VERMONT TECH

AGRICULTURE & FOOD SYSTEM TRANSFORMATION PROJECT

Steering Committee
Final Report
to President Patricia Moulton
June 1, 2021

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June 1, 2021

President Pat Moulton
Vermont Technical College
124 Admin Drive
Randolph Center, VT 05061

Dear President Moulton,

We are submitting the attached final report and supporting documents for the Vermont Tech Agriculture Transformation Project on behalf of the Steering Committee and the members of the five project teams.

This report is a reflection of the body of work carried out by a group of more than 40 stakeholders over the past year, looking at the strengths, challenges and opportunities for agricultural and food system education programming at Vermont Tech, so that it can continue to thrive during these uncertain times in higher education. We have included a series of recommendations in the executive summary, accompanied by documentation that reflects the process and in-depth evaluation and analysis that brought us to these conclusions.

We know the important role that Vermont Tech plays in offering practical, applied education to those across the Vermont food system and beyond. We look forward to having continued opportunities to offer support and feedback as needed and welcome questions and comments from you and your team.

Sincerely,

Louise Calderwood, Project Co-Chair

Regina Beidler, Project Co-Chair

ACKNOWLEDGEMENTS & APPRECIATIONS

This report is the culmination of hundreds of hours of work and the expertise, wisdom and passion of an extraordinary group of dedicated stakeholders from across Vermont's food, farm and educational systems. When planning began for this project, we were unsure how many people would be willing to dig into this conversation about transforming the food and agriculture program at Vermont Tech. We were heartened and encouraged by all those who not only said yes but were willing to attend and participate in multiple visioning and work sessions and who offered everything they had in assisting this process through. So, we offer many thanks...

To those who were willing to share their experiences from Vermont Tech, past and present. This included former and current faculty and staff, alumni and area farmers. Your insights into the strengths and challenges for the past and current programs gave us a strong foundation to build from.

To those who participated in the large group visioning sessions and report outs. Your presence and insights reinforced the importance of this program to Vermont, its citizens, and the food system by showing up and by sharing what this program is and what it could be.

To members of listening sessions that spanned the food system including dairy graziers, goat industry representatives, beef producers, former 2 + 2 students, alumni and value-added producers. Your thoughts added depth to our recommendations and reassurance that the final product would have meaningful resonance to the Vermont food system and workforce needs.

To the members of all the work teams (see appendix – page 22) who brought diverse perspectives, gave generously of their time, listened carefully, showed exemplary collaboration and together created detailed recommendations that are the foundation of this final report.

To the Steering Committee made up of 14 dedicated individuals who not only gave time for monthly meetings but also, in many cases, led the work teams and spent many hours planning and implementing what needed to be completed at each stage of the project. This group of heavy hitters gave generously and collaborated without ego, creating an environment of solid thinking based on experience and the bigger picture confronting higher education.

To President Moulton and the faculty and staff at Vermont Tech who graciously allowed all of us entry into this conversation and were invaluable to the work team and larger picture conversations in keeping the project based in the realities of the current campus environment and the needs for the future. All of this offered during a pandemic, in the midst of a Vermont State College merger and with their existing workloads in place. We appreciate your willingness to be part of this conversation, your forbearance, and your willingness to carry this work forward.

Vermont is a special place and one that has often taken the lead in addressing difficult situations through collaborative group thinking and positive action to the betterment of the whole. We are proud that this has once again been the case as we all work together to ensure a strong and meaningful future for Vermont food and farming for generations to come.

EXECUTIVE SUMMARY

VERMONT TECHNICAL COLLEGE is renowned for its practical, applied education, not only in agriculture but in all areas of study. Students who attend Vermont Tech have the opportunity to learn associated skills in engineering, diesel mechanics, business and many other specialties to strengthen the depth and breadth of their skills as they prepare to enter the workplace or farm or start a food-related business.

Vermont is fortunate to have several educational options for students interested in pursuing careers in agriculture and food systems. The Vermont Tech campus stands apart by offering both two and four year degrees, with the opportunity to prepare for many careers in all facets of production agriculture and food-related enterprises. The campus farm offers opportunities to develop hands-on skills working with large animals, maple production and a variety of farm equipment at commercial scale. Vermont Tech encourages students to customize their college experience through internships in their chosen area of focus. Vermont Tech is the only Vermont college with courses in diesel mechanics and welding (skills often useful when heading towards a career in production agriculture). Additionally, Vermont Tech offers courses in business, marketing and accounting which are essential for all types of farms and food-related enterprises.

Vermont's production agriculture and value added food businesses must have the skills and market savvy to successfully adapt to an ever evolving marketplace, whether locally, regionally, or nationally. The farm and food sector employs over 64,000 Vermonters (2019) and supports over 11,500 private sector farm and food enterprises (2019). Combined, these enterprises generate over $11.3 billion in economic output annually (2017). Local food consumption has steadily increased over the past 10 years and now represents over $310 million in annual sales (2017), helping to recirculate dollars in our rural communities. Vermont's dynamic farm and food enterprises are also vitally important to the state's $3 billion tourism industry.

Vermont Technical College plays a vital role in educating and training the next generation of farm and food workers and entrepreneurs. For over 120 years, Vermont Tech has been educating the next generation of farmers and food entrepreneurs, including decades of high quality dairy management education. However, with a significant decline in the number of dairy farms over the past 15 years, there has been a steady decline in the number of students seeking a degree in dairy farm management. At the same time, there has been growing interest by young people wanting to get into the business of diversified, livestock or regenerative farming (and often not coming from a farming background), brewing, cheese making, or other value added products. To be successful, Vermont Technical College must be responsive to the needs of an ever evolving food system and the interests of prospective students. And Vermont farm and food employers need a technical college with the capacity to turn out 60-70 graduates each year. By expanding its recruitment reach throughout the Northeast, Vermont Tech could also contribute to solving the state's demographic challenges by attracting young people to get their education here, who then fall in love with the state and decide to stay and start or buy into a farm or food business, and raise a family.

Mission Statements

VERMONT TECH

"We provide career-focused technical and professional education in a caring community which prepares students for immediate workplace success and continued learning."

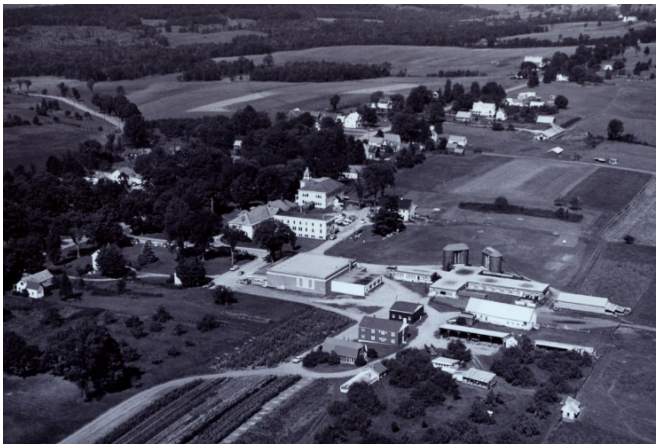
School of Agriculture, Plant & Animal Sciences

"Vermont Tech builds on its long history and strengths, offering a strong core agriculture and food curriculum and diverse opportunities for applied and practical experience in meeting the needs of the current and future food system."

