing houses collecting fees for the New England Apple Association, and New York operations collecting for its state's marketing order, growers were not pushing to collect another fee on their receipts in an already difficult economic climate.

The industry was ordered by Secretary Albee in 2009 to devise a plan to make the VAMO solvent, and a meeting of the VTFGA, VAMB, and members of the VAA in February 2010 generated a list of suggestions for altering the VAMO to reflect the changed nature of the industry by basing payments on planted acres rather than wholesale production. The VAA was not interested in enforcing the order, and had no marketing specialist to charge with doing so



Sentinel Pine Orchards in Shoreham is a third-generation farm growing apples on over 200 acres that was passed on to present owner-operator Whitney Blodgett in 1999. The orchard sells strictly to the wholesale market, with most fruit sales brokered by J.P. Sullivan & Co. in Ayer, MA. Blodgett continues to grow McIntosh as his primary cultivar, which accounts for 75% of his production, with Macoun, Empire, and Cortland making up the rest of his orchards. By aggressively replanting poor-producing blocks to newer and more efficient high-density plantings, keeping close track of production and costs, and investing in his own cold storage and packing facility, he has been successful in continuing the 'old game' of Vermont apple growing- producing McIntosh almost solely for out-of-state grocery store markets. Photo: Sentinel Pine Orchards.

anyway. *Provisions in the order allowed for its termination with majority support of its members, who were not interested in this option and its potentially permanent severing of that direct and stator tie with the Secretary.* Changing the rules of the VAMO would require legislative action, which was suggested to be prohibitively expensive by VAA attorneys. In response, VTFGA growers voted in February 2010 to support Secretary Albee in suspending the order, as allowed in the statute for a single marketing year. The suspension of the order was meant to be temporary, and the topic revisited annually by VTFGA and the Secretary who could continue suspension of the order with the support of the industry. It was felt that this would allow the industry audience with the Secretary on an annual basis in order to present their concerns and maintain contact with the agency. *To date, the VAMO issue has not been revisited by VAA or VTFGA, with the latter assuming responsibility for the previous tasks associated with the order, which it continues to struggle with an effective funding mechanism to cover.*

## **The Present State of the Vermont Apple Industry**

Since the mid-1990s, Vermont's apple industry has been in a state of evolution and adaptation. Orchard closures, which appeared in 1991 to potentially continue to decimate the industry, were rare by the middle of the decade. New generations of growers began to enter the industry, either by entering their own family businesses, or as new operators who purchased or leased existing orchards. *This occurrence suggested that, while entry into the business was relatively cheap due to depressed markets and outdated production systems, growers and lenders recognized the potential for sustained growth.* Presently, orchard operators who



assumed leadership from 1998 to the present time represent primary leadership roles in the industry. More inspiring is that, in a 2011 industry survey 61% of respondents planned to pass the farm on to the next generation[4].

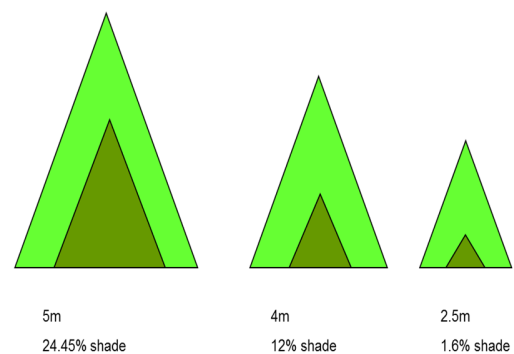
Changes in markets were important to the turnaround of the industry at the turn of the 21<sup>st</sup> century. By the 1980s, approximately 75% or more of Vermont apples were sold through wholesale markets. While this still remains a significant sales channel for Vermont fruit, with the largest five or six orchards selling mostly or solely through that method, direct sales of fruit to consumers have increased significantly in the state. In 2011, 20% of Vermont farms sold to wholesale markets, but another 30% sold direct to retail (direct store delivery, or DSD), and 49% sold at their farm stand, with another 26% and 31% selling via PYO and farmers' markets, respectively. Vermont growers also lead New England in growers who sell via community supported agriculture shares [3].

Wholesale orchards have diversified their products and/or marketing channels to meet the demands of today's markets, while maximizing efficiency in their operations. Several orchards, including Sentinel Pine and Champlain Orchards in Shoreham, Sunrise Orchards in Cornwall, and Saxtons River Orchard operate their own storage and packing facilities that reduce trucking costs to packing houses out-of-state. Vermont Refrigerated Storage, owned by the Hodges family from Sunrise Orchards, was established at the old SCAPA cold storage and packing facility, and serves as an important resource for area orchards as well as vegetable farms and a winery. Several growers now operate direct store delivery (DSD) routes which allow them to service retail stores directly, thus avoiding middlemen and the transaction costs

they demand. Some of these on-farm packing facilities also allow neighboring growers access to local markets by purchasing their fruit either on a spot market or through lease or contract arrangements. Scott Farm, in Dummerston, operates a unique, largely wholesale orchard that specializes in producing over 70 new and heirloom cultivars that are sold through DSD and regional distributor routes.

Retail orchards have been increasingly successful in the 21<sup>st</sup> century, with the lines separating them from traditional wholesale orchards blurring as well. Green Mountain Orchards in Putney and Allenholm Farm in South Hero, both traditional wholesale orchards with long ties to the Vermont industry, now sell significant portions of their fruit direct to customers at their farmstands or through PYO. Smaller, strictly retail orchards have increased in number and proportion of sales in the industry. Many farms have seen new ownership or establishment, including Chapin (Essex),

Effect of tree size on light exposure



**Figure 3: As tree size decreases, the shaded portion of the canopy decreases dramatically, leading to higher quantity and quality of fruit. Graphic: M.E. Garcia.**

Hackett's (South Hero), Mad Tom (East Dorset), and Burt's (Cabot) Orchards, in the past fifteen years which is a sign of a thriving and stable orchard economy in the state. And diversification among all types of farms,

including expanded apple varieties, apple products, and complementary farm ventures have helped growers maintain competitiveness in recent years.

Hard cider production represents an increasing market for Vermont apple products [20]. Traditionally, virtually all Vermont apples produced commercially since the 1930s have been grown for the fresh market. Cider processors such as Cold Hollow Cider (Waterbury) and other out-of-state operations have provided a market for preharvest-dropped fruit (prior to development of food safety concerns in 1990s) and off-grade fruit collected from wholesale apple packing lines. These processors, however, have a low price point for their product, such that growers receive roughly 10% of the price of fresh market apples for cider fruit. Hard cider processors, however, are able to increase the value of fruit through processing (fermentation and packaging), and thus may afford higher prices for Vermont grown cider fruit. Much research remains to be completed to develop production strategies and cost analysis to serve this growing industry.

