



# farm to plate

NETWORK

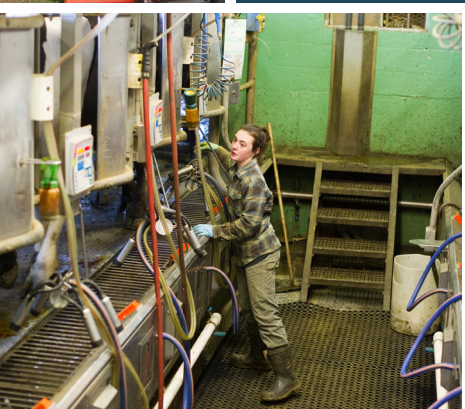
## Charting a Path:

Food System Workforce Needs Assessment

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Vermont Sustainable Jobs Fund



EDUCATION AND WORKFORCE DEVELOPMENT WORKING GROUP

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***“We must do a better job of focusing the education of our children—from grade school through college—on career readiness. We can do a better job of personalizing educational opportunities and integrating technology, career training and internships with traditional classroom education.”***

**-Governor Peter Shumlin, Second Inaugural Address**

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- 🍏 Vermont Agency of Education**
- 🍏 Vermont Agriculture Innovation Center**
- 🍏 Farm to Plate Network Fund**

# What are the education and training needs of Vermont's food system employers? Is Vermont's education system aligned with these needs?

Vermont is seen as a national leader in the local food movement and Vermont's diverse educational community has a tremendous opportunity to capitalize on this national spotlight and gain recognition as the pre-eminent place to study, learn, and launch a career within the food system.

There are many positive signs in Vermont's food system, including an increasing interest among students to go into farming and food system careers, and a willingness of many higher education institutions and adult education providers to develop new courses, certificate programs, and other educational offerings to meet student demand. Food systems businesses benefit enormously from the Vermont brand and its reputation as authentic, natural, and healthy. At the same time, **research conducted for this report found that food system employers cannot find enough qualified employees to meet the needs of their businesses.**

At the request of the Farm to Plate Network's Education and Workforce Development Working Group, two researchers were hired by the [Vermont Sustainable Jobs Fund](#) (VSJF) to identify the education and training needs of Vermont's food system employers. The researchers were also tasked with assessing food system courses and programs at Vermont's higher education, post-secondary, and adult education institutions.

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***“Colleges need to structure curriculum to meet employer needs; employers need to meet, share and discuss challenges and best practices.”***

-Specialty food manufacturer plant operator

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This study was designed to accomplish the following objectives:

1. Determine employers' current unmet needs.
2. Conduct a review of existing education and training programs related to Vermont's food system.
3. Compare current employer needs with current educational and training opportunities in order to identify challenges and gaps.
4. Identify career pathways in Vermont's food system.
5. Demonstrate the range of well-paying opportunities in Vermont's food system.
6. Identify potential areas of revenue growth within the sector.
7. Provide preliminary recommendations for discussion and action within the Education and Workforce Development Working Group of the Farm to Plate Network and the education community as a whole.



The **Farm to Plate Strategic Plan** is Vermont's long-term comprehensive plan for strengthening its food system. **Chapter 4, Section 2: Food System Education** suggests that the success and resilience of Vermont's food system depends, in part, on its educational institutions for scientific knowledge, resources, best practices, skilled leadership, networking opportunities, and student training. **Chapter 4, Section 3: Food System Labor and Workforce Development** describes employment trends and other issues impacting food system workers.

This report is the culmination of online survey results and in-depth interviews with employers, educators, and business assistance providers. The research was funded by [Green Mountain Coffee Roasters](#), the [Vermont Agency of Education](#), and the Vermont Agriculture Innovation Center at the [Vermont Agency of Agriculture, Food and Markets](#) (VAAFAM). In addition, important data and staff support were provided by the [Vermont Department of Labor](#).

Most employers that participated in this study project significant revenue growth over the next few years. **However, these employers indicated that one of their biggest challenges was the availability of work-ready entry level employees (i.e., workers with basic work readiness skills such as timeliness, accountability, work ethic, and basic writing and math skills).** *Technical skills*, such as basic animal care, culinary experience, and machining skills, are challenging to find as well. *Higher level skills* that are also in demand include manufacturing design, repair, and installation, quality control, and food safety. Forty percent of large employers and 50% of small employers surveyed said that these hiring challenges are holding their businesses back (e.g., reduced revenue, less efficient production, and delayed expansion).

There are examples of academic and training excellence throughout Vermont that directly address these skill gaps. However, in several respects we're not maximizing the impact of these examples. For instance, we're not sharing information such as training resources in a consistent and accessible way to businesses (especially small ones). Curricula and programs are not always shared between teachers and administrators across the state, or even within supervisory unions (including examples that have been proven effective, as there is little incentive to do so). We're not coordinating information and ideas in a systematic, routine way among and between businesses, between businesses and education providers, and within the education community (e.g., between secondary and post-secondary institutions). Finally, we're not adequately scaling business products and services to expand market outlets and reach higher levels of profitability, thereby creating opportunities for even greater job growth.

**This report identifies the following 10 recommendations as critical for addressing the needs of Vermont's food system:**

1. *Develop clear educational pathways to careers in the food system, beginning in grades 7 and extending to post-secondary courses and degree offerings.*
2. *Maximize the strengths of each stakeholder group within the education system in order to create a supportive environment for adapting to the rapidly changing needs of food system employers.*
3. *Provide regular opportunities for educators and administrators to collaborate on and share best practices and model curricula that connect with food system career pathways.*
4. *Improve and strengthen the knowledge base and role of guidance and career counselors to help students identify and pursue careers in the food system – including production agriculture, food manufacturing, wholesale and retail distribution, nutrient management, and business technical assistance.*
5. *Develop a suite of certificate programs to offer alongside traditional two and four year degree programs.*
6. *Develop ongoing opportunities for food system employers and educators to build and maintain lasting relationships so that the education and training being offered meets the evolving needs of employers.*
7. *Strengthen work readiness skills development and evaluate aptitude within high schools, CTEs, and adult education programs.*
8. *Aggressively promote small business support systems to food-related businesses.*
9. *Identify and support food system entrepreneurs.*
10. *Build strong secondary and post-secondary engineering and manufacturing design programs.*

Examples of programs and curricula that address some of the challenges are identified throughout this report. They incorporate many of the essential elements required for success in the workplace and classroom such as flexibility and responsiveness, support for the scaling of successful programs, and leveraging existing strengths, among others.

Tackling the challenges identified in this report will be important for improving the quality and availability of workers and entrepreneurs employed in Vermont's food system. This will ultimately benefit thousands of Vermont businesses, large and small, by providing trained, efficient, and enthusiastic workers who are easy to recruit and hire. We also anticipate that thousands of Vermont graduates and residents who are looking for fulfilling careers that pay a livable wage will find those opportunities right here in Vermont, if we can focus and sustain a united effort. **Our hope is that this report will lead to new collaborations between the education and food system employer communities.**



Machining work in the classroom at Vermont Technical College. Credit: Andy Duback.

## 🍷 Methodology

Working closely with VSJF staff and a sub-committee of the Farm to Plate Network Education and Workforce Development Working Group, the consultants established priorities for targeting food system industries based on high wage, high demand opportunities estimated by the Vermont Department of Labor. A database of over 650 businesses, educators, and organizations was developed. This database included businesses that are significant to the food system but may have been overlooked in the past (e.g., refrigeration maintenance, repair, and installation; food manufacturing; and meat processing).

"High wage, high demand" jobs, as defined by the *Vermont Department of Labor*, have more than an annual income of \$32,720, and an annual growth rate of 0.8%, or have more than 24 openings per year.

Three surveys were developed: The first survey targeted large employers (i.e., those businesses with over 20 full-time employees), the second targeted smaller businesses and sole proprietors (i.e., those with less than 20 workers) and the last targeted technical assistance providers, educators, and other organizations offering training and technical support. All three surveys were tested with a select group ahead of official implementation. Together, these surveys generated a 19% response rate and **90 completed surveys** (out of 478 survey invitations sent out).<sup>1</sup> The range of respondents broadly represented different types of food system business and different regions around the state.

Interviews were also conducted with employers, educators, technical assistance providers, and apprenticeship hosts. **A total of 85 in-depth interviews were conducted.** These included 31 interviews with employers of all sizes and types, ranging from owners of livestock processing plants to dining service directors in public schools. Sixteen interviews were conducted with business assistance providers and trainers to gain their perspective about the needs of the food system workforce. Another 30 interviews were completed with curriculum experts, teachers, and administrators at Career and Technical Education Centers (CTEs) and traditional high schools, as well as professors at post-secondary institutions, in order to understand food and agriculture related curriculum and training that is currently available in the state. Finally, eight interviews with apprenticeship hosts were conducted.

The consultants also reviewed existing high school curricula, programs of study within CTEs, adult education programs, and post-secondary degree and certificate programs. They then identified the range of learning opportunities available, the geographic availability of those opportunities, and the challenges of evaluating the quality of those programs. Research included a review of national best practices in food systems curricula, collaborative approaches within the education system and between the education and the business communities, and adult training programs.

Employer needs and education/training opportunities were then compared to identify gaps and opportunities for strengthening Vermont's food system.

### 🔑 Limitations of Research Findings

The small sample size of this project limited the ability to cross-tabulate results by type of business, size of business, and geography. Focusing on high demand, high wage jobs—even though many food system jobs are low wage—means that some career opportunities were not evaluated or were evaluated to a lesser degree. Publicly available sources of curricula and training data is limited by those who update and edit it. Vermont Department of Labor data only includes firms that are required to furnish unemployment insurance (i.e., data for self-employed Vermonters, most farms, and food system specific nonprofits is consequently not easily gathered). This is a significant data gap for tracking employment and the number of businesses in Vermont's food system.

Lastly, this project focused on secondary curricula through post-graduate school. No middle school or elementary school research was conducted. However, coverage of those opportunities and subject areas was included in Chapter 4, Section 2 of the Farm to Plate Strategic Plan: Food System Education.

## 🍷 Understanding Employers' Needs

Employers confirmed the anecdotal evidence that prompted this study: they told us that hiring challenges were holding back their business growth.

This struggle can hamper growth, lead to high turnover (e.g., hiring workers who are unqualified for the job and leave, or are fired, because of that mismatch), strain existing staff, dampen morale and reduce profit potential. **Digging deeper into the skills that employers struggle to find helps to both define the challenges and identify possible solutions.**

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***“A reliable, enthusiastic, average ‘work a day’ person who is willing to learn new skills, is a perfect hire.”***

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-Specialty food manufacturer

### When asked whether hiring challenges held back their businesses, employers replied YES:

- 50% of large employers say YES
- 40% of small employers say YES
- 37% of technical assistance organizations say YES

### When asked how they address those hiring challenges in the short term, employers told us the following:

- They hire otherwise strong candidates and train them or they run the business without those skills until they can find them.
- In the case of technical program directors, it prevents them from providing the services their clients need.

### Employers told us how they most often find employees:

- 76.5% of large employers and 84.4% of small employers use word of mouth.
- 94.3% of large employers and 18.8% of small employers advertise in local papers.
- 76.5% of large employers and 28.1% of small employers use job websites.

**NOTE:** Large employers had more than 20 full time employees on staff.

## 🔑 Hard to Find Skills

During our research, employers told us it was challenging to find sufficient workers with basic work readiness and business skills, as well as certain technical skills such as in the culinary arts, animal care and humane livestock production, food manufacturing equipment handling, quality assurance, dairy herdsman, meat cutting and cheesemaking.

### Basic Work Readiness Skills

Employers identified a range of basic work readiness skills for entry and mid-level positions that they say are surprisingly difficult to find in applicants. These include character attributes such as reliability, common sense, the ability to work as part of a team, loyalty, a sense of ethics, a willingness to learn, and a willingness to work hard.

Other work readiness skills include basic academic abilities such as math, reading and writing, as well as higher order thinking skills such as the ability to problem solve, pay attention to detail, be accountable, show initiative, and demonstrate effective interpersonal communications. Although Vermont secondary schools have an excellent reputation and some of the highest graduation rates in the country, an extraordinarily high percentage of Vermont 11th-graders were partially below proficient or substantially below proficient in math (64%), writing (52%) and science (67%) in 2012.<sup>2</sup>

In response to employer complaints about basic work readiness, several secondary schools, CTEs, and adult training programs have started to embed both remedial programs and work skills into their curricula. In some cases, the work skills are required for successful completion of the program of study.