WE'VE BEEN HERE BEFORE

Around 1866, the University of Vermont was appointed "land grant" college status for the purpose of teaching practical agriculture curriculum. After 25 years of never granting a degree in agriculture from UVM, the Vermont State Grange pressed for the development of a state agriculture school, focused on the practical application of agricultural education. Thus the Vermont School of Agriculture was born in 1910 at the Normal School site. The school opened with 56 students. We served to educate farmers for Vermont.

In the 50's, the Vermont School of Agriculture almost closed its doors. Our history could have ended there at a time when nearly 300 farms were going out of business each year and the school's enrollments were low. Then governor, Joseph Johnson, noted in his inaugural address of 1957 that, "We still need trained young [men] on our farms, but we also need trained workers in industry. Until such a time as a program can be developed for greater use of the facilities of this school, not only in agriculture but in other fields, I would recommend its closing."



But at the same time, the Commissioner of Agriculture was reporting, "a mechanical technical revolution in Vermont agriculture," in his biennial report of 1957-1958. In response to evolving educational needs of Vermont's workforce, technical courses were added to the offerings of the school in 1957 and the institution was given a new name reflecting this expanding mission: Vermont Agricultural and Technical Institute (VATI). It was the first and only technical institute in Vermont, with an initial enrollment of approximately 75 students. It was then that we educated not only the farmers, but the highway engineers and electrical engineers for Vermont's growing industrial production.

The College continues to evolve. But throughout its evolution, one thing remains the same. The grand purpose, the mission, the strategic intent of Vermont Tech is to meet the educational needs of Vermont's workforce. To educate its citizens in the industries that are relevant and needed for our society and economy -- and in particular -- Vermont's agriculture and food system!

AN URGENT NEED TO ACT

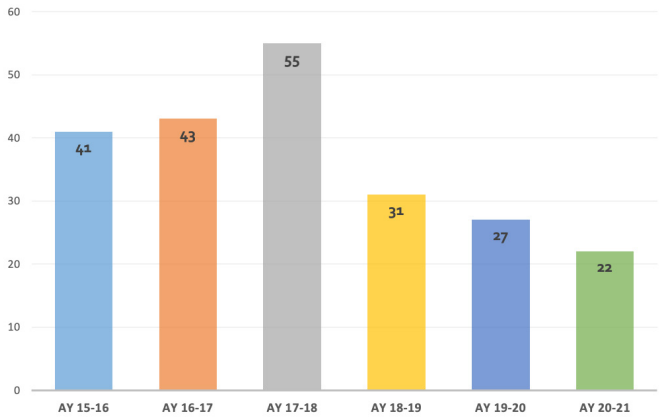


FIGURE 1: HEADCOUNT OF STUDENTS BY ACADEMIC YEAR (AY)

The current agriculture program at Vermont Tech has seen a steady decline in enrollment to unsustainable levels (current 2020-2021 academic year has 22 students; pre-COVID enrollment has also been in steady decline since 2017), due in part to a smaller number of Vermont farm families who are sending their kids to Vermont Tech (which mirrors the decline in the number of dairy farms in the state which has dropped from 1,015 in 2009 to 664 in 2019), and insufficient staff capacity at Vermont Tech to conduct personalized recruitment for the program. Without a significant reboot of the program (including significant increases in enrollment from in-state and out-of-state students), it is at risk of no longer being offered. At the same time, the regional food system is growing and employers across the state are struggling to find enough workers so that they can capitalize on growing market opportunities. Vermont Tech is needed more than ever to educate the next generation of food system workers and owners, for a wide variety of careers across many types of production (e.g., commodity, value-added) and in the areas between the farm-gate and the marketplace (e.g., food safety, supply chain logistics).

FISCAL YEAR 2020 (AY 19-20)	AG	NURSING	PILOT TECH	ELEC TECH
FPE Enrollment	27	386	46	45
% Total Student Body	2%	27%	3%	3%
Administrators	3	6	1	2
Operational Cost (Net of Fees)	$346,346	$1,393,547	$114,562	$28,214
Cost Per Student	$12,828	$3,607	$2,470	$621

FIGURE 2: OVERALL COSTS PER STUDENT

Low student enrollment means that the current agricultural program being offered at Vermont Tech is more expensive to operate than other programs, such as nursing, pilot tech and electrical engineering tech. This results in the overall cost per student being significantly higher than other programs.

In addition, the current 80-cow dairy operation at the Vermont Tech farm, has net losses of about $250,000 per year; a cost to the College as a whole that represents an unsustainable level of subsidy.

To answer the pressing need to transform Vermont's farm and food educational degree programs at Vermont Tech, a leadership team of Louise Calderwood, Regina Beidler, Ellen Kahler, and President Pat Moulton came together in May, 2020, assembled a talented 13-member Steering Committee along with more than 40 experienced stakeholders and launched 4 work teams over an 9-month period. The deep dive analysis that was conducted represents one of the most robust assessments into the possible future of an educational degree program ever completed within the Vermont State College system and represents a transformation model that has relevance throughout the system.

FISCAL YEAR	2016	2017	2018	2019	2020	5YR AVG
TOTAL REVENUE	$448,093	$398,604	$369,804	$354,012	$370,909	$388,284
TOTAL EXPENSES	($733,354)	($594,820)	($602,228)	($714,530)	($575,456)	($644,078)
LOSS	($285,261)	($196,217)	($232,424)	($360,518)	($204,547)	($255,793)

FIGURE 3: VERMONT TECH FARM LOSSES BY YEAR

As the various stakeholder teams dug into the details and learned more about the agriculture program's strengths, weaknesses, opportunities and challenges, and thoughtfully considered how best to transform the program, it became abundantly clear; the status quo is not economically viable. In the current economic environment and given the transformation underway throughout the Vermont State College system, the program may no longer survive, unless it too can be transformed and successfully recruit a significant cohort of new students.

This report is the final product of a year-long process to re-vision and ultimately transform the agriculture and food educational degree programs and the campus farm at Vermont Technical

College. Our recommendations build upon the high quality farm production and food business management curriculum already being taught (including the 2+2 program with the University of Vermont), and adds to it a more cohesive interdisciplinary program in the form of a new Center for Agriculture & Food Entrepreneurship, which will include a 9 credit guided internship program, expanded educational offerings during the summer months and in January, serving both traditional and non-traditional students, with greater student career advising, and offered in a variety of modalities (on-campus, virtual, hybrid).

The centerpiece of the new Center will be an Associate Degree in Agriculture & Food Entrepreneurship, with concentrations in either Dairy & Animal Science or Food Entrepreneurship. Students may still choose to go on to complete a bachelor's degree in either Diversified Agriculture or some other degree offered at Vermont Tech. Greater emphasis will also be paid to encouraging students to take classes in 'allied' subjects such as diesel mechanics, electrical engineering, HVAC, etc., as these are skills that also have relevance to the farm and food sector.