### Beyond (and including) McIntosh: Apple Cultivars in Vermont

Cultivar choice is relatively unique for apples among fruits and vegetables. Apple fruit are sold based on variety, with strong regional preferences often based on adaptability of a cultivar to the region, production system, and intended market [21]. Consumer preference for apple cultivars is changing as more unique cultivars are available both in grocery and direct retail (i.e. farm stand, PYO) markets, which presents an opportunity for apple cultivar diversification [15, 21]. In the 1980s, an

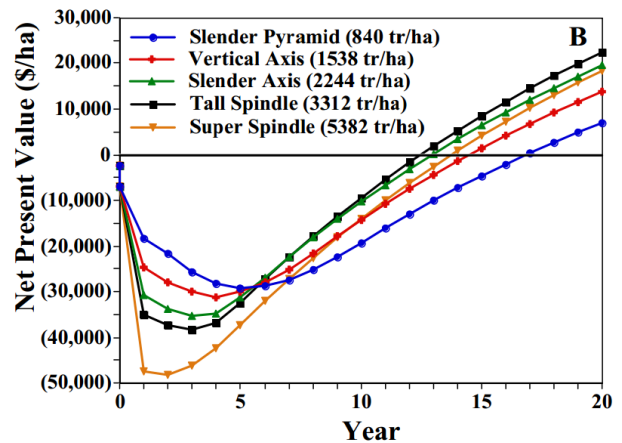


Figure 4: Discounted cash flows (Net Present Value) of five orchard systems over 20 years in New York State. From ROBINSON, T., DEMARREE, A. & HOYING, S. 2007. An economic comparison of five high density apple planting systems. *Acta Hort* (732) 481-489.

estimated 80% of Vermont-grown apples were McIntosh, reflecting the specialized, wholesale nature of the industry, but by 2011, that important cultivar made up only 44% of total production in the state [4]. New cultivar selection, however, is a major economic risk for growers, since marketable production will not occur for up to ten years, by which time the cultivar could be deemed inappropriate for Vermont conditions, or be unmarketable to consumers. UVM Apple Team personnel participated in the coordinated NE-183 apple cultivar trials from 1995-2006, and identified several cultivars that were suited for commercial production in the state (i.e., Honeycrisp, Gala, Zestar, Silken, etc [22-26]). *After successfully identifying promising apple cultivars of interest to growers (and potentially saving hundreds of thousands of dollars by avoiding planting that were not suited to Vermont orchards), the loss of the horticulturalist position within the group, and changes in the fruit breeding, nursery, and marketing aspects of the industry discouraged new cultivar trials on publicly-funded research farms.*

Apple cultivars now tend to be released by private and publicly-funded breeding programs into vertically-integrated 'clubs' where growers pay a fee for admission, are restricted to marketing through specified channels, and are limited by production quotas in exchange for (hopefully) higher prices for their fruit [27]. Presently, no Vermont growers have gained access to modern club varieties, and thus are not able to enter this production market. Renewed interest in 'heirloom', or historic, apple cultivars is significant, however, with several Vermont orchards growing and marketing cultivars previously grown in the state or other regions which were once popular, but were lost in the path toward industry specialization [28, 29]. The total market for heirloom or antique apples is limited, and production of increased numbers of differentiated cultivars increases management and transaction costs for an orchard. *Most important in the consideration of apple cultivars for Vermont orchards is fruit quality, which is a better indicator of marketability than price [30]. Therefore, growers have a great need for technical support to assist them with selection of apple cultivars to grow, and the systems to best grow them.*



**Figure 5: A high-density tall spindle orchard in Massachusetts. This orchard yielded about 300 bushels per acre in its third year. Photo: T. Bradshaw**

## The Changing Architecture of Vermont Orchards

The greatest change in apple production systems in Vermont and across the world is in the development of high density planting systems utilizing size-controlling rootstocks. Orchards in the beginning of the 20<sup>th</sup> century were planted on 'standard' seedling rootstocks that produced trees that could reach 30 feet in height and spread equally as wide. These orchards had several disadvantages from a commercial standpoint, including: a very long period from planting to full production (up to 10-15 years); wide spacing requirements between trees that created much unusable land during tree establishment (tree density as low as 40 trees/acre); loss of significant productive acreage if individual trees were removed; excessive shading in the tree canopy that produced small, under-colored fruit that were not as marketable as fruit from better-exposed regions of the tree; and high labor and spray costs. Beginning in the 1950s, Vermont orchardists began to utilize size-controlling rootstocks, planting generally semidwarf trees at densities of 100-200 trees per acre. In successive decades, growers planted more dwarfing trees at greater tree densities, with most trees supported by individual wooden poles in a miniature version of the traditional orchard systems planted earlier in the century. Freestanding or pole-supported orchards of 200-500 trees per acre became common production systems by the 1980s, with some of the best orchards able to produce 500 bushels of high-quality fruit per acre [31, 32].

Beginning in Europe around the 1980s, orchard planting systems that relied on heavily built trellises started to become common. The theory with trellised orchards was that, for a given amount of energy produced by a plant



though photosynthesis, the plant could produce either vegetative or reproductive growth (and, to a lesser degree, roots). By supporting the orchard completely on wires, the need to develop a strong trunk to carry the weight of an apple crop was minimized or removed, and the tree could be managed immediately after planting towards developing fruit. By planting trees very closely, typically 3-4 feet between trees and 12-13 feet between rows (838-1210 trees/acre), grafting on fully dwarfing rootstock, and manipulating the tree to encourage fruit production, a small crop could be produced in the second year of the orchard, with significant production (300-500 bushels per acre) in year three. By the fifth year, these orchard systems are able to consistently produce an annual crop in excess of 1000 bushels per acre, or roughly three times the average production for a Vermont orchard [33]. Research in the Champlain Valley of New York by Dr. Terence Robinson confirms that these yields are achievable in this region, and that such a planting system could be viable for Vermont apple growers [34]. *Economic analysis of orchard production systems indicates that maximum net present value and return on investment can be achieved with orchards of 800-1000 trees per acre. Time to reach 'break-even' status in the orchards, when initial establishment costs have been accounted for and the orchard attains a positive rate of return on investment, decreases by five or more years under these systems as well [35].* Tall spindle and similar planting systems provide better light penetration into the canopy, and this produce higher quality fruit, with fewer large limbs and thus more efficient pruning than lower density orchards. Spray applications can be easier because of the more open canopies, with less pesticide applied per unit of fruit harvested [36]. Another important advantage to high-density plantings is the ability they allow

growers to rapidly begin production of a particular cultivar, thus improving the likelihood of capitalizing on any price premiums that may be in place.

Adoption of high density 'tall spindle' plantings in Vermont has been slow however, due to several factors. Tall spindle and other high-density orchards have high establishment costs, roughly \$20,000 per acre vs. \$5-8000 for lower density freestanding or pole-supported trees [31]. Grower risk during establishment is therefore much greater than with lower-density (and lower-investment) systems. Critical management decision during orchard establishment thus become more important, including: selection of appropriate cultivars and rootstocks, building of an appropriate trellis system capable of supporting the crop; overall layout and design of the orchard and its infrastructure, including siting of irrigation lines, turning lanes for tractors, and customer access for PYO operations; and proper tree and branch manipulation to encourage early fruit production which ensures economic potential of the system and prevents trees from overgrowing their allotted space. Growers who are adopting this system receive information from Cornell and other University outreach services, but have little chance to view this new system in Vermont orchards to assist with system implementation. In 2011, the VTFGA received a VAA Specialty Crops Block Grant to establish tall spindle orchard demonstrations at the UVM Horticulture Farm, and two acres of trees were planted in that year [37]. Orchards in Cabot, Shoreham, and Essex have experimented with the system, but adoption remains slow among the industry overall. In 2011, 65% of orchards in Vermont were planted to free standing, standard (6% of total) or semidwarf trees, 22% of orchards were planted to single-pole

supported trees around 300-400 trees per acre, and 12% of orchards were supported by trellises. Among the latter system, only 1% of orchards in Vermont were of the tall spindle or similar high density system with greater than 900 trees per acre [4]. The Vermont industry is just at the beginning of a transformation in orchard architecture which is well-underway in neighboring New York and Massachusetts, for example [38, 39].