Most CTEs already address work readiness skills in their programs, ranging from [ACT WorkKeys](#)<sup>3</sup> assessments to cooperative programs, specialized rubrics, and class discussions. However, there is no uniform method of embedding such programs and no uniform method of measuring them once in place—although there is a process under development at the Vermont Agency of Education.

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***“Based on the last eight applicants, it is a valid statement that the lack of employable applicants is a major constraint in our growth.”***

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-Poultry farmer

It was not possible to determine the level of work readiness skill development that is provided across all Vermont high schools. However, based on employer input received during our research, it is clear that these are skills that are lacking in high school graduates. In fact, some post-secondary institutions are developing these skills in their student populations at the request of employers.

### Best Practices: Customized Student Support

**Hannaford Career Center** in Middlebury administers the [Accuplacer](#) exam to all incoming students. Accuplacer is a diagnostic tool that helps teachers identify students' proficiency levels in math and reading so they can target areas of support customized for each student. Since most students below grade level are on Individual Education Plans (IEPs) their coaching now includes both Hannaford staff as well as special educators from their sending schools. This ensures that students have access to remediation while still in high school and increases the likelihood that they will graduate from high school at higher levels of proficiency.

### Technical Skills

Employers identified a number of technical skills that are challenging to find in workers. At the *entry level*, they include basic culinary skills, animal care and handling skills, and basic computer skills such as Microsoft Office and Excel. At the *mid to senior levels* they include manufacturing and machining expertise in the design, development, installation, and maintenance of food manufacturing equipment; HVAC and refrigeration knowledge; quality assurance skills; food safety expertise; herdsman skills; veterinarian expertise in poultry and/or less common species; culinary training; humane livestock production knowledge; meat cutting skills; and cheesemaking skills.

Although there are education and training programs in Vermont for all of these skill areas, issues such as geographic dispersion, affordability, program quality, flexibility of the training schedule, career knowledge, and negative—but outdated—perceptions of these careers reduce enrollment in these areas, the frequency of the training and overall access. See [Table 1 on pages 12-14](#) to additional information on food system programs of study available at high schools and [Table 2 on pages 16-17](#) for additional information on food system programs of study available at CTEs.

**CULINARY ARTS** training is offered in 13 of 17 CTEs around the state, with most offering “industry recognized credentials” (IRCs) usually [ServSafe](#).<sup>4</sup> Nine CTEs host on-site restaurants for their students to provide real work experiences, and four CTEs offer college credit. Many of Vermont’s high schools also offer cooking or nutrition programs. Only two counties—Lamoille and Orange—lack either one in their high schools. These courses, when offered in high schools, generally fall under family and consumer sciences curricula which have traditionally been designed for lower-track students.

**Food prep workers earn a median income of \$21,940, while head chefs and cooks earn a median of \$42,700, placing them in the high-wage category.** At this point, this field is not considered a high-demand sector within food systems.

However, employers indicated that careers in dining services are going to require a greater understanding of food preparation, the ability to work with whole foods, an intimate knowledge of menu planning based on federal nutrition guidelines and budgets, and strong customer service skills.

### **Best Practices: Dual Enrollment**

#### **The New England Culinary Institute**

(NECI) offers a wide range of academic programs in Culinary Arts, Baking and Pastry and Hospitality and Restaurant Management, including three associates’ degrees, three certificates, two online BA programs and two residential BA programs.

NECI is committed to providing secondary students with a clear path to their programs from CTEs. Their dual enrollment options can

include college credit for high school and CTE courses and all NECI students are required to participate in internships prior to receiving degrees. NECI has stringent guidelines for both apprentice and host that could be used as a model for the development and expansion of apprenticeship programs. It offers accelerated learning opportunities through tools such as prior learning assessments. A number of scholarship opportunities are available for NECI degrees, all of which are described on its website, [www.neci.edu](http://www.neci.edu).



NECI students prepare a dish. Credit: Kevin O'Donnell.

**ANIMAL CARE** encompasses everything from animal handling (such as feeding calves or handling animals in slaughter facilities) to treating farm animals medically. Animal care experience can be provided through a range of education and apprentice opportunities. For example, diversified agriculture, agri-science, agroecology, and food systems are just a sampling of programs of study or individual courses offered by both CTEs and high schools throughout Vermont that could include the study of animal science. At this time, only five high schools offer courses in animal science, although 8 of the 17 CTEs offer programs of study in agriculture. No high school or CTE in Vermont currently offers direct hands-on animal care through its curriculum.

Only one CTE—[Hannaford Career Center](#)—currently offers a complete series of programs of study in food systems, although four others offer some programs of study. [Missisquoi High School](#) offers an animal science and agricultural resource management course; [Thetford Academy](#) offers a course on food and society; and [Lake Region Union High School](#), through its *North Country Career Center* satellite program, offers a diversified agriculture course.

[Vermont Technical College](#), [Sterling College](#), [Green Mountain College](#) and the [University of Vermont](#) all offer two and four year programs that encompass entry level, hands-on animal care with UVM also offering a pre vet program.

Apprenticeships in animal care and handling are available through farm work, work based and cooperative learning through CTEs and, in the case of veterinarians, through job shadowing and field work. However, it is unclear whether there are apprentice programs for aspiring veterinarians specializing in certain species (e.g., hogs, poultry).

Additionally, producers who can diagnose and treat health issues in their own livestock have a financial advantage over those that need to contact a vet for basic care.

**The range of wages for this field varies from \$21,960 for entry-level farm workers to veterinarians at a \$81,140 median salary.**



### **Best Practices: Loan Repayment Programs**

The Vermont State Veterinarian's Office has submitted an application for the past three years to the federal **Veterinary Medicine Loan Repayment Program** (VMLRP) to request assistance for food animal veterinarians who practice in defined shortage areas within the state. VMLRP will offset educational debt by up to \$25,000 annually for veterinarians who commit to practicing for at least three years in defined shortage areas. One of the shortage areas defined in Vermont was filled via this program. In addition, the 2011 Jobs Bill included \$30,000 in loan forgiveness funds for large animal veterinarians, to be administered through VAAFM.

### **FOOD MANUFACTURING EQUIPMENT HANDLING, HVAC AND REFRIGERATION EXPERIENCE**

involves machining expertise in the design, development, installation, operation, and maintenance of food manufacturing equipment, as well as HVAC and refrigeration knowledge. Often this type of training, although less specific, falls under the term "mechanical sciences." CTEs have a variety of terms for mechanical sciences, including *small engine maintenance, heavy equipment, welding, HVAC, industrial mechanics, and manufacturing*. Over half of the CTEs in Vermont offer mechanical science courses beyond auto mechanics. Only a few offer options for college credit, although many are involved in [Skills USA](#).<sup>5</sup> Seven CTEs offer welding programs, and most of these include an industry recognized credential. [Northwest Technical Center](#) has developed adult education programs and trainings at a basic level for manufacturing, applied measurement and mathematics, three levels of non-residential electricity,<sup>6</sup> and welding for manufacturing (i.e., with stainless steel, which is used in food manufacturing). These programs were developed in response to employer requests within Franklin County, but students come from other areas of the state. **Course content relating to the unique skills needed in food manufacturing and handling is needed, but is only available in a limited number of venues.**

*Vermont Technical College*, through its new *Institute for Applied Agriculture and Food Systems*, will offer an associate's degree in agribusiness management technology in addition to its bachelor's programs in business technology and management, electrical

engineering technology, and diversified agriculture. Graduates of these programs will be specialized technicians such as biodigester technicians, farm equipment repair technicians, food processing technicians, and soil conservation technicians.

Other post secondary training and education opportunities include the [Vermont Manufacturing Extension Center](#), which offers courses such as production maintenance and lean manufacturing through its technical assistance programs and workshops. Six CTEs offer adult education courses in manufacturing and several offer adult education programs in industrial maintenance, mechanical engineering, industrial electricity, welding and plumbing. Only [Green Mountain Technology and Career Center](#) in Hyde Park offers a comprehensive program in HVAC and refrigeration for adults and secondary students.

Although there are many career opportunities in mechanical sciences that don't involve the food system industry, these skills are critical for one of the fastest growing sectors in Vermont's food system economy— specialty foods manufacturing. Employers indicated that when their production line breaks down they struggle to find someone to repair the equipment. Additionally, the scale of production in Vermont requires smaller manufacturing equipment than used in larger facilities, leading to a dearth of appropriate and efficient machines for Vermont-scale production lines. **This also presents an opportunity for employment: the design and manufacturing of scale-appropriate equipment.**

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***“We need to launch a career academy in a tech center that graduates high school students proficient in basic machine maintenance (e.g., food manufacturing, sanitation) and/or an apprentice program. It’s a huge gap and slows business for many food entrepreneurs.”***

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-Food production entrepreneur

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***“There is a large gap between industrial food equipment and micro equipment that’s currently available and better suited to Vermont scale.”***

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-Manufacturer and Distributor of Dairy Processing Equipment

**Jobs in these specialty areas have median incomes that are defined as high wage (>\$32,070 annual income).** Most are also in high demand, especially HVAC and refrigeration jobs. It will be important for Vermonters seeking careers in these specialty areas to recognize this niche market opportunity and effectively market themselves to those in need of services.

**QUALITY ASSURANCE** involves the systematic testing of food products to ensure both their quality and safety. As food safety and traceability continues to increase in importance, demand for trained workers in this career path will increase. These jobs involve extensive science studies and a desire (or willingness) to be in a lab most of the day. Other than basic food safety skills which are taught in all the CTEs that provide culinary programs of study, higher level positions require a minimum of an associate's and preferably a bachelor's degree. Vermont Technical College offers quality assurance training in its food processing technician program (associate's degree) and diversified ag program (bachelor's degree). The University of Vermont offers bachelor's, master's, and doctoral programs related to quality assurance.

The closest job titles for which wage information is available in this category are quality control analysts and quality control systems managers. **Median incomes range from \$47,640 to \$91,130, with quality control systems managers being in greatest demand.**

**EXPERIENCED HERDSMEN** are crucial for larger dairy farms in particular. Vermont Technical College offers associate's degrees in Herd Manager Certification and Dairy Farm Management—both requiring hands-on work with animals. UVM and Vermont Technical College offer the 2+2 program, which requires students to work at the Vermont Technical College dairy farm while enrolled in the two-year Dairy Farm Management program. Students then continue on to UVM for further study including courses in strategic planning and global diversity and a semester at the Miner Institute, for a combination of course work and applied research.

The experienced dairy farmers and veterinarians interviewed during the research process urged young farmers or students to consider taking courses in animal sciences and animal research to better equip themselves for the challenges they'll face throughout their careers.

Anecdotally, **larger farms pay as high as \$100,000 in salary plus housing and benefits** for experienced herdsman. It is difficult to gauge wages and anticipated job openings more accurately because the Department of Labor does not track this job title.

### **HUMANE LIVESTOCK PRODUCTION**

is another area identified by employers as a skill set that is challenging to find in the current workforce. Some programs of study include discussions about the ethics of livestock production, such as in the Sustainable Agriculture program at Green Mountain College. Periodically, trade associations, VAAFM, and other technical assistance providers sponsor adult training programs that include training in humane livestock handling.

**MEAT CUTTING SKILLS** were also identified during the research for the Farm to Plate Strategic Plan in *Appendix E, Meeting the Demand: Strategies for Expanding Vermont's Livestock Production and Meat Processing*. In response to those findings, funding was made available in the 2011 Jobs Bill for the development of a meat cutting training program. A grant was issued in 2011 through VAAFM to fund such a program, which includes a focus on food safety and sanitation, a retail meat practicum, and skill development in specialty cuts. This program also includes individual units such as poultry processing, meat technology, sausage-making, and specialty meats.

The program was developed by the [Hannaford Career Center](#) in consultation with an advisory committee composed of slaughter facility owners, retail butchers, and custom meat cutters, as well as representatives from Vermont Technical College, VAAFM, the Vermont Department of Labor, and regional economic development centers.



Cecil Bromley, Class of 2010, VTC Credit: Andy Duback.