The transformation process will also involve numerous changes to the Vermont Tech Farm, which serves as a working laboratory to complement classroom based learning. Planned changes include selling the milking dairy herd, updating the farm facilities, and launching four new enterprises (custom dairy heifer grazing, deep bedded hogs, vegetables, grass-fed beef) alongside the existing apple orchard and maple sugaring operations. These six enterprises will give students real world experience in production, marketing, and sales of a wide range of products to campus faculty and staff and community members. Also planned is a meat cutting training lab which will support credit, noncredit and apprenticeship opportunities, serving as a workforce training program for the dozens of meat processing facilities and supermarkets eager to hire trained workers. Short credit and non-credit bearing courses for students seeking applied training as well as students wishing to "stack" these credits for an eventual degree will be also be available. A revamped farm operation will also enable outside, values-aligned entities, such as the nationally recognized Dairy Grazing Apprenticeship program, to partner with Vermont Tech in offering training opportunities, potentially attracting a national audience for these offerings.

As detailed below, there are still many steps that must be taken over the next 15-24 months before the new Center for Agriculture & Food Entrepreneurship at Vermont Tech can fully materialize. Success is not guaranteed. It will be a significant and heavy lift to achieve a 'steady state' of 125 enrolled students within the next 5 years. Key to achieving this 'steady state' will be the hiring of a dynamic, experienced, visionary Center Director, along with a robust marketing and recruitment campaign capable of attracting students from across the Northeast and Vermont. In addition, an interdisciplinary team across Vermont Tech -- from leadership, faculty and staff, as well as food system stakeholders across the state -- will need to mount a focused, multi-year effort to fully implement and build out the Center for Agriculture & Food Entrepreneurship at Vermont Tech, as outlined in the recommendations in this final report. Vermont's growing and evolving farm and food system businesses need Vermont Tech to succeed in this transformation process -- both at Vermont Tech and the in the entire State College system!

The following ten recommendations are offered with the understanding of the steep climb ahead to bring the food and agriculture program at Vermont Tech to its next stage. The College's long history and practical mindset positions it well to be responsive to the next generations of workers and farmers in meeting the ever-evolving needs of a dynamic regional food system.

Value Proposition

Vermont Tech offers a practical, applied education in a small, intimate, rural setting in Vermont. We educate the future producers, business owners and managers in the Northeast Food Shed, honing critical thinking skills by combining classroom learning, hands on learning and real-world experience on farms and in other areas of the food system.

Positioning Statement

The Vermont Technical college agriculture and food programs offer relevant, hands-on education to prepare students for a rewarding, meaningful career, mentored by a community connected and committed to a sustainable farm and food system.

RECOMMENDATIONS

1 *Recommendation #1: Create a new Center for Agriculture and Food Entrepreneurship at Vermont Tech.*

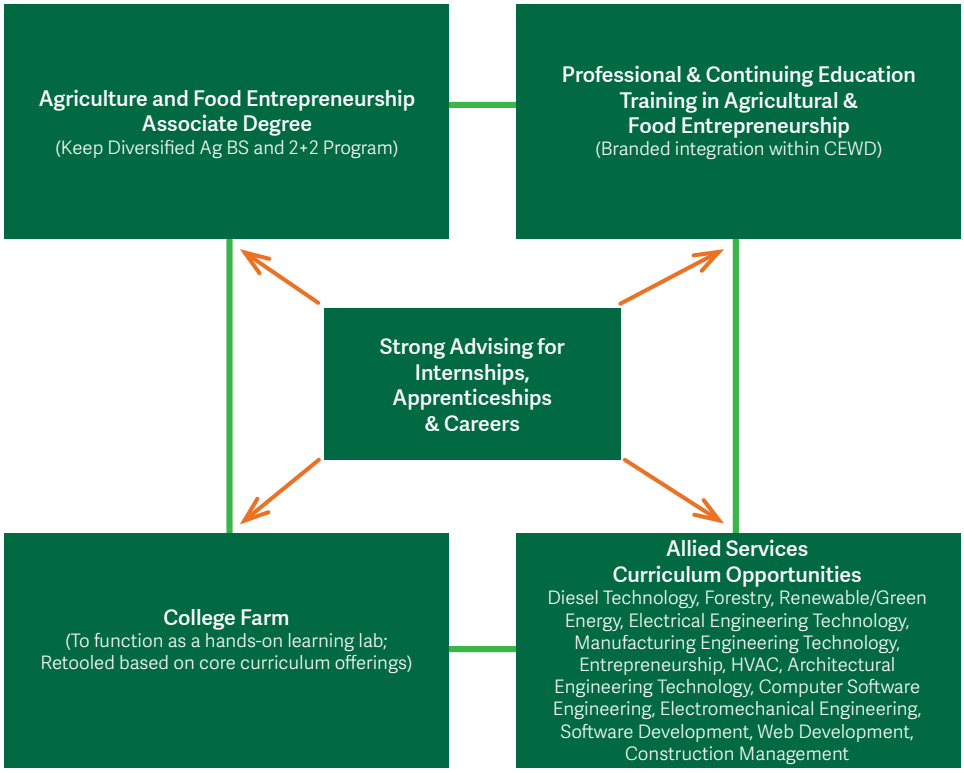
Rebrand the program at Vermont Tech and create a new Center for Agriculture and Food Entrepreneurship and hire a full-time Center Director. A clearly defined Center for Agriculture & Food Entrepreneurship degree program would offer a number of advantages:

- Easily identifiable and marketable portal for prospective students to see the variety of available learning options.
- Visibility of Vermont Tech's thought leadership in this area and demonstrated institutional commitment to keystone programs representative of Vermont's heritage and future.
- Centralized coordination for procurement, dispersal, and impact assessment of external funding both for innovative and operational needs that enhance educational opportunities for a range of audiences.
- A structure that allows for more collaborative and coordinated efforts between classroom, staff, full semester internships and the Vermont Tech Farm, and between other staff and faculty at Vermont Tech, including strategic budgeting across all related sectors.
- A more natural way to build synergy and coordinated educational offerings for a variety of audiences.
- Ability to place advising at the center of the learning process to assist individual students in meeting their individual learning and professional goals.
- Ability to strategically market, implement, assess, and continually enhance a suite of programs and learning modalities under the umbrella of the Center.

The Purpose:

Prepare Vermont Tech students, who come from Vermont and across the Northeast, to be the next generation of bright, innovative farmers, food workers, and food entrepreneurs upon graduation.