### Integrated Pest Management

As Vermont fruit growers adapt to changes in orchard planting systems, they also must deal with new pest management issues. Orchards and other perennial crops are unique among specialty crops in Vermont in that they cannot be rotated between fields, practically speaking, so pest complexes develop over several years and become a perennial problem for the grower. Managing pests in orchards is a long-term practice, which necessitates the use of crop-protecting sprays in virtually all orchards. Beginning in the 1970s, apple growers implemented Integrated Pest Management (IPM) programs on their farms to replace the old weekly spraying of broad-spectrum pesticides



Figure 6: Pesticide applications are a necessary component of apple production in Vermont. Growers use Integrated Pest Management practices to minimize sprays in the orchard. Photo: L. Berkett.

that orchards relied on since the 1930s. IPM is a holistic management system that replaces chemical use with grower knowledge, in order to target pests at appropriate times and only after they have been determined to be a threat to the crop. IPM involves several components, including: detailed knowledge of pest and predator populations through orchard scouting and degree-day models; understanding of pest and predator life cycles and ecology to determine critical points in the formers' development when they are vulnerable to management strategies and when populations of the latter may manage the pest without chemical intervention; accurate weather data collection and application to field-tested models; and complete understanding of available pesticide chemistries and their interactions with the pest, beneficial predators, agricultural

*Critical management decisions during orchard establishment, including: selection of appropriate cultivars and rootstocks, trellis construction; layout and design of the orchard and its infrastructure; and proper tree training to encourage early fruit production require technical support assistance that is lacking in Vermont.*

*Implementation of Integrated Pest Management programs is often one of the most difficult concepts for growers to grasp, and ever-changing pest complexes and legal pesticide registrations require academic or consultant support for their success.*

workers, neighbors, customers, and the environment [40]. Implementation of IPM programs is often one of the most difficult concepts for growers to grasp, and ever-changing pest complexes and legal pesticide registrations require academic or consultant support for their success. For example, the federal Food Quality Protection Act of 1996, which changed pesticide registration qualifications to address concerns regarding consumer exposure to pesticides, particularly for children, continues to affect pesticide registrations today [41]. As broad-spectrum insecticides and fungicides are phased out in favor of reduced-risk, low-rate materials that are more selective against certain pests (but not others), growers require accurate, regionally-appropriate information to help them produce high-quality food profitably while minimizing pesticide exposures to workers, consumers, and the environment. Organic apple production is a very small component of the Vermont apple industry, with approximately 2% of orchards managed organically in the state [4]. The UVM Apple Team has conducted significant research on organic apple production since 2006, but

findings have not yet identified complete production techniques that have facilitated increased adoption of certified organic management among Vermont growers [42-46]. Unfortunately, the university IPM specialists region- (and nation-)wide are declining, just as growers require their support the most.

Another factor compounding the need for science-based IPM information for apple growers is the increase in pest occurrences in light of climate change, and the introduction of exotic pests that threaten crops and challenge present IPM programs. Brown marmorated stink bug (BMSB) is a particularly worrisome pest that first was discovered in Allentown, PA in 1998 [47]. This pest was introduced accidentally from Asia where it is a minor pest of fruits and vegetables. When BMSB was introduced to North America, where its natural enemies did not exist, its population quickly exploded, causing \$37 million in damage to the Mid-Atlantic apple crop in 2010 alone [48]. BMSB management has altered IPM programs in the areas where the pest is present at levels to cause crop damage, because it is extremely difficult to manage with newer, reduced-risk materials and strategies, and thus, insecticide applications have increased dramatically where it is present in sufficient numbers to cause crop damage. BMSB has been reported in Vermont, but at present, it has not reached levels to make it a major pest. This is likely to change in the future, however, and apple growers require up-to-date BMSB management information to integrate into their IPM programs. Another increasing concern for apple growers is the disease fire blight (*Erwinia amylovera*), a potentially devastating bacterial disease that affects apples, pears, and some other rosaceous species [49]. The primary infection site for the disease is through open blossoms during bloom, and

because of the bacteria's requirement for accumulated heat units to reach potential infective population levels, the traditionally cool spring climate in our region tends to discourage the disease. Warm spring weather that has been experienced in recent years, however, has increased potential incidence of the disease in the state [50]. Fire blight can be especially damaging because the disease can potentially kill trees or entire orchards, as opposed to just affecting the crop, and devastating losses have occurred in other production regions [51]. Management of the disease relies on complex factors, including host plant resistance, inoculum reduction, hourly weather monitoring and pest modeling, and antibiotic applications to which the bacteria has developed resistance in some production regions [49, 52]. Biological control of the disease which may replace antibiotic treatments appears promising, but has not yet been effective in field trials, and growers require current information on its status before it can be implemented [53, 54].

A cooperative project between VTFGA, UVM Apple Team, and Cornell University' IPM Program has brought site- and pest-specific weather and IPM information to growers. In 2010, VTFGA and UVM Apple Team joined the

Cornell Network for Environmental and Weather Applications (NEWA) system which coordinates data from on-site weather stations located at seven Vermont orchards, as well as data collected at five airports in the state [55]. The NEWA system inputs weather data into pest models and outputs IPM information that is relevant to the site for which the data was collected. Orchards located close to participating stations may use NEWA data to guide their IPM decisions, but local, on-farm interpretation is essential to implement IPM on a particular farm. For example, in 2012, unusual hot, dry weather allowed for degree day accumulation that drove the model for apple scab development well-ahead of schedule, but those conditions were unlike those under which the models were originally designed beginning in the 1940s. Thus, NEWA output suggested that inoculum for the disease was no longer active six weeks ahead of a 'normal' year, and growers who relied solely on NEWA output to drive IPM decisions and may have ceased fungicide applications experienced apple scab symptoms that developed from infection periods that occurred after the models determined that no spores were remaining in the orchard. Bulletins posted by IPM experts at UVM and Cornell alerted growers to the situation who adjusted their IPM strategies and prevented what could have been a significant and damaging outbreak of the disease region-wide [56]. This highlights the need for trained personnel to help growers implement IPM practices on Vermont farms. Another concern with NEWA implementation is program cost. Annual subscription fees are required to access the network, and weather station upkeep entails significant financial and labor costs. Presently the network is funded by grant monies as available to VTFGA and UVM on an ad-hoc basis. For example, initial station purchases were made with Specialty Crop Block Grant funds awarded

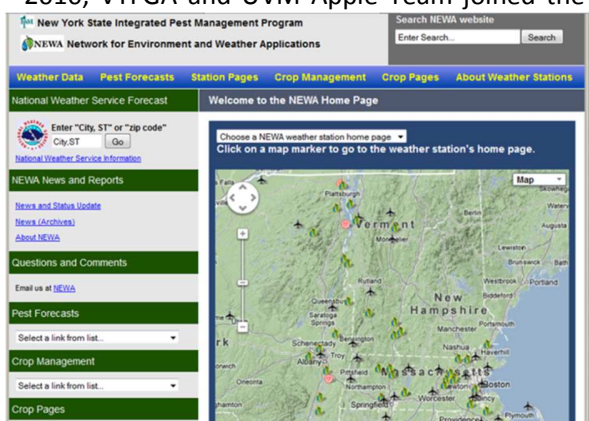


Figure 7: Cornell University's NEWA system provides site-specific weather and IPM information to growers in the northeast. <http://newa.cornell.edu>.

to VTFGA by VAA. Station maintenance has been covered by UVM Apple Team personnel and individual hosting growers, and NEWA subscription charges have been funded through provisions of grants awarded to VTFGA (USDA Rural Business Enterprise Grant) or UVM (Extension IPM Competitive Grants). Users of the system feel that it is extremely useful in helping to implement IPM in Vermont orchards, given the caveats mentioned above, and all parties agree that future funding of the system will be a priority when seeking external grant funds.