**Wages in this field range from \$23,200 (well below the Vermont median income) to \$32,080 for butchers and meat cutters. Demand is increasing, although the number of open positions is currently projected to be fewer than 10 annually.**

### ***Promising Approach: CTE–VTC Partnership***

To increase the number of skilled meat cutters in Vermont, Hannaford Career Center and Vermont Technical College have teamed up to provide a **meat processing training program** for adults. In partnership with local slaughter and meat processing facilities which serve as hands-on training sites, Hannaford Career Center now offers a two-year certification program that includes a second year apprenticeship. Vermont Technical College is developing coursework that will lead to an associate's degree. A total of \$25,000 in funding for this initiative was made possible from the 2011 Jobs Bill and was awarded through a competitive grant process by VAAFM; further development will be supported by a grant from the U.S. Department of Labor.

The program combines food safety with humane animal handling and meat processing training. Additionally, the Hannaford Career Center purchased a mobile poultry processing unit (MPPU) which it leases to other technical education centers as well as Vermont Technical College to respond to interest and meet the demands in other parts of the state. It also enables the career center to offset some of the initial program costs through leasing. As demand for local chicken increases, this will provide processing that many farmers struggle to access.

**Ten new students have enrolled in Hannaford Career Center's Skilled Butcher and Meat Processing class, and the 9 inaugural students are expected to graduate in June 2014 with a full certificate.**

**CHEESEMAKING SKILLS** are needed as a result of the growth in demand for artisan cheeses, as well as the large growth in cheese operations such as Cabot Creamery, Swan Valley, and Vermont Farmstead Cheese. This is prompting existing cheesemakers to expand their production or product lines and creating an attractive opportunity for new cheesemakers. Distributors of Vermont specialty foods are also

looking to increase their sales of Vermont cheeses. Additionally, some current artisan cheesemakers will be retiring, leaving recipes and cheeses vulnerable to extinction unless bought and developed by new cheesemakers.

Currently, there are several providers of cheesemaking training including [UVM's Institute for Artisan Cheese](#) (VIAC)—the only program of its kind in the United States.

VIAC is the only organization that offers a comprehensive program that includes courses from Sensory Evaluation to Cheese Chemistry, to Business Planning for Cheesemakers and Cheesemaking Facility Construction, and Advanced Risk Reduction. VIAC's program also offers a cheesemaking certificate and an advanced cheese making certificate. The [Vermont Cheese Council](#) also offers courses, as do organizations such as [Rural Vermont](#), which offers workshops on raw milk cheese production. Food safety is challenging as the number of cheese makers increases because one high-profile safety issue could place the entire sector at risk.

### ***Basic Business Skills***

Basic business skills that are in demand include information technology, marketing, accounting and bookkeeping, software expertise, logistics management, customer relations, merchandising, social media marketing, and management. Because of their relevance to so many sectors in the economy, business skills are taught throughout the secondary, post-secondary and adult education continuum. Because of the large number of small businesses in the food sector, business owners and managers need employees with a broad range of basic business skills. Unfortunately, ongoing professional development to keep pace with changing conditions often takes a back seat to the daily demands of running a business.



Cheesemaking at Vermont Creamery. Credit: Vermont Creamery.

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***“I would get students in my class who had good grades in basic business courses but couldn't read a balance sheet or describe an asset.”***

-Former college professor and CFO specialty foods

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Business courses and programs of study are abundant throughout CTEs (e.g., 11 of 17 offer some courses), with five offering optional college credit, and five offering industry recognized credentials. Some counties and supervisory unions have what appear to be strong business programs in their high schools that include courses in marketing, bookkeeping, accounting, and business planning. Many schools offer work-based learning opportunities that include work in local businesses.

Technical assistance providers identified the following business and technical skills that small employers need to invest in but might not be aware of, including: cash flow analysis, bookkeeping and accounting, strategic thinking about labor, wages and benefits management, marketing and sales, business planning, resolving conflicts among workers, and managing farm and business transitions.

Basic business training in such areas as management and marketing and basic accounting and finance are widely available through [NOFA Vermont](#), [UVM Extension's New Farmer Project](#), [UVM Continuing Education](#), small business development centers, adult education programs at CTEs, the [Women's Agricultural Network \(WAgN\)](#), the [Vermont Agriculture Development Program](#), and regional food centers. Business courses available through online sources such as [Ed2Go](#) are extensive and relatively affordable, and provide flexible timing and access.

Wages in general business positions vary but generally run higher than the state median income. The degree of specialization can significantly impact a Vermonter's income in this sector. *The reader may wish to review Table 3 on pages 22-24 for additional information pertaining to this section of the report.*

## Food System Education in Vermont

Vermont is home to more than 50 public high schools, more than 30 private high schools, 17 CTEs, 5 public colleges, 1 land grant university and 17 private colleges. The intellectual breadth and depth of these resources is impressive. However, our educational resources are not sufficiently focused on the needs of the expanding food system economy. The quality and availability of academic opportunities vary dramatically, the paths to food systems careers are not always well-defined, and the employability of graduates is not always clear.

### Public High Schools

The high school courses that were included in this analysis were: Anatomy and Physiology, Animal Science, Botany or Horticulture, Business/Marketing/Finance, Ecology and Environmental Science, Entrepreneurship, Machining/Mechanics, Natural Resources/Forestry, Nutrition, and Culinary. Additionally, virtual learning opportunities and/or work based learning opportunities were also identified. *See Table 1 on pages 12 to 14 for a full listing of food systems courses offered by high schools.*

Every high school in the state offered at least one food system-related course (a handful of high schools had no course information available). Many high schools offered courses that were also offered by the local CTE, although it was difficult to determine whether they were offered at the 9th- and 10th-grade levels rather than only at the 11th and 12th grades, which is the case with CTE programs of study.

Generally there is no standard for curricula in the area of food systems. Courses that were most frequently offered in high schools included anatomy and physiology, ecology and environmental science, business classes, culinary arts and nutrition. Only a few schools offer animal science, botany or horticulture, and machining or mechanics.

Nearly half of Vermont high schools indicate that they offer some form of work-based learning and virtual school, but very few students participate. There are no consistent statewide requirements or standards for work-based learning in high schools. Educators describe the following barriers to work-based learning: lack of transportation to and from work, lack of statewide standards for students and hosts, and not enough businesses or organizations willing to host students.

Interviews with both high school and CTE teachers and administrators indicated that most food systems related curricula are grounded in 21st-century learning skills (e.g., collaborative problem solving, learning through digital means, global awareness, economic and entrepreneurial literacy, communication, and accountability), evidence-based methods, and content, and will soon include the new [Common Core Standards](#). Common Core Standards are academic standards promoted by a state-led effort coordinated by the National Governors Association Center for Best Practices. They were developed in collaboration with teachers, school administrators, and experts to provide a clear and consistent framework to prepare children for college and the workforce.

Little is currently done to weave food systems issues into existing courses where natural synergies exist. For instance, even though all high schools teach biology, most do not integrate food system elements into the curriculum (e.g., nutrient cycles, plant physiology, and integrated pest management). And many courses aren't integrated into any program of study (e.g., beekeeping, horticulture, botany, machining, market analysis, management and operations, and entrepreneurship). However, individual efforts are underway in many high schools including internships in the cafeteria, greenhouse food production for school consumption, locally purchased foods for dining services, composting, and many community based learning programs and virtual learning.

Following are examples of subject integration as developed by the [Center for Sustainable Systems](#) which could be expanded upon throughout the state:

- **Biology:** Nutrient cycles, plant physiology, integrated pest management
- **Spanish:** Grow *papas y maize* and make traditional dishes when studying Latin American cultures
- **World history:** Wheat production and bread making when studying the Fertile Crescent
- **Economics:** Full-cost accounting of industrial farm practices, food subsidies
- **Physics:** Biochar as a soil amendment (made through pyrolysis)

- **Nutrition:** The benefit of whole foods
- **Statistics:** A rapid market assessment of the Montpelier Farmers' Market
- **Environmental science:** Low-input farming, organic methods, food miles, water/air quality, genetic diversity, and seed saving

### **Best Practices: Integrated Learning**

The Center for Sustainable Systems (CSS) is bringing relevance and rigor to high school education in Central Vermont by using the food system and sustainability to cut across a variety of academic disciplines and subjects. Because food systems affect environmental issues such as climate change; water, air, and soil pollution; resource depletion; energy consumption; and human health and nutrition, CSS provides a context for studying history, psychology, economics, and sociology; as well as a framework for applying math and foreign languages.

The program incorporates service learning-based projects into the core curriculum, which is developed by certified teachers in their respective disciplines. Projects are carried out on school campuses and at the Two Rivers Center farm in Montpelier. Summer programming offers academic credit and a stipend. The regular school year schedule normally sends kids home during what amounts to half the growing season, limiting both what can be grown at school gardens and learning opportunities associated with food production. CSS addresses this issue with summer programming, which combines academic credit and pay.

The food produced through CSS is sold through student-run businesses and provided to community organizations serving those in need. Partners and donors include the Montpelier Public Schools, the Rowland Family Foundation, Green Mountain Coffee Roasters, the Block Foundation, the National Life Group Foundation, and the New England Grassroots Environment Fund.

**Table 1: Vermont High Schools Food System Related Curricula by County**

		Anatomy and Physiology	Animal Science	Botany or Horticulture	Business/ Marketing/ Fincance	Entrepreneurship	Environmental Science/ Ecology	Machining/ Mechanics	Natural Resources/ Forestry	Nutrition	Culinary	Work Based Learning/ Internships	Virtual High School
Addison County	Middlebury Union	x	x	x	✓	✓	✓	x	x	x	x	✓	x
	Mount Abe	x	x	x	x	x	✓	✓	x	✓	✓	✓	✓
	Vergennes	x	✓	✓	✓	x	✓	✓	✓	x	x	✓	x
Bennington County	Arlington	✓	x	x	x	x	x	x	x	✓	✓	✓	x
	Burr and Burton	✓	x	x	✓	✓	✓	x	x	x	x	✓	x
	Mt. Anthony	✓	x	x	x	x	✓	x	x	x	x	✓	x
	Twin Valley	x	x	✓	✓	x	✓	x	x	x	x	x	✓
Caledonia County	Danville	x	x	x		x	x	x	x	x	x	✓	✓
	Hazen	✓	✓	x	x	x	✓			x		x	x
	St. Johnsbury	✓	x	x	x	✓	✓	x	x	✓	x	x	x
	Lyndon Institute	✓	✓	x	x	x	x	x	x	x	x	x	x
Chittenden County	Burlington	x	x	x	✓	x	x	x	x	x	x	x	✓
	CVU	x	x	x	✓	✓	✓	✓	✓	x	✓	✓	x
	Colchester	✓	x	x	✓	x	✓	x	x	x	x	✓	✓
	Essex	✓	x	✓	✓	✓	x	x	x	✓	✓	✓	x
	Milton	✓	x	x	✓	x	x	x	x	✓	✓	✓	✓
	Mt. Mansfield	x	x	x	✓	x	✓	x	x	x	x	x	x
	South Burlington	x	x	x	✓	x	✓	x	x	✓	x	✓	✓
Winooski	x	x	x	✓	x	x	x	x	✓	x	✓	✓	

Indicates that local CTE offers similar course work but in a program of study
  Indicates that no course catalog was available

Table 1: Vermont High Schools Food System Related Curricula by County...Continued

		Anatomy and Physiology	Animal Science	Botany or Horticulture	Business/Marketing/Finance	Entrepreneurship	Environmental Science/Ecology	Machining/Mechanics	Natural Resources/Forestry	Nutrition	Culinary	Work Based Learning/Internships	Virtual High School
Essex County	Canaan Memorial	x	x	x	✓	x	x	x	x	✓	x	✓	x
	Concord												
Franklin County	Bellows Free	✓	x	✓	✓	✓	✓	x	x	✓	x	✓	✓
	Enosburg Falls	x	x	x	x	x	x	x	x	x	✓	✓	x
	Missisquoi	x	✓	x	✓	✓	x	✓	x	✓	✓	x	x
	Richford	x	x	x	x	x	x	x	x	✓	x	✓	x
Lamoille County	Lamoille Union												
	People's Academy												
	Stowe	x	x	x	x	x	✓(AP)	x	x	x	x	✓	✓
Orange County	Blue Mountain Union	x	x	x	x	x	✓	x	x	x	x	x	✓
	Chelsea	✓	x	x	x	x	x	x	x	x	x	x	✓
	Northfield	x	x	x	x	x	✓	x	x	x	x	x	✓
	Oxbow												
	Randolph Union	x	x	x	x	x	x	x	x	x	x	x	✓
	Williamstown	✓	x	x	✓	x	x	x	x	x	x	x	x
	Thetford	x	✓	✓	x	x	x	x	✓	x	✓	✓	x
Orleans County	Craftsbury Academy	x	x	x	✓	x	x	x	✓	x	x	x	x
	Lake Region Union + NCCC Satellite	✓	x	✓	x	x	x	✓	x	x	x	x	x
	North Country Union	✓	x	x	x	x	✓	✓	x	✓	x	x	x