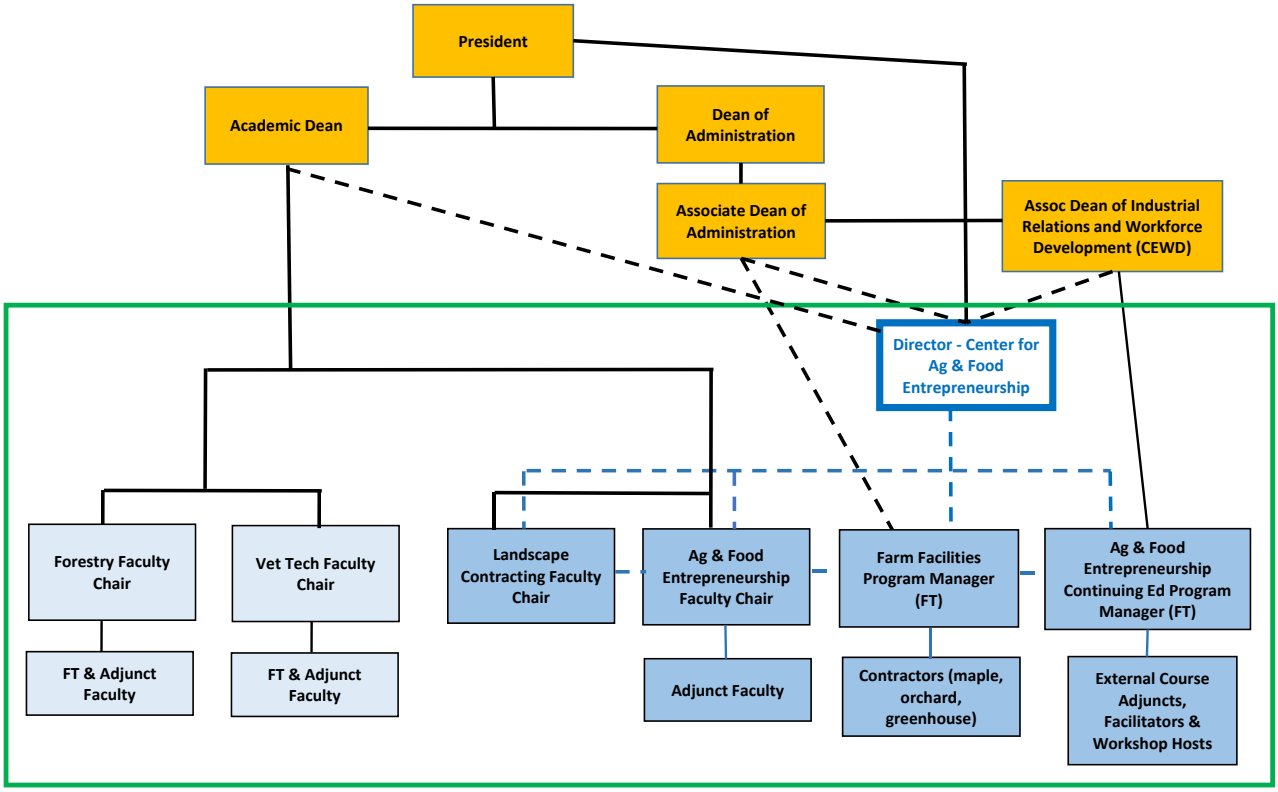
FIGURE 4: PROPOSED ORGANIZATIONAL CHARTS PROVIDES VISUAL REPRESENTATION OF THE WAYS IN WHICH THE UMBRELLA STRUCTURE OF A CENTER FOR AGRICULTURE & FOOD ENTREPRENEURSHIP WILL FACILITATE GREATER CONNECTIVITY ACROSS ALL FARM AND FOOD RELATED EDUCATIONAL PROGRAMMING AT VERMONT TECH. THE CENTER FOR AGRICULTURE & FOOD ENTREPRENEURSHIP WILL EXIST WITHIN THE CURRENT SCHOOL OF AGRICULTURE, PLANT AND ANIMAL SCIENCES WITH STRONG COLLABORATION AND COMMUNICATION WITH VET TECH AND FORESTRY PROGRAMS AND OTHER DEPARTMENTS TO EXPAND THE OPPORTUNITIES TO MEET STUDENT NEEDS ACROSS THE COLLEGE.



School of Agriculture, Plant and Animal Sciences

Center for Agricultural & Food Entrepreneurship

~ DRAFT ~



KEY:

= School of Agriculture, Plant and Animal Sciences

Solid Lines = Reporting / Accountability

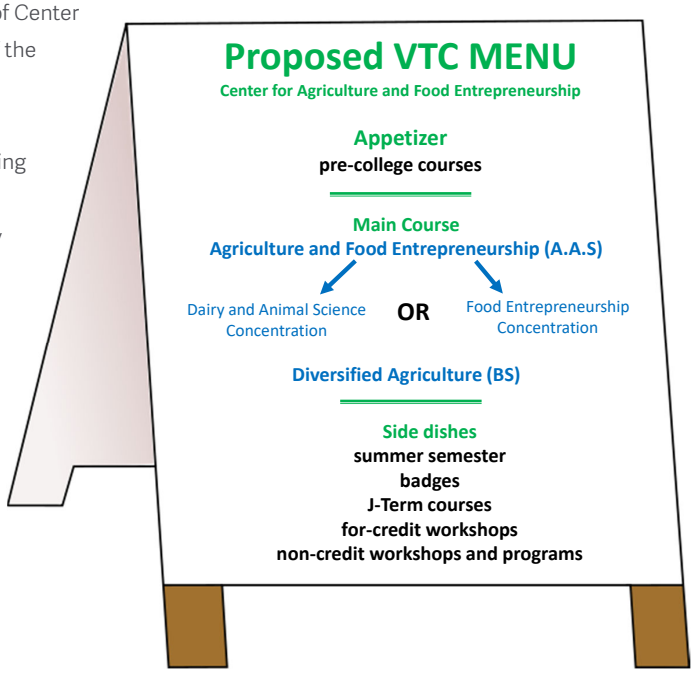
Dotted Lines = Strong Connectivity

Part of School + Center for Ag & Food Entrepreneurship

Part of School only

2 *Recommendation #2: Re-Brand Current AAS Degree Programs to an Associate Degree in Agriculture & Food Entrepreneurship.*

The centerpiece of the new Center for Agriculture & Food Entrepreneurship will be an associate degree (AAS) in Agriculture & Food Entrepreneurship with two possible concentrations – Dairy and Animal Sciences and Food Entrepreneurship. The four-year bachelor's degree (BS) in Diversified Agriculture will be maintained along with the current 2+2 Program with the University of Vermont, which focuses on dairy farm management. The 2+2 Program could potentially expand to allow both dairy and other types of Center for Agriculture & Food Entrepreneurship students to take advantage of the program.



There is value in a strong core curriculum that allows flexibility in learning for individual students. The existing associate degrees in Agribusiness Management and Dairy Farm Management have significant overlap. By simplifying the degree offerings, it will attract a wider range of students interested in meeting other needs in Vermont's growing food system. However, in order to continue serving Vermont's dairy farms, students will still be able to concentrate in dairy and animal sciences, attend the 2+2 Program at UVM (with a semester at Miner Institute) and will be able to enroll in a paid internships with specific learning objectives on dairy farms.

Other attributes of a re-branded degree could include:

- Ability to expand the program by adding concentrations in additional areas in the future
- Introductory courses, workshops, short courses, etc. could be bundled and added to the curriculum
- Opportunity to incorporate credential courses to train and certify students with specific industry skills

This re-brand of the degree program should also include a reworking on the modalities used to deliver the educational offerings at Vermont Tech. To reduce student costs, to be responsive to student interests and needs, and incorporate lessons learned during COVID-19, consider what courses can be delivered fully on-line, through a low-residency delivery model or are best delivered full-time in-person on campus.