### **Seasonal Labor Needs of Vermont Apple Growers**

Apple growers are largely reliant on seasonal hand labor to meet their production needs. Activities including tree pruning, harvest, and apple packing require timely, sometimes intense activity to complete tasks when required by the plant or before fruit quality diminishes. Local labor availability has long been problematic for fruit growers. Since the 1960s, apple growers in Vermont and other states have

used the federal H2A program to access laborers, primarily from Jamaica, who provide this critical labor supply. Many of these workers have returned to the same farms for multiple years, and even multiple generations, and have become an important part of orchard communities. Requirements for compliance with H2A regulation include housing, base pay, transportation, and other standards for workers, as well as significant paperwork and bureaucratic navigation. In recent years, growers have seen increased audits from the US Department of Labor and public scrutiny in the guise of immigration reform that could undermine the program overall. Presently a single private accounting firm provides H2A brokering services in the state, and virtually all growers utilize their services to access the program. U.S. Apple Association is the primary advocate for growers on H2A and similar labor issues at the federal level, and their support is maintained through statewide membership with the organization.

### **Food Systems and New Developments in Vermont Agriculture**

Agricultural policy in Vermont in the 20<sup>th</sup> century, as reflected through programs at VAA and the UVM Colleges of Agriculture and Life Sciences (CALs) and Extension, was oriented toward production and marketing improvements for three major crops: dairy, maple, and apples. As markets and tastes changed, and the landscape for wholesale marketing of those crops diminished, an increase in the scope of policy was seen as we entered that new millennium. Programs emerged that encouraged farm diversification, new market development, and a rethinking of the food system from soil to fork. This paradigm presently

guides agricultural policy in the state, but it is an evolving one. As new chairs have been pulled around the collective table, some parties have seen their influence diminish, but that only highlights the need for old partners to work with the new ones to ensure success for the overall Vermont rural and agricultural economies. The following list of service providers and the programs they offer to the apple industry is not exhaustive, but rather highlights some of the important aspects of the overall food system that reflect its present status in Vermont.



## UVM Food Systems Spire of Excellence

The concept of food systems as a quantifiable entity has been discussed in academic literature for decades, and by the early 2000s it was appropriated into the language of agriculture policy as well. Efforts were underway at UVM to define transdisciplinary research and education initiatives that would coordinate faculty efforts into ‘spires’ that would coordinate study of complex issues under a cohesive framework. In 2010, the University launched the Food Systems Spire of Excellence as “a community of university professionals, researchers, students and local partners who generate, teach, and apply new knowledge while contributing to the present and future viability of small scale, regional food systems.” [57] This effort, under the direction of UVM Extension Dean Doug Lantagne, includes several initiatives to help meet its directed mission. The Initiative's advancement is built on three strategic tools: outreach, research, and education. Each of these tools are woven throughout the three overarching themes of UVM's work: Working Landscapes & Value-Added Food; Innovative Food Systems Organizations; and Food: Health & the Environment [57]. The Food Systems Initiative sponsors an annual Food Systems Summit at the University to convene practitioners and summarize goals and results of the program. It coordinates outreach through interdisciplinary communications efforts including email lists and a blog (<http://learn.uvm.edu/foodsystemsblog/>) that highlights issues of concern for participants. It has facilitated several faculty hires directed toward transdisciplinary efforts to improve the food system in the state through research, education, and outreach. Overall, the Initiative serves as the primary vehicle to coordinate

efforts at UVM that affect scholarship and action on food and farming concerns for the greater community.

## UVM Extension: A Broader Mission

The focus of UVM Extension has changed in recent times, beginning before the Food Systems Initiative was established. In response to the budgetary problems that Extension faced in the 1990s, faculty and staff expertise shifted away from commodity-specific programs to include broader, cross-commodity efforts that could better serve diverse segments of the agricultural economy. Business planning assistance is provided through the Farm Viability Program

(<http://www.uvm.edu/extension/agriculture/?Page=farmviability.html>) , for example, which enrolls individual farms into a two-year program that helps farmers analyze their operations and perform long-term strategic planning to improve the financial stability of their business and prepare them for future success. The overall sustainability of their businesses. The Ag and Farm Business Management Program (<http://www.uvm.edu/extension/agriculture/?Page=management.html>) provides topic-specific training for farmers, including labor and risk management, farm succession, tax preparation, and overall business management skills. Vermont apple growers utilize services from this program regularly; for example, the Risk Management Agency annually funds outreach efforts by the UVM Apple Team and assists growers with access to federal crop insurance programs that growers have identified as essential to the success of their farms which must deal with weather-related and other risk factors that may threaten crops in certain years. RMA assistance allows those farms to ride out difficult situations in certain years to improve their long-term financial sustainability.

IPM outreach is directed through the coordinated Extension IPM program (<http://pss.uvm.edu/EIPM/>), which has been funded through a competitive USDA since 2010. This program provides stakeholder across multiple crops with up-to-date and regionally-appropriate information to assist them with pest management strategies on their farms. Apple programming has been provided by Dr. Lorraine Berkett with the UVM Apple Team, and with her impending retirement, she is transitioning that effort to Terence Bradshaw, who has worked with her since 1995, beginning in the 2013 crop season. The Vermont IPM program also includes the services of the Plant Diagnostic Clinic (PDC), managed by Ann Hazelrigg. The PDC provides pest identification and assists with sourcing pest management information for multiple crops, and will serve as an important component of the Apple IPM program in the future. One potential impediment to sustained IPM programming is the reliance on competitive external grants, which will remain a primary source of funding in the future.

Food safety has become an increasingly important concern for agricultural producers, and requirements from retailers and regulations at the state and federal levels demand that apple and other produce growers implement food safety plans within their operations. UVM Extension recently hired a full-time food safety specialist for food processors. Through the UVM Center for Sustainable Agriculture (CSA), on-farm food safety training has been offered to fruit and vegetable operations. Many buyers require implementation of a Good Agricultural Practices (GAP) food safety plan as a requirement for purchasing, and implementation of the federal Food Safety Modernization Act (FSMA) will further affect growers who will need to comply with its

provisions in the future. Unfortunately, the staffing for the CSA on-farm food safety program operates on competitive grant money, and those funds are in question beyond the 2013 crop year.