Indicates that local CTE offers similar course work but in a program of study

Indicates that no course catalog was available

**Table 1: Vermont High Schools Food System Related Curricula by County...Continued**

		Anatomy and Physiology	Animal Science	Botany or Horticulture	Business/Marketing/Finance	Entrepreneurship	Environmental Science/Ecology	Machining/Mechanics	Natural Resources/Forestry	Nutrition	Culinary	Work Based Learning/Internships	Virtual High School
Rutland County	Fair Haven Union	✓	x	✓	✓	✓	✓	✓	x	x	✓	x	x
	Mill River Union	x	x	x	✓	x	x	✓	x	x	x	x	x
	Otter Valley	✓	x	x	✓	✓	x	x	x	x	x	✓	✓
	Poultney	✓	x	x	✓	x	✓	x	x	✓	✓	✓	x
	Proctor	✓	x	x	x	x	✓	x	x	✓	x	x	x
	Rutland	✓	x	x	x	x	✓	x	x	x	x	x	x
	West Rutland												
Washington County	Harwood	x	x	x	✓	x	✓	x	x	✓	x	✓	✓
	Montpelier	x	x	x	x	x	✓	x	x	x	x	✓	x
	Spaulding	x	x	x	x	x	x	x	x	✓	x	x	✓
	U32	✓	x	x	✓	x	✓	✓	x	x	✓	✓	✓
Windham County	Bellows Falls	✓	x	x	x	x	✓	x	x	x	x	x	x
	Brattleboro	x	x	x	✓	x	x	✓	x	✓	x	x	✓
	Leland and Grey	✓	x	x	x	x	✓	x	x	x	x	x	x
	Twin Valley	x	x	✓	✓	x	✓	x	x	x	✓	x	✓
Windsor County	Black River	✓	x	x	x	x	✓	x	x	x	x	x	x
	Green Mountain Union												
	Hartford												
	Rochester												
	South Royalton	✓	x	x	x	x	x	x	x	✓	x	✓	x
	Springfield	x	x	✓	x	x	✓	x	x	x	x	✓	x
	Windsor	x	x	x	x	x	✓	x	x	x	x	x	x
	Woodstock	x	x	✓	x	x	✓	x	✓	x	x	x	✓

Indicates that local CTE offers similar course work but in a program of study
  Indicates that no course catalog was available



### 🔑 Career and Technical Education Centers

Career and technical education centers (CTEs) provide a wide range of academic and work-based learning that can be applied to careers in food systems. The categories included in this analysis are: mechanical science and automotive technology, culinary arts, forestry and natural resources, agriculture, plumbing, heating, welding, manufacturing, and business (Table 2, pages 16-17).

Career pathways are not always clear, although there are examples that have been developed that could serve as models (See pages 26-27), and all of the CTEs in Vermont have been asked to create pathways in agriculture and other programs of study. All of the food system programs of study offer some industry recognized credentials, a few offer dual enrollment credits, and many have articulation agreements with Vermont and other New England colleges. Additionally, by definition, there are opportunities for work-based learning or cooperative learning in nearly all programs of study. CTEs have developed criteria for using cooperative work in conjunction with their programs. However, according to the Vermont Agency of Education, only 10% of CTE students take advantage of cooperative work opportunities.

#### **The depth and range of the curricula is difficult to evaluate across CTEs because there is no consistency in content or program evaluation metrics.**

Even programs that share the same state assessment, such as agriculture programs and culinary programs, are completely different. Prerequisite courses for programs of study at CTEs can deter students from exploring these career areas, although they also increase the readiness of the students and usually signal greater academic rigor as well. Additionally, scheduling conflicts between CTEs and sending high schools often prevent students from participating in some CTE programs of study.

This research and anecdotal evidence suggests that guidance counselors at sending high schools, parents, and students are unfamiliar with the career opportunities in the food system, and do not realize that many of these careers do offer well-paying jobs in growth industries. **Historical misperceptions continue to prevent strong academic students from considering careers in the food system** either because study takes place at a CTE (where traditionally only academically struggling students have attended) or they believe the available jobs do not pay well (or both).

In addition, **dual enrollment at both CTEs and sending high schools is difficult to negotiate with colleges.** Existing dual enrollments in food system-related programs enable students to take college courses for free at Vermont Technical College and the [Community College of Vermont](#) (CCV). Other state colleges offer dual enrollment, but students must pay to take courses (i.e., vouchers no longer exist).

Finally, another barrier to students accessing food-related programs at their CTEs is the funding mechanism. A portion of the sending school's tuition is sent to the CTE if a student enrolls in a program of study, creating a disincentive for high schools to encourage students to take classes there.

### 🔑 Apprenticeships and Internships

Formal apprenticeships and/or internships can be found all over the state through educational institutions—including high schools, CTEs, and colleges—and may include farm work, heavy equipment operation, machining, and so on. Some academic programs (such as the one at Sterling College) require an apprenticeship or an externship in order for students to receive a degree or certificate, while others simply encourage it. All of the colleges that have degree programs in agriculture require on-farm work. Most colleges that offer other degree-related externships encourage student participation.

State-approved apprenticeship programs are registered and involve licensing or professional certificates. These include opportunities in machining, culinary, and HVAC careers. Apprentices in registered apprenticeship programs receive a paycheck (from day one), hands-on career training, the potential to earn college credit, and national industry certification.<sup>7</sup> For each year of an apprenticeship program, the apprentice receives approximately 2,000 hours of on-the-job training and a minimum of 144 hours of related classroom instruction. In competency, or performance-based, programs apprentices may accelerate the rate of competency achievement or take additional time to complete the requirements. Nationally recognized programs are available in baking, culinary arts, dairy technology, horticulture, machining, and operations engineering. There are over 1,000 occupations with national credentials.

**Table 2: Career and Technical Education Centers Food Systems Related Programs of Study (9-12 grade)**

	<b>Mechanical Science/ Automotive Technology</b>	<b>Culinary Arts</b>	<b>Forestry and Natural Resources</b>	<b>Agriculture and Diversified Ag</b>	<b>Plumbing, Heating, Welding, Manufacturing</b>	<b>Business</b>
<b>Barre Technical Center</b>	Auto	3-6 college credits, on-site restaurant	✘	✘	IRC apprenticeship, OSHA	✘
<b>Southwest Vermont Career Center (Bennington)</b>	Auto, IRC	IRCs	FFA	Agri-science (1 semester) and Agroecology	✘	FBLA
<b>River Bend Career and Technical Center (Bradford)</b>	Heavy Equipment, IRC	Off-site restaurant	✘	Animal, Plant, and Soil Science	✘	✘
<b>Windham Regional Career Center (Brattleboro)</b>	Machine operations and maintenance	On-site restaurant 3 credits	FFA	Sustainable Ag and Food Systems	Machining, Manufacturing	x
<b>Burlington Technical Center Cold Hollow Career Center (Enosburg Falls)</b>	✘	On-site restaurant, apprenticeships, IRC	✘	✘	Welding, IRC	✘
<b>Center for Technology at Essex</b>	Heavy and small equipment	✘	FFA, option for college credit, apprenticeships	Agro-science	Welding	✘
<b>Green Mountain Technology and Career Center (Hyde Park)</b>	Auto only	On site restaurant and co-op, IRC, College credit	IRC	✘	Heating Ventilation and AC, IRC	✘
<b>Lyndon Institute Technical Center (Lyndon Center)</b>	✘	✘	✘	✘	CNC Manufacturing and Welding	IRC
<b>Hannaford Career Center (Middlebury)</b>	Option for college credit, apprenticeships	On-site restaurant 3 credits	FFA	FFA option for college credit	✘	✘
<b>North Country Career Center (Newport)</b>	Heavy equipment	IRCs	FFA	Year 2 of Forestry has Ag	Welding IRC	✘
<b>Randolph Technical Center</b>	Diesel Technology	✘	FFA	✘		✘
<b>Stafford Technical Center (Rutland)</b>	Power mechanics (ag and heavy)	On-site restaurant, option for NECI credits, scholarship, IRC	IRC, college credits	✘	Welding IRC	✘
<b>River Valley Technical Center (Springfield)</b>	✘	On-site restaurant, work coops	✘	✘	Welding IRC	✘

**Table 2: Career and Technical Education Centers Food Systems Related Programs of Study (9-12 grade)...Continued**

	Mechanical Science/ Automotive Technology	Culinary Arts	Forestry and Natural Resources	Agriculture and Diversified Ag	Plumbing, Heating, Welding, Manufacturing	Business
<b>Northwest Technical Center (St. Albans)</b>	Option for college credit	Option for college credit, IRC	✕	✕	Engineering technology, manufacturing, option for college credit	✕
<b>St. Johnsbury Academy</b>	Auto	On-site restaurant, option for college credit, IRC	Combined with Ag	Combined with Forestry	Distribution logistics	✕
<b>Hartford Area Career and Technology Center</b>	Industrial mechanics	Onsite restaurant	FFA	FFA	Welding	IRC, option for college credit

Sources: Interviews and websites for course catalogues, announcements, programs of study

Note: IRC stands for Industry Recognized Credential and FBLA stands for Future Business Leaders of America

[ATTRA](#), a program developed by the National Sustainable Agriculture Information Service and operated by the National Center for Appropriate Technology, has close to 100 Vermont listings for apprenticeships but there is no way to determine the quality of the apprenticeship or the types of standards each business abides by. [Willing Workers on Organic Farms](#) (WWOOF) currently lists 52 Vermont farms and is another source of apprenticeship postings, but again, has no criteria for screening listings. This leaves the apprentice vulnerable to potentially unscrupulous host businesses, although reports of these are rare. In addition, [NOFA Vermont](#) lists dozens of farm apprenticeship opportunities on its website.

Apprenticeships, by definition, involve the transfer of skills and wages in exchange for labor over a specific length of time. Although many of these are of significant value to both host and apprentice, there can be problems with safety and the exploitation of apprentices through long hours, low pay and little transfer of skills. Internships provide exposure to certain careers and businesses and can be either paid or unpaid—often depending on whether the internship comes with academic credit. Many more apprenticeship or internship opportunities are informal. They can range from cheese-making to farming, or from marketing to human resources management.



[Vermont Businesses for Social Responsibility](#) administers a statewide internship program that places students into paid internships with interested employers. Following is a sampling of current internship openings that connect with the food system in Vermont:

**Sodexo-UVM - Burlington**

[Student Promotion Coordinator](#), [Sustainability Intern](#)

**Vermont Technical College - Randolph**

[Assistant Food System Coordinator](#)

**Vermont Switchel Company - Remotely**

[Marketing and Communications Intern](#)

**Localvore Today - Burlington**

[Junior Web Developer Intern](#)

**Vermont Country Store - Manchester Center**

[Communications, Business, Tech, Marketing and Financial Analysis Interns](#)

For more information about this program, visit: [http://vbsr.org/intern\\_program/](http://vbsr.org/intern_program/)

Farmers and small business leaders generally indicated that they either didn't have the time to train an apprentice or couldn't afford to pay for one. They also cited the regulatory and safety hurdles to hosting an apprentice because doing so creates a liability. There are age restrictions on teaching certain skills based on various kinds of farm equipment. And finally, there are often legal hurdles because employers cannot hire interns as replacements for full-time employees.

With numerous businesses commenting that students need to get out of the classroom earlier and begin applying their academic skills in the field, expanding apprenticeship and internship programs could address these concerns.

### — Post-Secondary Institutions

Currently, two private colleges ([Green Mountain College](#) and [Sterling College](#)) offer degree programs in agriculture. The [University of Vermont](#) and [Vermont Technical College](#) are the two public colleges that provide extensive education and degree programs in agriculture and food-related study. Nearly every college in the state offers degrees in business, with a handful offering specializations in sustainability and entrepreneurship. Four offer MBA programs. Sixteen offer undergraduate degrees and two offer masters programs in environmental sciences. Five colleges offer degrees in hospitality and tourism (which includes culinary arts) at the bachelor's level. Three offer degree programs in environmental law. Green Mountain College just launched a master's program (online, low residency) in [Sustainable Agriculture and Food Production](#).