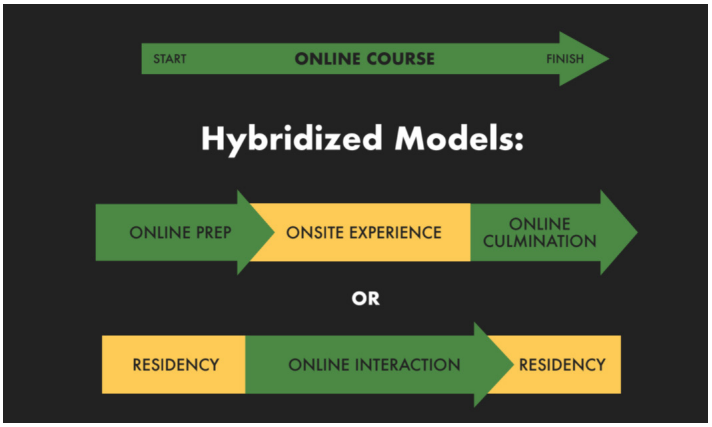


FIGURE 5: LEARNING MODALITIES AT VERMONT TECH

FIGURE 6: PROPOSED CURRICULUM: AGRICULTURE & FOOD ENTREPRENEURSHIP ASSOCIATE DEGREE (60 CREDITS TOTAL, INCLUDING 20 CREDITS OF GENERAL EDUCATION REQUIREMENTS)

Vermont Tech General Education Requirements (20 credits)

- English 001 (3 credits)
- Technical Communication (3 credits)
- Natural and Physical Science (4 credits)
- Information Technology (1 credit)
- Arts, Humanities, or Social Sciences (6 credits)*
- Mathematics (3 credits)

Agriculture & Food Entrepreneurship Associate Degree (23 credits)

- Introduction to Agriculture Economics & Policy (3 credits)**
- Business Skills for the Food System (3 credits)
- Emerging Issues in Food and Agriculture (4 credits)**
- Environmental Issues (3 credits)
- Two Internships (3 credits and 6 credits) supported by classroom work in the existing courses
- Career Preparation Capstone (1 credit)

Choose 1 or 2 Concentrations

DAIRY & ANIMAL SCIENCE CONCENTRATION

(supported by at least 17 credits from below)

- Agronomy & Soils
- Animal Management, Behavior, and Welfare
- Soil Science, Health & Nutrient Management
- Livestock Nutrition
- Livestock Reproduction
- Production, Management & Marketing
- Advanced Mechanical Systems
- Use of ARCGIS
- Livestock Systems and Buildings
- Forage Crop Production & Management
- Additional Dairy Management courses (electives)
- Up to THREE 1 credit credential courses

FOOD ENTREPRENEURSHIP CONCENTRATION

(supported by at least 17 credits from below)

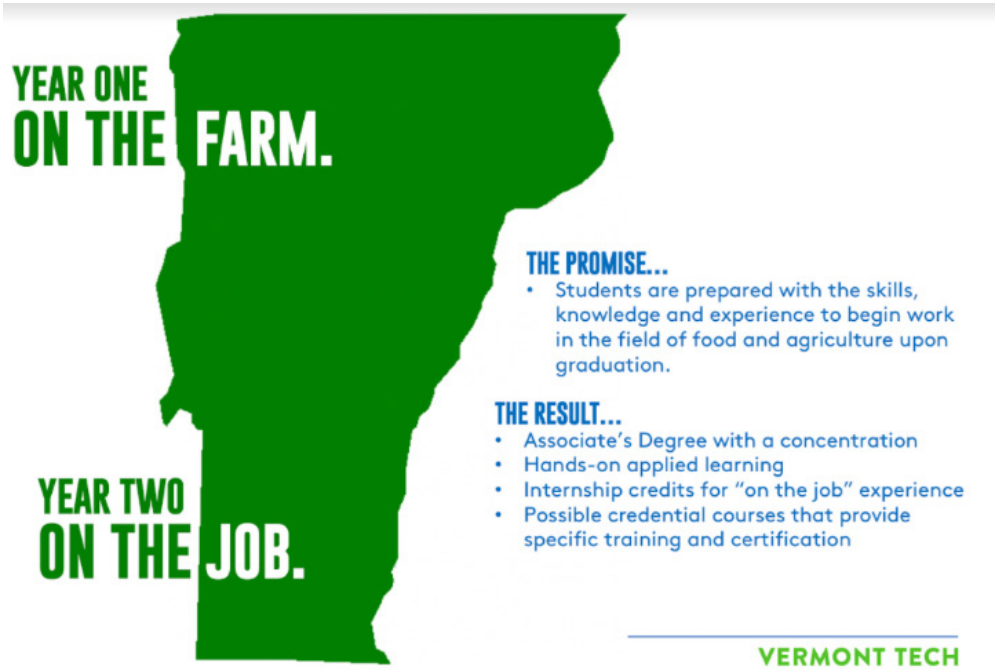
- Introduction to Specialty Foods
- Soil Science, Health, and Nutrient Management
- Mechanical Aspects of Food Systems
- Entrepreneurship Skills in Food Systems
- Production, Management & Marketing
- Fruit & Vegetable Production Management and Making Specialty Foods
- Advanced Mechanical Systems
- Diversified Agriculture courses (maple, dairy, goats, etc.)
- Additional Business related courses (electives)
- Up to THREE 1 credit credential courses

3 *Recommendation #3: Develop a robust, guided internship program.*

Applied education is a hallmark of Vermont Tech. This will be reinforced by introducing 9 credits of internship experience spread over the final two semesters of the associate degree. First-year students will focus on developing basic farm and food production skills at the Vermont Tech campus farm (an on-site farm laboratory), along with resume and interviewing skill building. Second-year students will be placed into off-campus internships with a focus on their area of interest, including a project of interest that would be beneficial to the student's mentor (employer), in the final semester.

By focusing the first year on learning basic farm and food production skills at the Vermont Tech Farm and through field trips and guest speakers, students will be provided with a strong foundation for an agriculture and food education. An introductory off-campus internship in the fall semester of year two, followed by an advanced internship, with more responsibility within the same placement, will provide an opportunity for students to not only understand multiple aspects of the business, but also focus on a project with a valuable outcome to the mentor.

FIGURE 7: INTERNSHIPS THROUGH VERMONT TECH



4 *Recommendation #4: Significantly Expand Student Recruitment and Enrollment.*

Build a robust student recruitment and enrollment outreach process and increase enrollment to 125 FTE students with the Center for Agriculture & Food Entrepreneurship within 5 years, returning a 74% margin to Vermont Tech to cover their core operational costs that enable the program to exist (i.e., achieve Figure 8: Scenario #4 below).