Other programs of interest at UVM Extension include general farm safety training (<http://www.uvm.edu/extension/agriculture/?Page=safety.html>), testing services provided by the UVM Agriculture and Environmental Testing Lab ([http://pss.uvm.edu/ag\\_testing/](http://pss.uvm.edu/ag_testing/)), and beginning farmer training programs (<http://www.uvm.edu/newfarmer/>). In addition, a relatively new Agricultural Engineer provides farmers with expertise on mechanical systems including refrigeration, processing, and field equipment.

### **UVM College of Agriculture and Life Sciences: A Long-Time Partner of the Vermont Apple Industry**

Research and education programs for Vermont apple growers have been an important component of UVM CALS for over a century. The Vermont Agriculture Experiment Station (VAES), established in 1887, currently hosts 43 research faculty who conduct diverse programs that tackle issues of agriculture, environment, nutrition, food safety, health, community and economic development [58]. Apple growers are familiar with past and present researchers including Drs. Lorraine Berkett, Joe Costante, Elena Garcia, Alan Gotlieb, among others. Many other faculty have contributed expertise on agricultural economics, soil management, insect and disease management, and other topics over the years. The combined VAES/UVM Extension FY 2013-2017 calls for continued program support for apple producers through consultations, research, and field visits ([www.uvm.edu/extension/publications/annualreport/fy13-17pow.pdf](http://www.uvm.edu/extension/publications/annualreport/fy13-17pow.pdf)). The UVM Apple Team

presently operates within CALS, and not UVM Extension.

An important resource for apple research and outreach programs is the UVM Horticulture Research Center (HRC). Established in 1952, the farm, located a few miles from campus in South Burlington, has hosted experimental apple orchards since its beginning, and much research has and continues to be conducted there. As the primary 'field laboratory' for the UVM Apple Team, the HRC hosts several acres of diverse orchards that represent several phases of planting systems used in the industry, including freestanding central leader, moderate-density pole-supported, and intensive high-density trellised plantings. HRC orchards include over fifty apple cultivars, including many apple-scab resistant varieties that have been an important component of organic and IPM research for the Apple Team. Since 2006, the farm has hosted the OrganicA research and demonstration project, which has focused on identifying challenges and opportunities associated with expanding organic apple production in the region. The highest-density orchards, planted in 2011, were funded in part through the VTFGA and represent some of the most intensive plantings in the state, with tree density as high as 1200 trees per acre. Investments in infrastructure including drip irrigation and narrow tractors, sprayers, and orchard mowers specialized for modern high-density plantings by the HRC and UVM Apple Team further enhance the value of the facility for conducting on-farm trials, especially for high-risk projects such as organic management, cultivar trials, and alternative tree fruit crops.

Plans are underway for redevelopment of the classroom, fruit storage, and other facilities at the HRC, and increased summer

coursework through the Plant and Soil Science department and UVM Continuing Education have provided scores of students with on-farm training opportunities in applied farm management. Increased teaching opportunities are expected, both at the farm and on-campus, that would provide students with the skills they require to become the managers of complex biological and economic systems that farming requires today. Increased programming geared toward farmers and other Vermonters who are not part of the undergraduate curriculum has been identified as a valuable service that may be provided in the future.

### **Vermont Agency of Agriculture: Changing Focus with Changing Times**

It has already been mentioned that agricultural policy in Vermont was primarily guided toward production of a few commodity crops for much of the 20<sup>th</sup> century. Core functions within VAA, such as pesticide regulation and implementation of federal GAPS requirements remain key parts of the agency's activity. But as farm diversification and market development toward local food production and consumption have become more important in recent years, the VAA has implemented programs to facilitate this shift. Vermont orchardists should no longer rely on apple-specific programs at the Agency, but rather can identify efforts that which the industry can partner with to ensure continued success within the new paradigm of agriculture and food policy in the state.

Of particular interest to the apple industry is the Specialty Crops Block Grant Program (SCBGP), authorized in the 2008 U.S. Farm Bill, to appropriate funding to states for programs designed "solely to enhance the



competitiveness of specialty crops...[which] are defined as fruits, vegetables, tree nuts, dried fruits, horticulture, and nursery crops (including floriculture) [59].” Enhancement of programs for specialty crops producers under the farm bill is an important priority for the Specialty Crop Farm Bill Alliance (<http://www.strongeragriculture.org>), which represents over 120 producers of specialty crops in the U.S. Rather than seek subsidy payments that are a primary component of agronomic crop support, Specialty Crops producers advocated for investments in research and marketing programs that would allow growers to maintain competitiveness within international, national, regional, and local agricultural markets. The SCBGP provides states with block funding, administered through their agriculture agencies, to carry out those priorities. Since 2008, SCBGP funding has been allocated to the apple industry, either VTFGA, UVM Apple Team, UVM Extension, and within VAA to conduct several initiatives. Some programs have directly supported VTFGA priorities, including funding of comprehensive marketing programs and support for UVM research and implementation of the VT NEWA weather station network. Other programs have supported service providers including GAPs trainers, the Vermont Foodbank, and VAA marketing efforts such as the DigInVT.com website, which seeks to provide online access to farm products to web-savvy consumers. VTFGA has been critical of some SCBGP programs in the past, and has suggested a lack of transparency in the granting process and identified projects with strong industry support, such as the Vermont Harvest brochure, a print marketing tool supported by apple, vegetable, honey, wine, and other producer groups which has been denied funding in lieu of more modern online efforts. In 2009, when discussions over solvency and future direction of the VAMO were held, SCBGP funding

was suggested as the primary mechanism available to fund promotional programs for apple and other specialty crops producers from the VAA. VTFGA has therefore sought funding through the program as a primary component of its marketing programs, with varied success.

Other VAA initiatives that promote apples and other produce are included under the greater Buy Local program within the Agency (<http://www.vermontagriculture.com/buylocal/>). This program provides marketing support for numerous initiatives, including support for farm-to-school programs, expansion of farmers markets, and education programs for Vermont school students on local agriculture and food issues. Unfortunately, the website for the program appears to be out-of-date and in need of updates. One more recent and previously mentioned online resource that coordinates marketing outreach for Vermont food producers is DigInVermont (<http://www.diginvt.com/>). This site is more up-to-date, and appears to be the primary web resource for VAA to provide information on farm products to consumers. VTFGA, while not participating in the site development, is a member of the Vermont Agriculture and Culinary Tourism Council, which is a key partner in the project. The success of the site partially rests on its promotion to consumers, and content generated for it may well be complemented by additional marketing efforts including traditional print or other advertising channels. Additionally, support for wholesale produce growers such as larger vegetable or apple orchards (the latter of which account for over half of the state’s \$11 million annual farmgate receipts for the crop) are not traditionally served through ‘agritourism’ marketing, nor are consumers who simply wish

to access food without regard to its provenance or niche marketing.