Both educators and employers emphasized that the complexity and quantity of knowledge needed in food businesses is accelerating and that it will be important to provide broader and deeper academic content or workplace training for these food businesses in areas such as **renewable energy, nutrient management, food safety and quality assurance**. Farmers and food manufacturers need an ever greater understanding of complex systems, regulations and technology. A background in animal sciences could also provide an advantage to livestock producers seeking opportunities to increase profits. Degrees in engineering are going to be more widely in demand because of the increasing complexity of equipment. Quality assurance and food safety will become more important than ever because producers will have to track their products through the supply chain.

Additionally, new software is being released every year for monitoring such things as CSA memberships, crop rotations, finances, cost accounting, lot tracking, inventory management, manufacturing equipment repair, scheduling, and marketing. These software packages are readily available and can improve the success of businesses but farmers and food entrepreneurs must seek them out and learn how to use them.

Some skills that are in demand have limited training available in state, such as quality assurance and veterinary. Interested workers have to earn advanced degrees which can be started in Vermont (e.g., at Vermont Technical College and UVM) but often need to be completed out of state.

### — Adult Education Programs

Ten CTEs and [UVM's Department of Continuing Education](#) offer adult education in subject areas relevant to food system businesses (e.g., business and science courses). While some have abundant and diverse offerings (such as those at the Southwest Technical Center), others offer individual courses that are related (e.g., knife skills at Green Mountain Technology and Career Center). Ed2GO also provides online courses in business, anatomy, and manufacturing.

**Certificate programs** provide industry recognized credentials at an affordable cost and in a shorter time frame than two- and four-year program. Certificate programs can be an excellent way for adults to upgrade their skills and increase their confidence and ultimately their income. There is an increasing need to create credentials that are unique to Vermont, such as one in specialty food manufacturing.

Some certificate programs take place over a full year (e.g., the *New England Culinary Institute's* certificates in Professional Cooking, Professional Baking and Professional Pastry). Others require only one course, such as ServSafe or the Occupational Health and Safety Administration's (OSHA) 10-hour worker safety course, but need to be retaken every few years because of ongoing changes in food safety best practices (e.g., new regulations). These courses range from basic food safety such as ServSafe to the American Welding Society-TIG or EPA Act 608 Safe Refrigerant Handling Certificate.

Vermont Technical College has just launched the *Institute of Applied Agriculture and Food Systems* which offers certificate programs for food processing technicians, biodigester technicians and meat cutters. The institute will train technicians to be

plant operators at food production sites or to service biodigesters at the applied level. Students will learn how to read measurements and extrapolate the meaning of the data. All programs are less than one year and lead to a certificate.

The employers that have partnered with the Institute are businesses with over 25 employees and it is expected that the graduates will most likely work for businesses of that size upon graduating. Career readiness is built into the curricula for the one-year certificates, and cooperative placements are required for all certifications. Additionally, embedded remediation is part of the institute's work and includes the paired model approach.<sup>8</sup> Students may also apply for academic credit based on prior life learning.

CTEs provide adult education in food systems careers, as does the University of Vermont through its Continuing Education program. For producers, UVM's Continuing Education program offers courses in anatomy and physiology, animal science, environmental science and plant and soil sciences. This option provides a relatively inexpensive way for producers to upgrade their knowledge in key science areas.

For students interested in food preparation, a handful of CTEs offer courses in food preparation and ServSafe. Six CTEs offer courses in manufacturing, and Ed2Go offers an online course in manufacturing. Barre Technical Center and Northwest Technical Center offer some courses in electrical repair, heating systems service and repair, industrial maintenance and plumbing. Five CTEs offer courses in small engine repair. Most but not all CTEs and the UVM Continuing Education program offer some courses in business-related content ranging from marketing to finances. Finally, the Vermont Institute of Artisan Cheese offers adult certificates and individual courses on cheese making and food safety.

### **Technical Assistance Programs and Continuing Education**

Vermont is home to a wide range of business planning and technical assistance support organizations that help to develop business plans, identify diversification strategies, and implement financial management systems, as well as provide topic, product, and process expertise (see Chapter 4, Section 4, Food System Business Planning and Technical Assistance for more information). At least 30 organizations provide technical assistance and some form of business planning for food system enterprises in Vermont, in addition to many trade and industry associations, advocacy groups, and private consultants.

### **Best Practices: Re-Training**

The **Institute of Applied Agriculture and Food Systems** at Vermont Technical College, with support from a major grant from the U.S. Department of Labor, targets adult *trade-affected* learners who have less than an associate's degree. The certification programs are innovative in that they are designed to align with available employment opportunities in the state and are focused on food and energy.

The application was developed in cooperation with seven successful food businesses, numerous state agencies and public utilities. Each certification program can be valuable as a standalone credential or can be a starting point on the pathway to an associates or bachelor's degree. Students who arrive below college readiness levels are enrolled in developmental coursework paired with occupational and academic courses.

Ninety-four percent of large employers and 67% of small businesses or farms surveyed sought some level of training or technical assistance from a Vermont based provider. Most survey respondents indicated that they had either an excellent or very good experience with their assistance providers.

Of those that didn't use a TA provider, the reasons included "they don't offer what I need" (60%) and "my business hasn't needed it so far" (60%). Services and assistance provided to farms, food businesses and farm-related businesses range from permitting to food safety, transition planning to renewable energy and water quality. Survey respondents identified nearly 30 types of services and assistance they had sought from providers. A few survey respondents indicated that they had specialized needs around migrant worker issues, with whom cultural and language barriers present challenges.

Most providers feel that they are offering the support their clients' need; however some can be expensive and have limited availability such as those that offer support for manufacturing challenges or business transitions. TA providers offer a range of food safety support through on farm advisory work, Good Agricultural Practices (GAP)

training, and online resources. They indicate that demand for basic business training in such areas as cash flow analysis and business planning continues to be strong.

The technical assistance providers interviewed indicated that they struggle to stay ahead of their clients in developing the technical expertise needed to keep pace with the rapid changes in technology and the industry as a whole. Many providers offer a mix of support including one to one support, peer learning opportunities, and technical workshops. Their experiences indicate that mentoring and long term support have proven to be the most effective in generating positive results for their clients, but these can also be the most costly because of the time commitment.

TA providers also said that their clients are most frequently in search of assistance with organic certification, GAP, herd management, animal nutrition management, construction engineering, shop floor experience, migrant worker support and food safety. Help in these areas is provided through a mix of TA providers (e.g., NOFA Vermont, RAFFL, Center for Sustainable Agriculture, and UVM Extension) and through both secondary and post secondary institutions. Food safety education is embedded to a greater degree in the colleges, UVM and technical assistance providers such as VIAC’s Hazard Analysis and Critical Control Points (HACCP) training, etc.

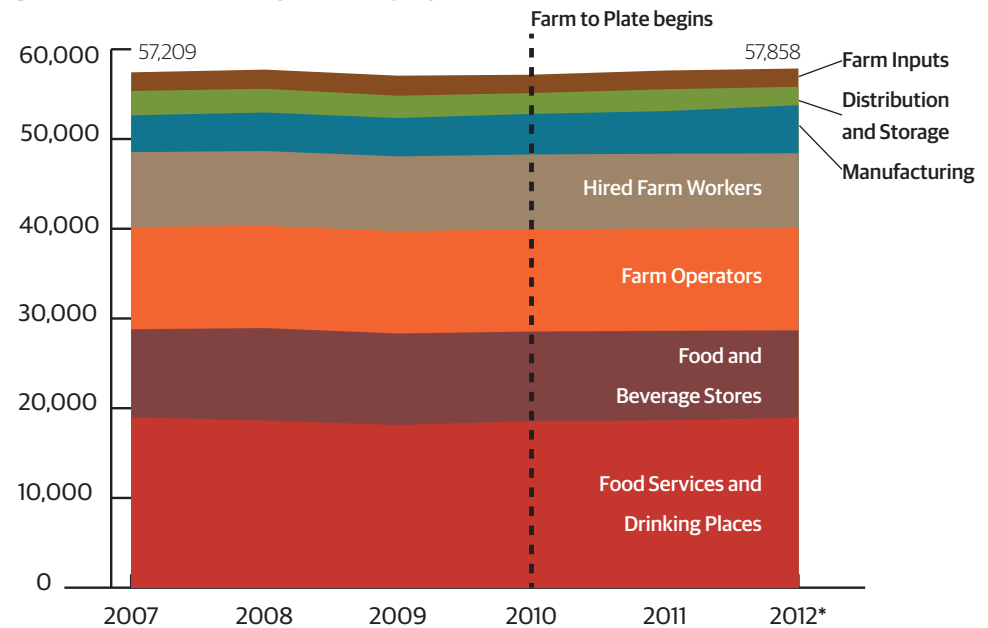
Survey results and interviews indicate that small business employers could use support in identifying the skills they need in employees, recruiting people with those skills, developing employee loyalty programs, and conducting wage and benefit analyses. This was less true of large employers that had access to human resources staff, recruiting firms, and in house training programs.

### 🍏 Career Opportunities in Vermont's Food System

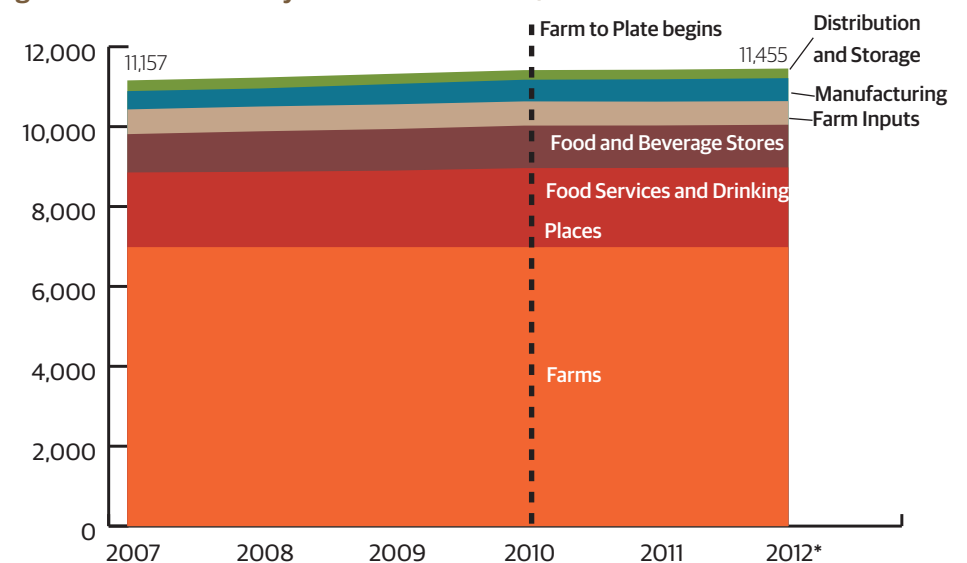
**Vermont’s food system is critical to our economy, identity, quality of life, and sustainability. Over 57,000 Vermonters are directly employed in Vermont’s food system, equal to over 16% of all private sector jobs (Figure 1). And over 13% (over 11,000 businesses) of all private businesses are part of Vermont’s food system (Figure 2).**

Figure 1 shows employment figures for major food system categories (e.g., farms, restaurants, value-added processors, and grocery stores). From 2007 (the last year of the Census of Agriculture) to the second quarter of 2012 (the latest available data from

**Figure 1: Vermont Food System Employment, 2007-2012**



**Figure 2: Vermont Food System Establishments, 2007-2012**



Sources: Vermont Department of Labor, Quarterly Census of Employment and Wages 2007-2012, 2007 Census of Agriculture, 2010 US Census Bureau Nonemployer Statistics.

\* Second quarter 2012 employment and establishments data.

the Vermont Department of Labor) total food system jobs increased 1%, from 57,209 to 57,858, while total private sector jobs decreased 2.4% from 364,903 to 355,990. During this time period, food system jobs increased from 15.7% of all private sector jobs to 16.25% of all private sector jobs.