ESTIMATED "STEADY STATE" ANNUAL REVENUE & EXPENSE FY2021 DOLLARS	SCENARIO #1 Status Quo		SCENARIO #2 No Enterprises No Center	SCENARIO #3 Rev. Enterprises No Center	SCENARIO #4 Rev. Enterprises With Center
Net Matriculated Student Revenue	$259,146	$1,591,326	$523,311	$908,802	$1,469,056
All Operational & Other Revenue	$470,600	$470,600	$94,600	$240,755	$240,755
REVENUE	**$729,746**	**$2,061,926**	**$617,911**	**$1,149,557**	**$1,709,811**
Academic Program Expense	$186,452	$484,220	$227,326	$320,050	$454,810
Enterprise Expense	$593,000	$593,000	$0	$232,820	$232,820
Institute of Ag Expense	$107,795	$107,795	$107,795	$107,795	$107,795
Center for Ag Expense	$0	$0	$0	$0	$187,225
Other Expense	$0	0	$20,000	$0	$0
EXPENSE	**$887,247**	**$1,185,015**	**$355,121**	**$660,665**	**$982,650**
NET REVENUE (EXPENSE) *WITHOUT INST. O/H*	**-$157,501**	**$876,911**	**$262,790**	**$488,892**	**$727,161**
INST. O/H TARGET MARGIN = 74%	**-18%**	**74%**	**74%**	**74%**	**74%**
INSTITUTIONAL OVERHEAD	**$656,563**	**$876,911**	**$262,790**	**$488,892**	**$727,161**
NET REVENUE (EXPENSE) *WITH INST. O/H*	**-$814,064**	**$0**	**$0**	**$0**	**$0**
Enrollment Status	CURRENT	BREAKEVEN	BREAKEVEN	BREAKEVEN	BREAKEVEN
Enrollment Headcount	**22**	**135**	**44**	**77**	**125**
Revenue $$ / Student	$11,779	$11,779	$11,779	$11,779	$11,779
Additional Cost / Student*	$2,833	$2,833	$2,833	$2,833	$2,833
*assumes 1FT faculty per 30 students					

FIGURE 8: ENROLLMENT "STEADY STATE" SCENARIOS

Based on many years of declining enrollment, the current agriculture program at Vermont Tech is not sustainable and will likely not survive the existing Vermont State College transformation project – which is eliminating low enrolled programs not aligned with projected workforce needs. The first column in **SCENARIO #1** represents the present state of the AY'20-21, with just 22 enrolled students.

The second column in Scenario #1 represents the number of enrolled students that would be needed (135) for the agricultural program as currently configured to contribute the required 74% margin for support of Vermont Tech operational costs.

SCENARIO #2 represents the number of enrolled students that would be needed in order to break-even if the Vermont Tech Farm was dismantled and no longer served as a 'lab' for the program, and the Center for Agriculture & Food Entrepreneurship was not created.

SCENARIO #3 represents the number of enrolled students that would be needed in order to break-even if the current dairy herd was sold and the 6 enterprises recommended in this report were fully implemented, but no Center for Agriculture & Food Entrepreneurship was created.

Finally, **SCENARIO #4** represents the number of enrolled students that would be needed in order to break-even, assuming the current dairy herd is sold and the 6 enterprises recommended in this report are fully implemented, and the Center for Agriculture & Food Entrepreneurship is created, with a Center Director hired.

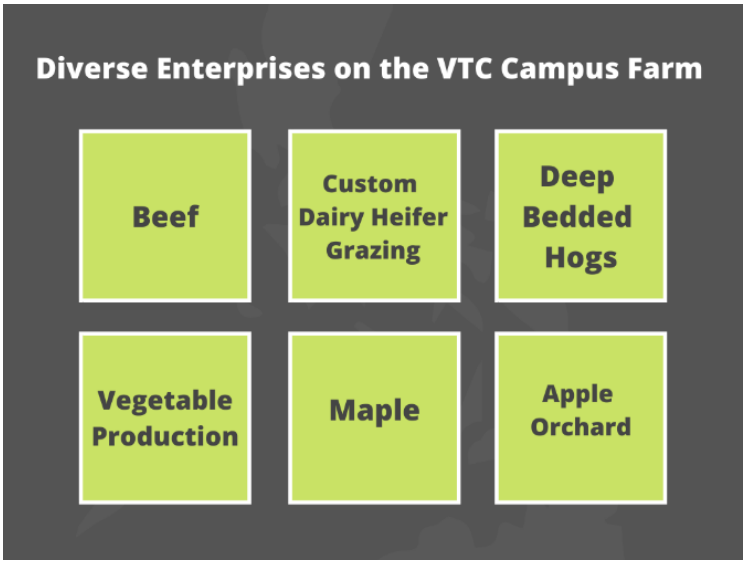
It is important to understand that the 74% margin that is included in these 'steady state' scenarios represents the level financial contribution the School for Agriculture, Plant and Animal Sciences needs to be able to generate to contribute to the overall maintenance of Vermont Tech (e.g., administration, admissions, marketing, facilities, etc.).

5 *Recommendation #5: Manage Six Enterprises at the Vermont Tech Farm.*

Expand the diversity of enterprises and experiences on the Vermont Tech farm. A more diverse set of enterprises will better serve the needs of students and the changing food system, giving exposure to many different types of agricultural production.

This recommendation includes selling the existing dairy herd and upgrading the existing infrastructure to accommodate six enterprises (four new + two existing). The farm should first and foremost support education and function as a learning laboratory on campus. With the addition of a custom dairy heifer grazing enterprise, the opportunity for up to a 9 credit paid internship at off-site dairy farms, and the opportunity to enroll in the 2+2 Program at UVM, students interested in pursuing careers in dairy production will still be able to obtain a high quality, hands-on dairy education.

FIGURE 9: ENTERPRISES AT VERMONT TECH FARM



The Business Case Development Team arrived at these 6 recommended enterprises after conducting a deep analysis of 28 different enterprises, including a 60-cow milking herd with robotics, and a value-added dairy operation. Central to this exploration was how best to utilize the assets (e.g., 250 acres of land) and facilities (e.g., existing dairy barn and associated buildings) as a learning laboratory connected to core classroom learning. At Vermont Tech, the primary business is education, not a dairy operation. The difficult decision has been made to divest of the milking herd while maintaining groups of other large ruminants, on the campus farm, including dairy heifers and a grass-fed beef herd.

In the proposed grouping of enterprises only the existing maple sugaring and apple orchard enterprises can be expected to generate a surplus of revenue, but the combined losses from the other four recommended enterprises are still significantly lower than the annual losses that currently accrue from the current 80-cow dairy operation (annual losses ~$250k/year). It should also be noted that the Vermont Tech farm is a learning laboratory and like other educational departments at Vermont Tech that have a lab component, it is not expected to be net positive. It just needs to not sustain significant losses.

FIGURE 10: ANTICIPATED VERMONT TECH NET INCOME BY ENTERPRISE

	Feeder Beef	Dairy Heifers	Feeder Pigs	Potatoes	Maple	Orchard	Overhd
NET INCOME	$ 9,633	$ 15,115	$ (3,640)	$ 1,291	$ 8,470	$ 980	
LABOR TOTAL	$ 9,802	$ 29,361	$ 10,684	$ 2,658	$ 7,865	$ -	$58,042
NET AFTER LABOR	$ (169)	$ (14,246)	$ (14,324)	$ (1,367)	$ 605	$ 980	$(86,564)

6 *Recommendation #6: Increase and enhance the Continuing Education & Workforce Development (CEWD) short courses.*

Increase and enhance the Continuing Education & Workforce Development (CEWD) short course, workshop, certificate and credentials of value learning opportunities, not just for traditional Vermont Tech students but also for adults and other continuing education students. Sunset the use of the Ag Institute name and instead use existing CEWD branding, and improve on the marketing of agriculture and food related offerings within CEWD, including partnering with food system organizations who can help publicize these offerings through their networks. Include CEWD agriculture and food related course marketing in the comprehensive marketing plan for the Center for Agriculture & Food Entrepreneurship.