Food systems practitioners must avoid falling into the 'local trap', where we can assume that the benefits of local food production will always outweigh 'conventional' food production systems [60]. Some direct market channels, by creating a community narrative and implied social contract between farmer and consumer, coupled with higher prices resulting from reduced economies of scale and less efficient production systems, generate an air of exclusivity that discourages participation by lower income, minority, and less educated persons [61, 62]. Thus, 'exclusive' products are marketed to 'exceptional' customers, thereby limiting total impact of the local food system on the overall population. Increased profitability may also not be as common as suggested for farmers that work within local food systems, as they often do not include their own labor into profit calculations, and when they do, they typically undervalue it [63]. Farms that utilize farmers markets and community supported agriculture marketing models tend to be part-time operations with average annual sales under \$12,000 [64], so to establish a food system on the backs of farmers who live below poverty level and face significant economic insecurity may be unwise from a food security, not to mention economic and social justice, perspective. It is important to consider what foods produced in Vermont that are commonly sold through conventional channels. Bread and many prepared foods typically are made from non-local ingredients, so while their production does generate jobs and other associated economic benefits, it does not necessarily anchor the state's agriculture sector. Apples and dairy are products are particularly well-suited for production in the Vermont climate, and their

production this is far greater than both present and ideal consumption levels for the state's population [65]. Cultivation of these successful crops, if produced sustainably, should be encouraged, since their export to other regions results in significant external income coming into the state, which can offset our 'importation' of other goods from other production regions. Local vegetables are common in grocery stores, food coops, farmers markets, and roadside stands during their production season, and most of their roughly \$15 million in annual direct farmgate sales occurs within the state [3]. The success of marketing our crops to local consumers has been so good that our Secretary of Agriculture has indicated that he is looking forward to policies that promote their marketing out-of-state, feeling that the local markets are already well-developed (*pers conversation*, Chuck Ross, 12/20/12).

### Vermont Working Lands Initiative

One new program administered through VAA is the Vermont Working Lands Enterprise Initiative (WLEI). The program is outlined on their website:

<http://www.vermontworkinglands.com/>.

Through the WLEI, a competitive grants program was implemented in spring 2013 to support individual operations as well as service providers in Vermont's agricultural and forestry industries. Interest in the WLEI programs was overwhelming, with more than \$12 million in requests for roughly \$1 million in available funds. Project funding was therefore very competitive, and many good proposals did not receive funding simply because the program did not have enough available. Efforts are underway by service providers and interest groups to increase funding in future years, and the success of the program remains to be seen as implementation proceeds with this initial year.

VTFGA submitted an initial letter of intent for a service provider grant to conduct market surveys of wholesale and retail customers with the intent of guiding future marketing efforts. UVM Apple Team, in cooperation with Dr. David Conner, agricultural economist with UVM's Department of Community Development and Applied Economics, submitted a separate letter of intent to conduct horticultural feasibility and market analysis of value-added markets with hard cider processors to increase purchases of Vermont fruit. At the request of the WLEB, those proposals were combined into the single proposal "Apple Market Optimization through Customer Analysis and Value-Added Cider Production," which was submitted by the UVM Apple Team. The project included significant pledges of cash and in-kind support from VTFGA, cider processors, and individual growers, and received strong support from CALS Dean Thomas Vogelmann. Despite this broad support across multiple levels of scale and region from the industry and its support providers, this proposal was not funded in the initial request for proposals.

## **Farm to Plate: Guiding Agricultural Policy for Today and Tomorrow**

The Farm to Plate (F2P) Initiative ([http://www.vsjf.org/project-details/5/farm-to-](http://www.vsjf.org/project-details/5/farm-to-plate-strategic-plan)

[plate-strategic-plan](http://www.vsjf.org/project-details/5/farm-to-plate-strategic-plan)) was approved at the end of the 2009 Vermont legislative session and is directed by the Vermont Sustainable Jobs Fund (VSJF) in consultation with the Sustainable Agriculture Council and other stakeholders to develop a 10-year strategic plan to strengthen Vermont's food system. The plan is a living, adaptive set of documents, and is continually adjusted to reflect activity within the farm and food sectors in Vermont. An underlying principle of the plan is that "Food System Development is Economic Development." [1] The goals of the legislation that created to plan are to: 1. Increase economic development in Vermont's food and farm sector; create jobs in the food and farm economy; and improve access to healthy local foods. The plan is comprehensive, and outlines strengths and potential weaknesses within the food system, especially highlighting areas where Vermont can identify opportunities to improve food self-sufficiency. At the time of this writing, the Fruit and Vegetable section of the plan has not yet been written, although staff from VSJF have met with VTFGA representatives and will continue to include growers in their development of this component of the plan.

## **Strategic Planning for the Vermont Apple Industry**

In December 1998, Vermont's apple industry held a *Vermont Apple Industry Summit* in response the difficulties faced by the industry

in the 1990s that have been outlined above. At that industry summit, Vermont's apple growers came together to determine if they could influence their collective and respective futures in the apple business. In 1998, Vermont's apple

growers had substantial support from the Vermont Department of Agriculture, the University of Vermont, UVM Extension and the Vermont Apple Marketing Board. Soon after that summit, the Vermont Legislature passed *Act 48, An Act Relating to Diversified Agricultural Development and Special Support for the Apple Industry* (<http://www.leg.state.vt.us/docs/2000/acts/act048.htm>). That legislation addressed immediate needs identified by apple growers and their support partners, including: recordkeeping and cost accounting; quality control; marketing; and labor issues. From that project, several initiatives were implemented that helped the industry get back on its feet as it entered the new millennium. The seeds of the present, comprehensive agricultural support policy at VAA were also planted with the legislation.

Today the Vermont apple industry is on strong footing, but its economic impact has been stagnant for the past ten years. Significant changes, especially in available support systems, have occurred recently, with the loss of support from UVM Extension and VAA. At the same time, new directions in agricultural and food policy have been pursued, and the apple industry has not always been at the table to integrate their needs into this new paradigm. As part of a SCBGP proposal for the 2013 season, VTFGA proposed to conduct strategic planning activities to help align the industry with these changes in direction within the state.

### **2013 Vermont Apple Strategic Planning Summit**

The *2013 Vermont Apple Industry Strategic Planning Summit* was the first part of this effort. Held in March 2013, the meeting

convened partners including: VTFGA and apple growers; VAA representatives; UVM CALS and Extension Deans and Faculty; representatives from Vermont's Congressional delegation; and support partners including representatives from the F2P Initiative, VT Farm Viability Program, New England Apple Association, and New England Apple Council. Efforts were made to be inclusive of all potential partners in the industry to ensure complete representation of parties with potential involvement in the future of the Vermont apple industry. This ensured that a full participatory approach was followed in order to include expertise, concerns, and limitations of the parties at the table. The meeting included a series of introductory presentations to outline the state of the industry and its supporting partners. For many, these were new introductions between growers and the organizations that direct agriculture and food policy in the state.