Figure 2 shows establishment figures for major food system categories. From 2007 to the second quarter of 2012 total food system establishments increased 2.7%, from 11,157 to 11,455, while total private sector establishments decreased 1.9% from 86,242 to 84,592. During this time period, food system establishments increased from 12.9% of all private sector establishments to 13.5% of all private sector establishments.

These figures undercount the number of food system jobs and establishments since some job categories are not easy to parse out from official data sources (e.g., compost production) and some jobs provide critical services to the food system but cut across multiple economic sectors. These include Heating, Ventilation and Air Conditioning (HVAC) mechanics and installers, energy producers, veterinarians, waste management businesses, manufacturers, packaging and distribution companies. Additionally, the latest data from the 2012 Census of Agriculture on the number of farms and farm workers in Vermont has not been released yet.

**Available data shows major gains in food manufacturing employment (31% increase) and establishments (25% increase) in Vermont from 2007 to 2012. In fact, food manufacturing has been one of only two manufacturing sectors that have recently experienced employment growth.** According to the Vermont Department of Labor, food manufacturing employment is expected to grow at an annual rate of 2.4%.

### — Areas of Projected Growth

Nearly all of the specialty foods manufacturers and farm input businesses (e.g., feed, seeds) that participated in the research anticipate strong growth over the next one to three years, in either revenue or jobs, as the economy rebounds. A few businesses indicated that their revenue growth would come through increased production efficiencies. Not surprisingly there is a correlation between the skills that are hard to find and those that will be an important part of new business growth. Students and existing workers who have desired skills will likely find increased opportunities for employment.

Some employers have elevated the importance of work experience ahead of education. This is true for most entry level jobs and many mid to senior level jobs, depending on the size of the employer. Large businesses invest in recruitment and training and are often better able to choose among a pool of qualified candidates and to require college—or graduate—level education for certain positions.

Small businesses often “take what they can get” or hire based on experience and work ethic. For employees with only low-level skills, small businesses usually require a GED and basic reading, writing and math skills. For those with mid-level skills, they look for a high school diploma or some college credit but the most important thing is relevant work experience and attitude.

At higher skill levels, employers prefer some college (although it’s not impossible to find a high-level job that does not require a college degree) but there is often a requirement for more specific technical skills and/or extensive work experience.

Most large employers require post secondary education and specialized expertise, although entry-level hires may only require ‘minimum qualifications.’ Most positions in administration (e.g., marketing, human resources, strategic planning) require an undergraduate degree at a minimum. Manufacturing, floor, and production line work do not necessarily require a degree, but one might be needed in order to be promoted.

Jobs within technical assistance programs (i.e., those that offer aid to food system businesses) require a college-level degree as well as practical experience and client management skills such as the ability to be tough when regulations are violated, along with strong collaborative skills to create a constructive rapport with clients.

**Tables 3 and 4 and Figures 3 and 4 begin to paint a picture of opportunities for articulating career pathways, understanding employers’ needs, and for seeing gaps in educational offerings.** Table 3 shows how basic skills correspond to food system careers. Using data from the Vermont Department of Labor, it then shows whether these careers are: 1) expected to have above median wages; 2) expected to have a high number of annual job openings; and 3) expected to have a high annual growth rate. Table 4 attempts to match basic skills with educational offerings throughout Vermont, while Figures 3 and 4 demonstrate possible educational pathways for culinary careers and HVAC careers.

**Table 3: Food System Skills and Career Opportunities**


Skills	Corresponding Career Opportunities	Mid Range of Wages May 2011 Statewide	Projected Number of Openings Annually	Number of Positions	Projected Annual Growth Rate
<b>Basic Culinary</b>	Food Preparation Workers	\$18,670-\$23,870	68	1,743	0.3%
<b>Animal Care</b>	Farm Workers, Farm and Ranch Animals	\$20,230-\$23,210	N/A	63	N/A
	Non Farm Animal Caretakers	\$19,890-\$26,420	24	527	2.1%
<b>Meat Cutting</b>	Meat, Poultry and Fish Cutters and Trimmers	\$18,950-\$25,860	7	171	1.2%
	Butchers and Meat Cutters	\$25,130-\$38,780	9	250	0.8%
	Slaughterers and Meat Packers	\$18,920-\$32,490	N/A	N/A	N/A
<b>Mechanical Expertise</b>	Machinists	\$30,060-\$46,760	19	684	0.8%
	Manufacturing Production Technicians	\$42,490-\$61,670	N/A	N/A	N/A
	Mechanical Engineering Technicians	\$37,740-\$55,130	1	70	-0.3%
	Precision Agriculture Technicians	\$30,160-\$65,980	6	132	0.4%
<b>Equipment Knowledge</b>	Agriculture Equipment Operators	N/A	N/A	N/A	N/A
	Farm Equipment Mechanics	\$28,140-\$37,320	5	109	1.9%
	Farm workers and laborers	\$20,110-\$26,380	N/A	N/A	N/A
	Farmers and Ranchers	N/A	N/A	N/A	N/A
	Food Cooking Machine Operators and Tenders	\$24,400-\$30,720	N/A	N/A	N/A
<b>Food Safety</b>	Food Scientists and Technologists	\$41,620-\$75,970	2	62	0.6%
	Agricultural Inspectors	\$43,120-\$54,090	N/A	N/A	N/A
<b>Cheese Making</b>	Separating, Filtering, Clarifying, Precipitating and Still Machine Operators, Setters and Tenders	\$30,590-\$39,640	12	391	1.3%
	Food Batchmakers	\$23,750-\$32,880	14	322	1.4%
<b>Quality Assurance</b>	Quality Control Analyst	\$30,160-\$65,980	6	132	0.4%
	Quality Control Systems Managers	\$64,740-\$110,950	15	416	1.1%


Indicates wages higher than Vermont median income
  Indicates relatively high number of annual job openings
  Indicates high growth rate



**Table 3: Food System Skills and Career Opportunities**

Skills	Corresponding Career Opportunities	Mid Range of Wages May 2011 Statewide	Projected Number of Openings Annually	Number of Positions	Projected Annual Growth Rate
<b>Management</b>	First Line Supervisors, Agricultural Crop and Horticultural Workers	\$38,200-\$52,950	5	159	0.1%
	First Line Supervisors, Production and Operating Workers*	\$41,640-\$67,190	29	1673	0.4%
	Farm, Ranch and other agricultural managers	N/a	100	N/a	-0.7%
	Managers, All Others	\$71,170-\$112,500	32	1173	0.5%
<b>Marketing</b>	Purchasing Agents and Buyers, Farm Products	\$28,560-\$71,920	1	70	-0.1%
	Marketing Managers	\$84,880-\$160,970	18	437	1.0%
<b>Manufacturing</b>	Agricultural Engineers	N/a	N/a	N/a	N/a
	Bakers	\$20,900-\$30,510	24	796	0.2%
	First Line Supervisors, Production and Operating Workers*	\$41,640-\$67,190	29	1673	0.4%
	Food Batchmakers	\$23,750-\$32,880	14	322	1.4%
	Manufacturing Engineers	\$63,320-\$87,500	4	172	-0.2%
	Manufacturing Production Technicians	\$42,490-\$61,670	N/a	N/a	N/a
	Packing and Filling Machine Operators and Tenders	\$25,040-\$31,920	20	894	0.6%
	Team Assemblers (Food Manufacturing)	\$25,090-\$35,020	43	79	0.6%
<b>HVAC/Refrigeration</b>	Cooling and Freezing Equipment Operators and Tenders	\$21,250-\$25,000	N/a	N/a	N/a
	Refrigeration Mechanics and Installers	\$33,100-\$46,890	28	875	1.3%
<b>Veterinarians</b>	Veterinarians	\$63,260-\$93,800	11	248	2.2%
	Veterinary Technologists and Technicians	\$24,400-\$30,720	23	423	3.2%

 Indicates wages higher than Vermont median income

 Indicates relatively high number of annual job openings

 Indicates high growth rate

**Table 3: Food System Skills and Career Opportunities**

Skills	Corresponding Career Opportunities	Mid Range of Wages May 2011 Statewide	Projected Number of Openings Annually	Number of Positions	Projected Annual Growth Rate
<b>Herdsmen</b>	First Line Supervisors/Managers of Animal Husbandry and Animal Care Workers	\$38,200-\$52,950	5	159	0.1%
	Farm, Ranch and other agricultural managers	N/a	100	N/a	-0.7%
	Farm Workers, Farm and Ranch Animals	\$20,230-\$23,210	N/a	63	N/a
<b>Miscellaneous</b>	Welding, Soldering, and Brazing Machines Setters, Operators and Tenders	\$25,730-\$30,380	8	143	2.6%
	Welders, Cutters, Solderers and Brazers	\$27,600-\$41,030	14	375	1.0%

Indicates wages higher than Vermont median income
  Indicates relatively high number of annual job openings
  Indicates high growth rate

**Table 4: Hard to Find Skills Gap and Wage Analysis**

	Entry Level	Mid-Level	Senior Level	Range of Wages	High Schools	CTEs	Colleges/ Universities	Post-Graduate	Adult / Technical Assistance	Apprenticeships
<b>Basic Culinary</b>	✓			\$21,940 food prep workers–\$42,700 Chefs/Head Cooks		13 of the 17 CTEs	NECI		5 CTE Adult Ed	✓
<b>Animal Care</b>	✓			\$21,960 farm workers–\$81,140 Farm and ranch animals Vets		8 of the 17 CTEs offer Ag	VTC, Sterling, GMC, UVM			✓
<b>Computer Skills</b>	✓	✓		\$35,020 Computer operator–\$94,610 Computer Hardware Engineers	Most high schools	Most CTEs	Most colleges		Most CTEs	
<b>Basic Work Readiness</b>	✓	✓	✓			Employability Rubrics	CCV		Employability Rubrics	
<b>Meat Cutting</b>		✓		\$23,200 Meat, Poultry, Fish Cutters/Trimmers–\$32,080 Butchers/Meat Cutters		Hannaford	VTC, NECI		Hannaford	
<b>Mechanical Expertise</b>		✓	✓	\$38,640 Machinists–\$82,140 First line supervisors of production/ operating workers	6 of 14 counties	5 of the 17 CTEs	UVM, VTC			
<b>Equipment Knowledge</b>		✓		\$33,860 Farm Equipment mechanics–\$58,970 1st line supervisors/managers of mechanics, installers and repairers	7 of 14 counties	5 of the 17 CTEs	VTC			
<b>Food Safety</b>		✓	✓	\$39,870 food science technicians–\$62,750 food scientists		13 of the 17 CTEs	UVM, VTC, GMC, Sterling			
<b>Quality Assurance</b>			✓	\$47,640 quality control analyst–\$91,930 quality control systems managers			UVM, VTC	UVM		
<b>HVAC &amp; Refrigeration</b>	✓	✓		\$40,320 Heating/AC/Refrigeration mechanics/installers–\$58,970 1st line supervisors mechanics, installers, repairers		Green Mountain Tech and Career Center	Vermont Technical College		Green Mountain Tech and Career Center	