7 *Recommendation #7: Expand Vermont Tech's meat cutting workshop offerings.*

Expand Vermont Tech's meat cutting workshop offerings to include certificates, credentials of value and qualified apprenticeships to train students to meet the growing need for workers in Vermont's meat processing industry. The current demand for local meat products exceeds the processing capacity of the existing meat processing facilities in Vermont. As the demand for local meats has risen in response to the pandemic, various mechanism to increase meat processing capacity have been explored – including constructing new processing facilities, growing meat cutting course offerings, and upgrading, retrofitting, and expanding existing infrastructure. Construction of approximately seven new Vermont slaughter and/or processing facilities are under design and development with completion timelines generally beyond the 2021 calendar year. The most prevalent need that industry members have indicated, beyond infrastructure expansion, is access to a trained workforce. A recent survey of 16 existing meat processing enterprises conducted by the Vermont Agency of Agriculture asked what workforce trainings would benefit their industry, and respondents offered the following: on job training or apprenticeship opportunities; HCAAP (food safety) and inventory management; basic meat cutting and cured meat operation; and product development and sales and marketing skills training. These industry workforce development needs fit squarely within Vermont Tech's wheel-house to deliver graduates to meet their needs.

8 *Recommendation #8: Strengthen Vermont Tech's School of Agriculture, Plant and Animal Sciences by branding the Center for Agriculture & Food Entrepreneurship.*

Implement the marketing and outreach recommendations developed by the Communications & Marketing Team in order to significantly grow student enrollment with the goal of achieving the 125 student enrollment target envisioned in Scenario #4. Create a comprehensive marketing plan for the Center and begin implementation of that plan.

9 *Recommendation #9: Properly resource the transition to the Center for Agriculture & Food Entrepreneurship at Vermont Tech.*

The proposed restructuring and refocusing of academic opportunities as outlined in this report will require substantial, consistent leadership and support as well as dedicated financial resources. An estimated $1,546,000 needs to be raised to support the transition to a fully functioning Center for Agriculture & Food Entrepreneurship over the next 3 years, including:

- Short term contractors to assist with the start of the transition -- 4 short-term, part-time contractors = $100k
- Educational reboot from current program to create the Center for Agriculture & Food Entrepreneurship = $750k over 3 years (includes hiring a Center Director and additional funds each year for marketing and recruitment)
- Capital Expenditures for the Campus Farm = $371k
- Meat Cutting lab = $300k
- Upgrades to farm parking, office, classroom, bathrooms = $25k

Relationships and oversight of internships will be a substantial amount of work, and creating a vision to connect both for-credit and non-credit continuing education curriculum will need to be woven together under the mission of the Center for Agriculture & Food Entrepreneurship. Marketing and outreach will be critical for program development, as well as an ongoing assessment of efforts.

10 *Recommendation #10 : Implement a set of interim action steps.*

Implement a set of interim action steps, on the path towards implementing the recommendations contained in this Report over the next 2-3 years. Build a new Center for Agriculture & Food Entrepreneurship Advisory Board of stakeholders who have been part of the year-long transformation planning process. Recruit a team of 'ambassadors' from the transformation process and alumni to assist in ramping up enrollment over the next 3 years.

Interim action steps include:

- Hire 4 part-time contractors (over the next 18 month) to implement a scope of work designed to support existing staff and faculty in implementing the Center for Agriculture & Food Entrepreneurship
- Fundraise for interim funding needs that will also build enrollment towards the desired "steady state" (fill short-term gaps)
- Sign up farms and food businesses for the 2 semesters of off-campus internship learning
- Seek out additional employer partners to build CEWD offerings to meet workforce needs
- Set up the meat cutting "lab" and program (assuming funding)
- Develop additional short courses and continuing education offerings
- Re-work curriculum as needed and moving it through the internal Vermont Tech process
- Move forward with changes at the Vermont Tech farm and with establishing the new agriculture enterprises
- Complete overall program re-branding and marketing
- Re-constitute the program's external Advisory Board to serve as a resource to staff and faculty as they work to implement the recommendations in this Report
- Finalize the job description for the Center for Agriculture & Food Entrepreneurship Director and make the necessary preparations to hire a Director on a 3-year contract, once sufficient funding has been secured
- Steadily increase enrollment year over year

Note:

At a staff and faculty retreat of those involved in the Center for Agriculture & Food Entrepreneurship transformation project held on May 21, 2021, a 2-year work plan was developed, inclusive of milestones and go/no go performance gates.

APPENDIX

THE NEED FOR TRANSFORMATION

The farm and food sector is growing in Vermont and a lack of workers is holding back expansion

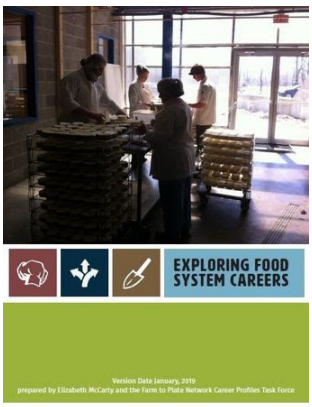
A great deal of knowledge about the trends, opportunities and bottlenecks has been gathered, and a new 10-year road map forged, as outlined in the recently released Vermont Agriculture & Food System Strategic Plan 2021-2030. The Plan validates what we have heard from stakeholders throughout this year long process, that there are many different types of jobs that exist in the farm and food sector and there is a great need for the next generation of well-trained farmers, workers and entrepreneurs to meet growing consumer demand for locally and regionally sourced food.

Here are a few notable statistics related to Vermont's food system that give us confidence that there is an important role for Vermont Tech to play in training the next generation of farmers and food entrepreneurs in Vermont, and across New England.

- More than 64,000 Vermonters are employed in jobs within the food system; there were 6,554 net new jobs (11.2% increase) between 2009-2019 in Vermont's food system.
    - Jobs range from production agriculture (e.g., dairy, livestock, grains, diversified vegetables), value added food manufacturing (e.g., cheese, yogurt, maple syrup, cured meats, beer, wine, ciders, and spirits, specialty products, artisanal bread), food related services (e.g., food hub operators, marketing/branding specialists, food safety experts, regulators, agronomists, nutrient management specialists, ag/food specific lawyers and lenders), food educators, food system developers (e.g., VAAFM personnel, non-profit organizations), distributors, warehouse personnel and food truck drivers, restaurant workers and chefs, and others. And careers in ag/food range from farm and production floor workers, to managers and owners.
- More than 11,500 farms and food businesses (2018) in Vermont's food system.
    - Of 6,800 farms (2017), 2,852 have sales >$10k (42%)
- Economic output increased from $7.5 billion in 2007 to $11.3 billion in 2017 (48% increase)
    - Food manufacturing is 2nd largest manufacturing sub-sector in Vermont ($3 billion in annual sales); it is the only one that grew during the last recession
- Vermonters' purchase of local food and beverages has increased from 5% ($114 million) in 2010 to 13.9% ($310 million) in 2017, annually. Even greater sales of Vermont products occur across New England and the Northeast.
- You can read about the needs of Vermont farm and food employers here.