### **SWOT Analysis: Where Do Growers and Partners Stand Today?**

After the outline presentations were made, participants broke up into groups to discuss topical matters and outline potential opportunities and challenges for each topic. In the breakout sessions, participants performed a SWOT analysis of their interest topics. This technique allows a community to identify its Strengths, Weaknesses, Opportunities, and Threats for strategic planning purposes. The technique is described by R. Warren Flint in *Practice of Sustainable Community Development: A Participatory Framework for Change* [66]:

*“SWOT is a simple yet comprehensive way of assessing the positive and negative forces within and without the community, so you can be better prepared to act effectively. The*

*more stakeholders involved in preparing the SWOT, the more valuable the analysis will be. Whatever courses of action the community decides on, the four-cornered SWOT analysis prompts involved community members to move in a balanced way throughout their program... The SWOT analysis, like many other management assessment models, has four quadrants; Strengths, Weaknesses, Opportunities, and Threats... Strengths and weaknesses are internal factors. Opportunities and threats are external factors. You use each of the four quadrants in turn to support analyses of where you are now, where you want to be, and then make an action plan to get there. SWOT essentially tells you what is good and bad about a particular objective or planned activity. If the aim is to improve a situation in order to better formulate the objective or activity, then SWOT analysis reminds you to work on:*

- *Strengths by maintaining, building upon, and leveraging them*
- *Weaknesses by minimizing, remedying or stopping them*
- *Opportunities by seizing, prioritizing and optimizing them*
- *Threats by countering or minimizing them*

*in order to define actions that can be agreed and owned by a community group (team) or the entire community membership.”*

Three topic areas were addressed at the summit: 1) Labor and Wholesale Infrastructure; 2) Marketing; and 3) Research and Outreach. Participants in each group were balanced between apple growers, VAA and UVM personnel, Congressional staffpersons, and

industry support partners. Each participant was provided an index card on which to concisely identify an area of need within their topic, and after a few minutes, the cards were collected and summarized by a topic facilitator. Participants then discussed each topic and generated a SWOT table. Each topic area tended to be summarized into a few overarching, but relatively specific, areas of concern. After an hour and a half of detailed discussion, the entire group convened and topic facilitators presented their findings for further group discussion. The results of the discussions are outlined below.

### **Labor and Wholesale Infrastructure**

#### **1. Wholesale Apple Production and Processing**

##### **1.1. Strengths**

- One activity to concentrate on: apple production, storage.
- Market exists for fresh and processing fruit.

##### **1.2. Weaknesses**

- No affordable source of fruit for processors.
- Capital expense is high.
- Retail sales more profitable per unit.
- Food safety regulations are expensive and cumbersome.
- Scale of cider industry determines processing fruit price.

##### **1.3. Opportunities**

- Reliable markets appear to be developing.
- Tailor food safety regulations to crop via risk-based means.
- Cider apples provide good market if price remains high.
- Opportunity to dedicate some orchard production to cider and other

processing needs. This may identify ways to reduce inputs and costs and improve sustainability of the orchard.

#### 1.4. Threats

- Variable markets between and within seasons.
- Few wholesale distributors.
  - Most distribution handled by out-of-state firms.
- Sliced apple markets presently not practical.

### 2. Changes of Size and Scope within Wholesale Industry

#### 2.1. Strengths

- Presently there is a renewed sense of optimism in the industry.
- Demand is spurred by local/freshness attributes that are conducive to present campaigns.
- High density production is increasing

#### 2.2. Weaknesses

- Not a lot of options for cultivars wanted by wholesalers.
- Best available acreage for apples is presently utilized.
  - *Ed note: significant acreage suitable for apple production remains in Vermont, but may be priced high/not for sale/under other management practices.*

#### 2.3. Opportunities

- New opportunities in wholesale markets.
  - International markets.
- Diversification of processing: 'specialty' or value-added, i.e. hard cider.

#### 2.4. Threats

- Recent/historic downturns in industry.
- Limited shelf space in grocery stores.

- U.S. apple consumption is waning.
- Overproduction potential with high density plantings.

### 3. H2A Labor Program

#### 3.1. Strengths

- Experienced, legal workers.
- Crucial labor source.
- For Jamaican laborers, well-respected in community and no language barriers.

#### 3.2. Weaknesses

- Paperwork not efficient
- Regulations are archaic and confusing.
  - Title 29, part 780 of CFR (Agricultural Labor Exemption Rules) does not address present needs of industries.
- High costs: wages, housing, transportation.

#### 3.3. Opportunities

- High density/tall spindle may reduce labor requirements.
  - Automation of systems could further reduce labor needs (pruning, harvest).
  - Will also increase capital needs.
- Industry can make congressional delegation aware of the issues.
  - Specialty crops are different from agronomic ones, and involve significant seasonal hand labor.
- Regulators may offer warnings or less drastic penalties for rule violations.
  - Much good faith support exists between VT industry and regulators.

#### 3.4. Threats

- Individual H2A regulators can make or break the ease of working through the regulations.
- Health insurance changes by law.

- Adverse affect wage rate.
  - Growers are still required to pay full piece rate (well in excess of minimum H2A wage) when harvesting damaged crop for processing.
- Not enough support staff / bookends to file paperwork and stay current with the law (only two in all of New England).
  - Growers are completely dependent on these entities to file their paperwork.
  - Need to streamline paperwork.
- Geared toward Agritourism/foodies, not average customers
- Growers identified “lack of investment in nutritional education efforts toward local fruit consumption.”
- Despite all activity by VAA, UVM, and agriculture & food support partners, growers are unaware of those efforts, and they are not being communicated by them to their consumers. Farms and commodity organizations must have a full seat at the table.
- Small quantities purchased by schools.

## Marketing

### 1. Connecting Consumers to Producers

#### 1.1. Strengths

- PYO Orchards provide a healthy, unique family experience and quality product
- Public farm experience maintained by the private sector is a good value over other competing activities.
- Improved agricultural literacy in recent years.
- Some good individual farm websites
- VTFGA website has decent orchard listing.
- DigInVT.com working on providing customers with farm information.

#### 1.2. Weaknesses

- Print publication (VT Harvest) was successful and supported by all specialty crops producers in state
- DigInVT.com:
  - Not well-known, poorly marketed.
  - Little to no input from producers.

#### 1.3. Opportunities

- PYO Orchards are packed on weekends, but lack mid-week customers. There is a need to improve mid-week marketing opportunities.
- Potential to capitalize on tourism through interaction with resorts and B&Bs. Also, advertising at VT rest areas could go a long way in fall season.
  - Consider expansion of orchard weddings. This can be tricky though since they may compete with normal production activities.
- School outings yield return customers and local awareness in stores.
- Grower listservs to coordinate shortages and surpluses between operations.
- Local school purchases.
- Sliced apples are a market opportunity but infrastructure is necessary, high cost of entry.
- Search engine optimization to improve web marketing.

#### 1.4. Threats



- Weather: there is always potential to lose a crop in any given year. Also, bad weekend weather during harvest threatens PYOs.
2. Improve and Increase Awareness of VT-Grown Apples as a Brand
    - 2.1. Strengths
      - Clean, green, pure image.
      - Strength of VTFGA as a source for industry coordination.
      - VT apples are a premium quality product.
      - Support of UVM, VAA, and Governor.
      - Vermont Life: State-managed publication that can be used to promote VT-grown apples.
      - Vermont has a strong Buy Local movement.
    - 2.2. Weaknesses
      - Cutback of funds to assist market development and educators with VAA, VAMO, UVM Apple Team.
      - Focus on new/unique projects for SCBGP. Some programs, such as marketing, are an annual, on-going expense that VAA discourages for SCBGP funding but which are crucial to maintaining competitiveness of specialty crops.
      - Cost and time required for GAPS/FSMA detract from production and marketing activities.
    - 2.3. Opportunities
      - Grower network (two-way listserv) to coordinate shortages and surpluses between growers.
      - VTFGA can assist in marketing, if funding is available. Coordinated marketing is a good goal of the organization.

- VAMO is a legislated directive to coordinate marketing programs. Reexamine VAA policy on suspension of VAMO and use it to promote VT apples as it was intended.
- Coordinate with WCAX to promote apples in fall on Across the Fence and other programs.