Figure 3: Culinary Arts Career Pathway

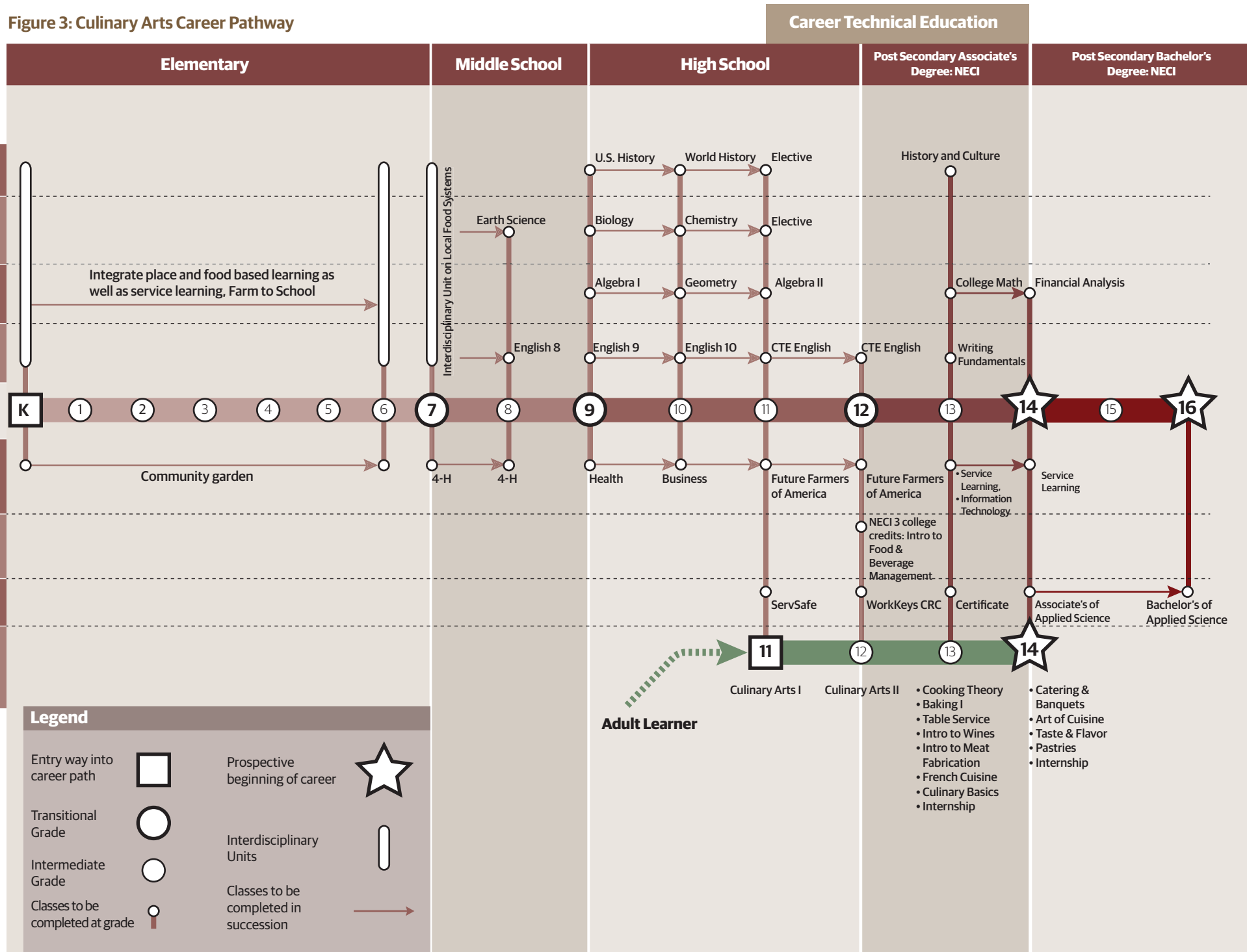
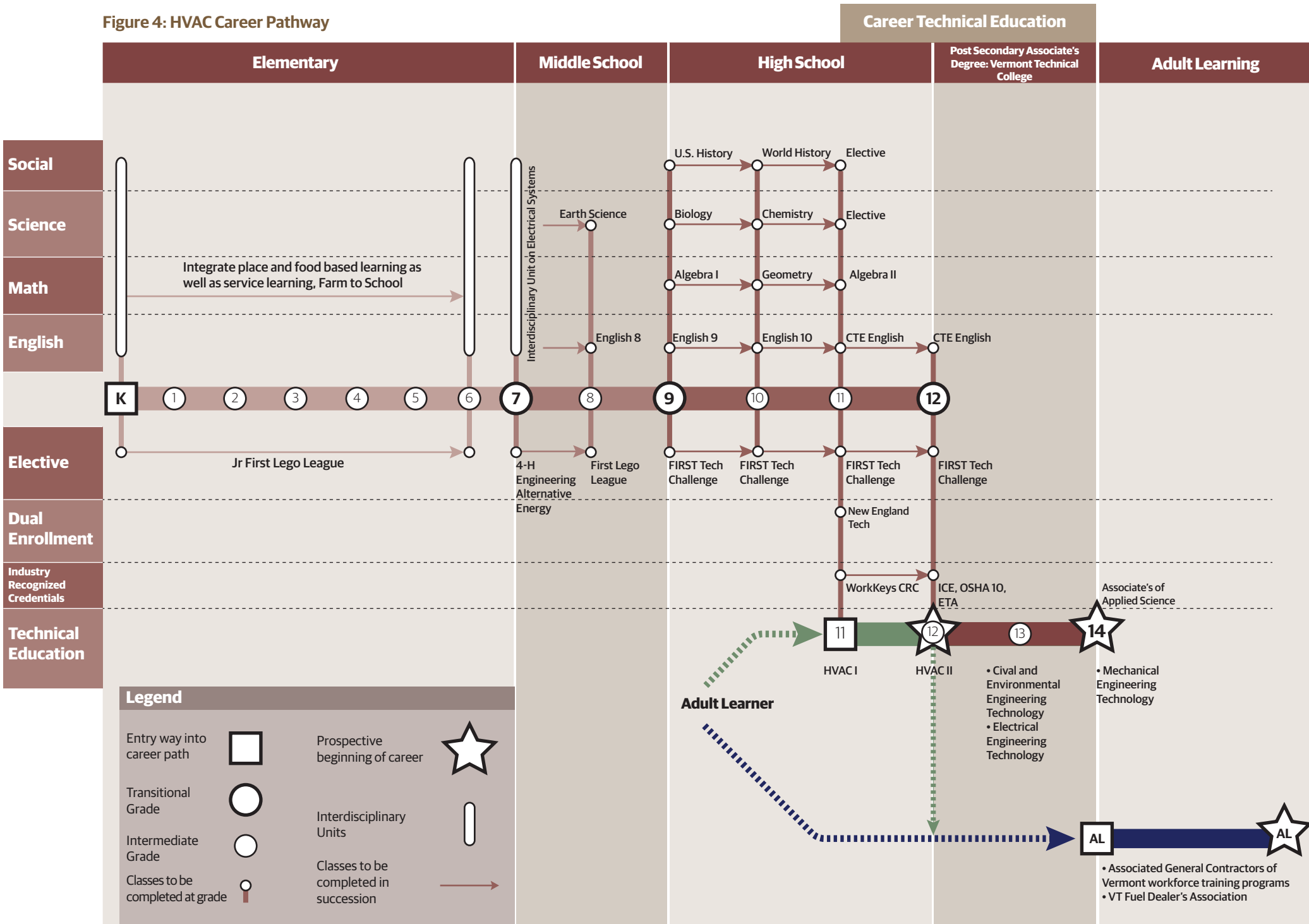


Figure 4: HVAC Career Pathway



Finally, in addition to this data from the Vermont Department of Labor, employers interviewed for this project expect to see revenue growth in the following areas:

### Specialty foods, meat and eggs

- 🍏 Specialty foods across the board, including special cuts of meat and processed meats (e.g., sausage)
- 🍏 New development of specialty food products
- 🍏 Eggs, especially free range eggs
- 🍏 Free-range and organic poultry
- 🍏 Grass-fed beef at the retail level
- 🍏 Organic poultry feed
- 🍏 Artisan cheeses
- 🍏 Private label maple products

### Production efficiencies

- 🍏 Increased operational efficiencies (This could increase revenue or profit growth, although may not lead to new hires.)
- 🍏 Reduced seasonality through investment in production enhancements (e.g., greenhouses, winter CSAs) (This may result in more year-round jobs.)
- 🍏 Increased use of maintenance mechanics and specialty foods manufacturing operations expertise, such as manufacturing equipment service and installation
- 🍏 Improved line production staffing
- 🍏 Increased number of acres under production
- 🍏 Use of quality assurance and traceability expertise

### Miscellaneous

- 🍏 Faster regulatory approval for small scale equipment
- 🍏 More veterinarians working with minor species, especially poultry
- 🍏 Use of coordinators of special events, such as weddings and corporate meetings
- 🍏 Higher-level professionals in dining service locations (e.g., schools and hospitals)



Students participating in Lyndon State College's iWOW program visit Eden Ice Cider. Credit: Ashley Christie.

## 🍷 Getting to 2020

### 1. Develop clear educational pathways to careers in the food system, beginning in grades 7 and extending to post-secondary courses and degree offerings.

Educators, administrators and guidance counselors identified defining career pathways as an important first step toward better understanding of food system careers. There was universal agreement that the information currently available is confusing and in some cases out of date. **Following are additional recommendations:**

- Begin career education in food systems in middle school through standard curricula and applied learning.
- Coordinate curricula between sending high schools and CTE programs of study in food systems so the high school course(s) can serve as conduits for students to pursue.
- Expand the opportunity for high school students to study animal sciences.
- Develop pre-technical education courses for seventh - through ninth-graders in food system-related curricula.
- Address scheduling conflicts between CTEs and high schools to facilitate students accessing programs in both schools.
- Encourage pre-requisite courses for participation in a CTE program of study to increase academic rigor.
- Embed career information in all high school and CTE courses that touch on core employer needs. Answer questions such as what is quality assurance? How important is expertise in pest management? What does a machinist do every day?
- Allow students at any in-state institution to take food system-related courses (with approval) at any other institution in Vermont, leading to a degree or certificate(s).
- Investigate the feasibility of expanding the dual enrollment system to increase academic rigor and help students arrive at college a few credits ahead of schedule.
- Incorporate other elements of flexibility, such as offering accelerated learning options, giving academic credit for work experience, developing assessments for testing out of courses (e.g., prior learning assessments) and removing age constraints on education.

### 2. Maximize the strengths of each stakeholder group within the education system to create a supportive environment for adapting to the rapidly changing needs of food system employers.

Both interview and survey findings reinforced that while there are outstanding private and public sector players in this industry, the entire system needs to be more responsive, flexible, and collaborative.

- Establish an initiative with select Vermont business associations to develop their role in supporting work readiness, creating work place opportunities in food systems, and exchanging information with educators about rapid changes in their industry (e.g., Vermont Cheese Council, Vermont Specialty Foods Association).
- Empower the Agency of Education to coordinate meetings and develop annual plans for convening education stakeholders. Coordinate regularly scheduled meetings between employers and educators and provide continuous organized contact among educators at secondary schools and post-secondary institutions.
- Strengthen the role and value of *advisory councils* for CTE programs of study and include representatives from relevant high school faculties and administrators.
- Develop biannual presentations to high schools and CTEs by the Vermont Department of Labor to students, faculty, counselors, and curriculum developers to ensure the dissemination of timely information about careers that are in demand and offer high wages in Vermont.
- Promote the *Vermont Department of Labor's Career Resource Centers* to high school students, guidance counselors and adult education students and providers.

### 3. Provide regular opportunities for educators and administrators to collaborate on and share best practices and model curricula that connect with food system career pathways.

- Roll out the Vermont educator exchange platform (developed in 2010) so that when new money is given for program development it is shared across the state.
- Create incentives for educators to attend regular information-sharing sessions with key stakeholders (e.g., among food-related entrepreneurs, secondary level food systems teachers and college ag professors or between employers and CTE instructors).
- Create opportunities for CTE instructors to network with each other, such as strengthening their ability to connect via the Ev2 platform.
- Share curricula among CTEs offering courses in agriculture, business, and mechanical sciences and embed food system learning into core middle and high school curricula (e.g., incorporating information about organic food systems into academic science courses).
- Continue to develop modules to address new and emerging areas of interest while also meeting standards. These areas of interest include renewable energy, nutrient management, food safety, and quality assurance.
- Invest in professional development and state-of-the-art systems for educators and trainers so the technology is relevant and its use expected.
- Enlist the support of the *Vermont School Boards Association*, the *Vermont Principals Association*, and the *Vermont Superintendents Association* in promoting the value of regular convenings between middle and secondary school educators and administrators and local employers.

#### **Promising New Tool: Vermont Food System Atlas**

The Vermont Sustainable Jobs Fund will soon launch the **Vermont Food System Atlas**, a website for members of the Farm to Plate Network to enhance coordination and collaboration. The Atlas is intended to increase linkages between and among producers, policy makers, educators, employers, businesses, technical assistance providers and many others. It will serve as a platform for real time communications, networking, information sharing and other valuable but often decentralized resources.

### 4. Improve and strengthen the knowledge base and role of guidance and career counselors to help students identify and pursue careers in the food system - including production agriculture, food manufacturing, wholesale and retail distribution, nutrient management, and business technical assistance.

Interviews with administrators and teachers confirmed that high school guidance counselors are often too overwhelmed with emergencies and students' social and emotional issues to provide comprehensive career counseling. Generally, CTEs address career learning to a greater degree but it should be started in elementary and middle schools.

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***“We need guidance counselors to understand and better explain the industry and the potential for a lifetime career in it.”***

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-Food services manager

- Organize an event that brings the *Vermont State Guidance Counselors Association* and the *Technical Educators Guidance Association* together for the sharing of best practices, professional support, and new data using food system-related courses as a model.
- Develop a community outreach program targeting counselors, parents, students, school board members and other stakeholders that will include details about job and income opportunities across a variety of food system careers such as small business, manufacturing, and farming.



- Use data from alumni tracking programs to reinforce the opportunities available in food systems careers.
- Recruit innovative farmers and food related business leaders as spokespeople and use social media to deliver communications.
- Promote the value of work based learning by training guidance counselors, instructors and students.

## 5. Develop a suite of certificate programs to offer alongside traditional two and four year degree programs.

Students, administrators, and employers are looking for immediate opportunities for staff and students to acquire specialized knowledge at an affordable cost and in a short time frame. Small businesses struggle to provide on-the-job training and larger businesses sometimes require very specialized skills. Employees who have the opportunity to achieve various certificates over time develop a habit of lifetime learning.

- Explore the concept of stackable certificates for some food related careers.
  - » A certificate in food manufacturing machining is an example of a layered program that could provide an element of specialization without requiring significant amounts of training and preparation.
- Expand certificate options for adults by delivering them through CTEs and other adult education providers.
- Involve the business community in the development of the certificate content to reinforce the value of the certificate in the hiring process.

### ***Best Practices: Certificate Programs***

**Central Carolina Community College** has developed a certificate in agricultural sustainability. The certificate was designed for students either working in a food systems business or interested in farmer advocacy work, agriculture education, or nonprofit organizations with agricultural missions in developing countries. It is two semesters long and incorporates both classroom work and applied field work. Students who decide to continue, can apply their credit towards a two-and-a-half year associate of applied science degree in sustainable agriculture.

## 6. Develop ongoing opportunities for food system employers and educators to build and maintain lasting relationships so that the education and training being offered meets the evolving needs of employers.

Establishing lasting relationships creates a mutual benefit that is valuable in the short to medium term. There are examples of productive collaborations but they are not common and are not taking place in all areas of the state.

### ***Best Practices: Business-College Collaborations***

**The Northeast Kingdom Manufacturing Training Program** is an example of an effective **collaboration between education and business in the manufacturing sector**. It is a partnership among Lyndon State College, NSA Industries, Weidmann Electrical Technology, Vermont Aerospace, Northeast Precision, Northern Community Investment Corporation, Northeastern Vermont Development Association, the Lyndon Institute and St. Johnsbury Academy. The eight-week course, was piloted in the summer of 2012, and there are plans to train 48 individuals in the first year and then expand enrollment in 2013 and beyond. The program will need ongoing support from employers, as well as private and public funding. Placement and tracking of program graduates will need to be monitored and shared.

## 7. Strengthen work readiness skills development and evaluate aptitude in high schools, CTEs, and adult education programs.

The most consistent feedback we received from employers, regardless of their size, was the need for a greater level of work readiness on the part of entry level employees. In some cases, this pertained to higher level positions as well. Larger employers had fewer challenges because unqualified applicants were often eliminated from the hiring process by their human resource departments.

- Expand the use of effective work readiness tools across the secondary and post secondary continuum such as WorkKeys, Accuplacer, and CCV's Career Readiness Certificate.
- Working with the Vermont Department of Labor's State Apprenticeship Council and Project Worksafe coordinators, expand state-approved apprenticeship programs to include a broad range of additional opportunities in food businesses and establish requirements for both hosts and apprentices. Train employers to provide a high-quality and safe work experience.
- While workforce skills are referred to in the Common Core standards, creating a teacher toolkit that addresses these skills and helps teachers advocate for them throughout their schools and districts could accelerate the inclusion of workforce skills in curricula.

### **Best Practices: Chart Progress**

**The University System of Ohio** has developed a **stackable certificate program** for adult students. For instance, the Basic Skills Certificate acknowledges that students have demonstrated a mastery of reading, writing and math competencies through the ninth-grade level. The Advanced Skills Certificate acknowledges that the student has demonstrated a mastery of reading, writing and math through the 12th-grade level. Instructors are required to conduct two assessments before granting the certificates. Scores are entered in a statewide database that can be accessed by educational organizations and potential employers.

### **Best Practices: Career Readiness**

**The Vermont Technology Council** has launched a successful summer internship program that places 80 college students from inside and outside the state in good-paying summer jobs with technology companies in the state. Not only does this provide valuable experience to the students, but it also brings some out-of-state students into the state to live for several months and develop relationships with Vermont employers—potentially leading to their return after graduation.

**The Community College of Vermont (CCV)** has developed a career readiness certificate that students can attain free of charge and that is available at all 12 CCV locations. This certificate is based on the ACT WorkKeys® program which is a nationally recognized program that has established benchmarks for workers at many levels. Equally important is for employers to value the workers who have earned the certificate—something that CCV has worked hard to promote and for which it has achieved significant success. For more details go to: [www.ccv.edu/careerreadyvt](http://www.ccv.edu/careerreadyvt).

## 8. Aggressively promote small business support systems to food-related businesses.

- Develop guilds for workers in specialized careers such as veterinarians, machinists, butchers, quality assurance specialists, and pest management specialists to provide support statewide. When available, develop and support the guilds through state professional associations.
- Coordinate small business employment opportunities through a central system that is widely promoted from high school guidance offices, college career offices, and technical assistance programs.
- Invest state funding in Vermont business associations to help them provide services to their members such as centralized job listings, participation in certificate development and school advisory councils.
- Support small businesses with human resources training in areas such as recruiting employees, building employee loyalty, and retaining employees.

- Encourage continuous learning by taking actions such as hosting a quarterly speaker series for food system businesses or creating a food business expo in which small businesses can access information about technical assistance programs, hiring opportunities, professional development and new technologies in their sectors.

### **Best Practices: Incubator Without Walls**

[\*Incubator without Walls\*](#) (iWOW) at Lyndon State College is a partnership between the college's Center for Rural Entrepreneurship (CRE) and the Patrick and Marcelle Leahy Center for Rural Students. The Center for Rural Entrepreneurship partners with the Vermont Small Business Development Center, the Northern Vermont Development Association, the Northern Community Investment Corporation, and local area technical education centers. Students add value to local businesses (some through the Vermont Food Venture Center) by conducting feasibility studies and SWOT analyses, creating graphics, working on branding, and creating labeling strategies. Since the program began, it has created 97 local jobs by helping local businesses expand. The program is a model that aligns the needs of local businesses with education. While iWOW provides the mechanism to engage student resources to help grow businesses and create jobs, the CRE network expands the capacity of iWOW by reinforcing the importance of the education and workforce connection.

## **9. Identify and support food system entrepreneurs.**

- Educate small businesses about the value of certain certificates. Include small businesses in the development of any new ones.
- Generate matchmaking opportunities between entrepreneurs and investors and between inventors and businesses requiring equipment development.
- Support the scaling up of businesses when appropriate because it increases efficiencies and creates more opportunities for employee development and retention.

### **Best Practices: Encouraging Entrepreneurship**

**The Chalmers School of Entrepreneurship** (CSE) at the Chalmers University of Technology in Sweden is a good example of combining entrepreneurship within an academic structure. This two-year master's program incorporates the development of new technology companies by "matching student teams (of two or three students) with a scientist or innovator to take an innovative idea forward into a new or existing business thereby blending entrepreneurial education with real-world incubation. Interestingly, students and the scientist/innovator all take ownership shares in any newly formed business.

## **10. Build strong secondary and post-secondary engineering and manufacturing design programs.**

Most small producers need small-scale, custom equipment such as micro-dairy pasteurizers or small-batch equipment. Educators and businesses that require these types of equipment or services should investigate the development of programs that could encourage young people to either develop their own food manufacturing equipment business and/or be trained to install, maintain, and repair this type of equipment.

- Develop a specialized training or technical education center that could offer a specialty in food manufacturing technology and design.
- Recruit and graduate secondary and adult students proficient in basic machine maintenance and food manufacturing.

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***“Vermont systems are so unusual from a scale standpoint that not a lot of what is accepted and understandable elsewhere can be directly applied here.”***

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-Technical assistance provider

## 🍏 Summary

Some employment challenges are *systemic*—that is, they cut across multiple economic sectors—not just food systems. These include lack of access to high-speed internet service; a large number of small businesses with limited hiring capacity, difficulty reaching sufficient profit margins, and accessing growth stage capital; and insufficient levels of state funding for higher and adult education.

Other challenges are more *cultural* and stem from a lack of experience in collaboration among business owners, teachers and academic administrators, and state agency officials. **Our research identified the need for regular, coordinated meetings between business owners and educators and between secondary and post-secondary school administrators; a greater sharing of resources (e.g., model curriculum) between high schools and between high schools and CTEs; and a “rebranding” of food system career opportunities** to address the misperception that all jobs in the food system are low paying, have few academic requirements, and involve hard physical labor.

Still other gaps can be addressed through improvements in new program content, accelerated learning options, and the development and dissemination of real career pathway information. A more work-centered orientation can be created by giving academic credit for work experience, developing assessments for testing out of courses (e.g., prior learning assessments), and removing age constraints on education.

Addressing the needs of Vermont’s food system employers, student and adult workers should not require enormous investments of new funding or capital. However, it will require actions that, arguably, are more challenging to achieve: **developing flexibility and responsiveness among key stakeholders; applying rigor and discipline to the execution of recommendations, including academics; changing the language and perceptions of food system careers and training providers through outreach and education; supporting the replication and expansion (i.e., scaling) of successful programs and businesses; sharing successes and challenges in order to learn; and leveraging existing strengths in the system.**

## End Notes

- 1 While we developed a database of 650 records, we could only confirm accurate email addresses for 478 of these records.
- 2 New England Common Assessment Program 2012 results as posted on the Vermont Agency of Education website, [http://education.vermont.gov/new/html/pgm\\_assessment.html](http://education.vermont.gov/new/html/pgm_assessment.html).
- 3 ACT WorkKeys® is a job skills assessment system that helps employers select, hire, train, develop, and retain a high performance workforce. This series of tests measures foundational and soft skills and offers specialized assessments to target institutional needs. Successful completion of ACT WorkKeys assessments in applied mathematics, locating information, and reading for information can lead to earning ACT's National Career Readiness Certificate, a portable credential earned by more than 1 million people across the United States.
- 4 The ServSafe Food Handler Program provides food safety training to employees and students. The program is considered a nationally recognized entry level credential and covers five key areas: (1) Basic Food Safety; (2) Personal Hygiene; (3) Cross-contamination & Allergens; (4) Time & Temperature; (5) Cleaning & Sanitation.
- 5 SkillsUSA programs include local, state and national competitions in which students demonstrate occupational and leadership skills. At the annual national-level SkillsUSA Championships, over 5,600 students compete in 94 occupational and leadership skill areas. SkillsUSA programs also help to establish industry standards for job skill training in the lab and classroom, and promote community service. SkillsUSA is recognized by the U.S. Department of Education and is cited as a "successful model of an employer-driven youth development training program" by the U.S. Department of Labor.
- 6 The state electricians' apprentice program is designed only for residential needs, which are different from industrial needs.
- 7 U.S. Department of Labor Apprentices, Employment and Training Administration, 2012.
- 8 "The paired model approach integrates remediation work into college level courses and allows for the work of two semesters to be completed in one," as defined in the federal application for the Vermont Applied Agriculture and Food Systems Institute at Vermont Technical College.

FARM TO PLATE NETWORK

# Food System Workforce Needs Assessment

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## Credits

**Food System Workforce Needs Assessment** was prepared by Holly Tippet and Wendy Meunier.

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[www.vsjf.org/project-details/5/farm-to-plate-initiative](http://www.vsjf.org/project-details/5/farm-to-plate-initiative)

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**On the Cover:** Students at Hannaford Career Center: Lynn Coale; Cheesemaker: Vermont Butter & Cheese Creamery; Food prepared by NECI student: Kevin O'Donnell; Machining work in the classroom at Vermont Technical College: Andy Duback; Lyndon State College students harvest produce at an organic farm in preparation for a farmers' market: Lyndon State College; Vermont Technical College Groundworks Summit: Andy Duback; 4-H dairy calf winners, circa 1950s: University of Vermont Special Collections; Sarah Flint, Class of 2010, Vermont Technical College: Andy Duback; Chick to Plate students: Lynn Coale.