#### 2.4. Threats

- VT brand not currently relevant outside of state's borders, because out-of-state packers and brokers won't differentiate our products.
- No method of distinguishing VT apples.
- VT had a good program, VT Seal of Quality, which was allowed to expire by VAA. Now there is talk of developing a similar program, but the old one was still effective but no one at VAA was designated to oversee after 2008 cutbacks.

### Research and Outreach

1. IPM and Technical Assistance Programs
  - 1.1. Strengths
    - UVM Apple Team has long, established track record on providing grower outreach.
    - UVM Plant Diagnostic Clinic is a valuable resource for fruit growers.
      - Allows for submission of digital photos for pest ID.
    - Cornell and other Universities extension networks available to VT growers.
    - VT NEWA weather station network.
    - UVM Hort Farm serves as a good research and demonstration site.
  - 1.2. Weaknesses
    - UVM resources decreasing- not enough personnel in-state. Since Lorraine's retirement in 2011, IPM information



has decreased, and since 2005, horticulture information has been nearly eliminated. No plans released from Extension for replacement of services.

- Growers need on-farm assistance during the growing season.
- Staffing at PDC could be overwhelmed with identification requests. PDC cannot provide detailed IPM implementation strategies for all crops.
- Cornell and other programs require payment from growers to access information. On-site and detailed direct consultations are minimal if available at all.
- Limitations of NEWA program because output based on computer models does not include interpretation or proofing.
- Not enough technical, especially horticultural, assistance available for new growers.

#### 1.3. Opportunities

- Partnership with other states:
  - Cornell, other New England states have large body of expertise.
  - Need to coordinate hires/retirements between regional universities to prevent holes in skill set.
  - Formalize agreement with Cornell to pay staff to support VT growers.
- Peer-to-peer mentorship opportunities.
- Utilize Continuing Education or other online resources (eXtension, webinars) to provide programming.
- Collaborate with the diversified agriculture sector as identified by the

Farm to Plate Strategic Plan to enhance trainings.

#### 1.4. Threats

- Staff at Cornell and other universities are declining as well. Cornell is undergoing a major realignment of its eastern New York fruit team that increases work loads of remaining agents, and sees the retirement of major IPM resource (Dr. David Rosenberger) in Champlain Valley that fruit growers have relied on.
- Reductions in Federal and state support for agriculture-related services.
- Changing climate, short-term weather patterns, and pest complexes.

### 2. Food Safety

#### 2.1. Strengths

- Whole apples do not inherently pose significant food safety risk- no food-borne illness has ever been attributed to their consumption.
- Dedicated staff at UVM and VAA are working on the issue.
- Track record:
  - Seven orchards in VT are already GAPS certified.
  - Others are privately certified
  - Cider makers have HACCP plans.
- Engineering expertise at Extension available to producers.
- Practical Food Safety curriculum at UVM can be applied to apple producers.

#### 2.2. Weaknesses

- Grower reluctance to adopt regulations.
- Not enough enforcement of food safety regulations.
- Old storage and other equipment create capital needs.

- Lots of wood surfaces used in picking/storing/packing. How do we transition to sterilizable surfaces?
    - Lack of infrastructure for adequate bin and other equipment sanitizing.
- 2.3. Opportunities
- Marketing potential for adoption of food safety practices.
  - Capitalize on VT reputation for quality and food safety.
  - National research being conducted on food safety: coordinate with U.S. Apple, other universities on recent developments.
- 2.4. Threats
- Challenge of shared cold storage/packing under GAPS and FSMA.
  - Lack of long-term funding for GAPS/Food Safety personnel.
  - Exemptions in FSMA could lead to food safety issues.
    - Everyone is at risk with even isolated food safety incidents.
  - Federal regulations don't fit the scale of VT producers.
3. Orchard Profitability
- 3.1. Strengths
- Vermont industry is overall profitable and sustainable. Crisis in 1990s forced inefficient producers out of the industry.
  - Farm Viability Program provides critical support and training.
  - New Farmers Project at UVM Extension Center For Sustainable Agriculture.
- 3.2. Weaknesses
- Uncertainty of production; surplus some years, crop shortage in others. Hard to make inroads into new markets given this uncertainty.
- 3.3. Opportunities
- Development of a clearinghouse to get information out to producers, identify programs best-suited to them.
  - New production systems, alternative tree fruit crops, and processing markets may provide increased opportunities.
- 3.4. Threats
- More severe and unpredictable weather events.
    - Inclement weather during bloom is a major 'wild card'.
  - New pests and diseases.
  - Threats to bees and other pollinators.

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## Afterword

As a kid growing up on a Central Vermont dairy farm in the 1980s, I collected apples from local abandoned orchards and pressed them at a nearby cider mill, one of the last remaining facilities of its kind in the area. At the mill we would see large bins of fruit coming in from Champlain Valley orchards, but I didn't understand the scope of the Vermont apple industry until taking a summer job while enrolled as a UVM undergraduate in the Plant and Soil Science program. I was soon visiting area orchards, collecting data for research projects and tending to trees at the UVM orchard, and have worked to some degree in the industry ever since. Beginning in 2000, I have been a technician with the UVM Apple Team, supporting research and outreach programs for the program faculty. In this capacity I served a tangential role to the industry, and, seeking greater involvement and a leadership position, I was elected President of the Vermont Tree Fruit Growers Association (VTFGA) in 2009. This coincided with the beginning of my graduate studies, also in the UVM Plant and Soil Science department, and I have used this role to serve as a spokesman for the apple industry, which growers at least seem to appreciate, since I have continued in that position ever since.

I have seen many changes in the industry since the mid-1990s, when many had written it off as unprofitable and in general decline. New apple varieties, marketing methods, and growing practices, including a complete reshaping of what we once knew as a traditional apple tree and changes in orchard architecture, have combined with changes in direction and staffing from support partners at UVM and the Vermont Agency of Agriculture to create a new era of Vermont apple production. It was in this light that I chose to propose this Strategic Planning initiative for the Vermont Apple Industry, with prompting from Steve Justis, Executive Director of the VTFGA, and its participating growers. This project was completed for academic credit under Dr. Robert Parsons from the UVM Department of Community Development and Applied Economics, but it really is done to support Vermont apple growers, and to help lead them into a new Vermont Food Systems paradigm. This is not meant to be a static document, nor a prescription for what I feel needs to be done to support the Vermont apple industry. Rather, it is the beginning of a process by which growers can better position themselves with support providers and consumers to improve the sustainability of their industry. The project is guided by principles outlined by Dr. R. Warren Flint in *Practice of Sustainable Community Development* (2013, Springer, New York). Throughout the process, Vermont growers and professionals from UVM Extension, College of Agriculture and Life Science, Vermont Agency of Agriculture, and other service providers have provided input and pledged time and effort to support action on the plan.

I look forward to continuing this conversation. Those apple trees that bore the fruit I saw at the local cider mill as a kid thirty years ago are still bearing today, right next to modern, high-density orchards of unique new varieties that are part of the future of the Vermont apple industry. Apples will remain a critical component of the Vermont agricultural economy for the foreseeable future, and I hope this plan helps growers and food system practitioners to guide their efforts.



June 10, 2013