How will the outcome of this project address the changing needs of the regional farm and food system?

Vermont Agriculture and Food System Strategic Plan 2021-2030 (a.k.a. Vermont Farm to Plate), identifies a number of workforce development needs that intersect with educational and workforce development programs at Vermont Tech. New England regional food system development efforts are underway to strengthen regional food supply chains and meet more consumer demand for food from within the region (e.g., New England Feeding New England) over the next 10 years, thus there will be a growing need for food producers across all categories of products in all types of market channels. This will coincide with changing demographics that will lead to unprecedented levels of farm and food business succession to the next generation over the next 10 years. The State Workforce Development Board and Vermont Department of Labor are both interested in ways that technical education can be delivered across a range of economic sectors to support workforce needs of employers. Thus, Vermont Tech's ability to offer a range of experiential degree programs (1 year tech, 2 year AAS, and 4 year BS/BT) delivered across a range of learning modalities (on-line and classroom/residential, semester-long and short courses, hands-on Vermont Tech farm and internships, etc.) will position it well to attract students looking for a practical educational experience with near 100% job placement after graduation as well as continuing education credits to supplement their chosen careers.



THE TRANSFORMATION PROCESS

How and why did this project begin?

In April, 2020, then Vermont State Colleges Chancellor, Jeb Spaulding, recommended that three Vermont State College campuses be closed including Vermont Tech's Randolph Center campus. Several people realized what the impact of a closure would mean for the future of applied agricultural education in Vermont and its food system and approached President Pat Moulton asking her permission to gather a stakeholder group to see what could be done. This project was convened in May 2020, led by a Leadership Team of Louise Calderwood, Regina Beidler, Ellen Kahler, and President Moulton and involved more than 40 stakeholders on work teams, including a 13-member Steering Committee. Over the past year, those involved on various teams have collectively volunteered hundreds of hours of their time to envision a new and improved agriculture and food program at Vermont Tech. This report details the findings and recommendations of our work, in hopes that it will be of service to President Moulton, the faculty and staff, and current and future students at Vermont Technical College. Those involved had four main motivations:

1. Ensure that Vermont Tech Randolph campus does not close down; a key aspect of this is for a revised agriculture and food system educational program being financially sustainable which means substantially increasing enrollment and ensuring the Vermont Tech farm at least breaks even in its expenses and revenue
2. Revise the agriculture and food system educational program to be rigorous and relevant to an evolving food system and the jobs that are emerging in it
3. Revise the agriculture and food system educational program so that Vermont Tech becomes THE place for applied, hands-on ag and food system education in the Northeast, with a clearly defined niche that enables Vermont Tech to recruit a much broader, more diverse student body from both Vermont and the Northeast. [note: students interested in careers in dairy production will still experience a strong dairy program]
4. Revise the role and focus of the Vermont Tech farm, its facilities and 250 acres to better align with the core of what is being taught in the re-visioned agriculture and food system educational program

Who was involved?

Over 40 stakeholders have been involved in the project including Vermont Tech's President, faculty and staff, alumni, local producers, lenders, funders, legislative representatives and faculty and staff from other Vermont educational institutions. All of these people have donated their time and expertise as volunteers in this process including the Leadership Team and Steering Committee, since June 2020. The final Steering Committee meeting was held on April 22, 2021.

PROCESS LEADERSHIP TEAM
met weekly between May 2020 and May 2021

- President Pat Moulton
- Louise Calderwood (co-chair), Echo Hill Farm Maple Products
- Regina Beidler (co-chair), Organic Valley
- Ellen Kahler, Vermont Sustainable Jobs Fund / Vermont Farm to Plate

STEERING COMMITTEE
met monthly between June 2020 and April 2021

- Marc Mihaly, retired, Vermont Law School (established the Center for Ag & Food Systems at VLS)
- Philip Ackerman Leist, formerly of Green Mountain College and Sterling College
- Jed Davis, Cabot Cooperative Creamery, Sustainability Director
- Dan Tobin, assistant professor -- UVM Community Development & Applied Economics
- Kate Finley Woodruff, UVM - Associate Dean of UVM College of Agriculture & Life Sciences
- Laura Ginsburg, Vermont Agency of Agriculture, Section Chief, Ag Development Division
- Meg Nelson - Vermont Tech alum, Nelson Farms and Shadagee Farm (dairy), alum
- Steve Schubart - Vermont Tech alum, Grass Cattle Co. (grass-fed beef), alum
- Molly Willard -- representing Vermont Tech faculty/staff

SURVEY & INPUT COMMITTEE

- Diane Bothfeld, Dairy Section Chief, Vermont Agency of Agriculture
- Meredith Niles, UVM
- Amanda Chaulk, Vermont Tech
- Jenn Colby, formerly of UVM Extension

PROGRAM MODELS DEVELOPMENT TEAM
Met 7 times

- Philip Ackerman Leist – Chair
- Dan Gingue, Dehm Associates, alum
- Dan Tobin, UVM Community Development & Applied Economics
- Sherry Lussier, former Career & Technical Education Center Director
- Grace Oedel, Executive Director, NOFA-VT
- Kate Duesterberg, Cedar Circle Farm
- Chuck Ross, former Secretary Agency of Ag, former director UVM Extension
- Sarah Danly, Vermont Farm to Plate (VSJF)
- Molly Willard, Vermont Tech

CULTURE & CURRICULUM TEAM
Met 6 times

- Marc Mihaly -- Chair
- Emily Wright, dairy nutritionist, alum
- Dr. Kim Crowe, Vermont Tech
- Emma Marvin, Butternut Mountain Farm
- Katie Ballard, Miner Institute
- Vern Grubinger, UVM Extension
- Steve Schubart, Grass Cattle Co, alum
- Laura Ginsburg, Vermont Agency of Agriculture

DAIRY SUB-COMMITTEE OF CULTURE & CURRICULUM TEAM
Met 6 times

- Laura Ginsburg – Chair
- Steph Nault, Vermont Tech, alum
- Chelsea Sprague, Sprague Farms
- Henry Pearl, Hillview Farm, Vermont Tech alum, UVM 2+2 Program
- Ryan Andrus, Bridgman Goat Farm
- Brent Beidler, former organic dairy farmer, Vermont Tech adjunct professor
- Linda Dimmick, Neighborly Farms
- Jamie St. Pierre, Pleasant Valley Farms
- Meg Nelson, Nelson Farms and Shadagee Farm, alum

BUSINESS CASE TEAM
Met 25 times

- Jed Davis – Chair
- Andy Wood, VEDA/VACC loan officer, alum
- Holly Fowler, Northbound Ventures
- Marty Strange, retired, Randolph resident
- Dan Gingue, Dehm Associates, alum
- Jenn Colby, formerly of UVM Extension
- Steph Nault, Vermont Tech, alum
- Lit Tyler, Vermont Tech
- Greg Hughes, Vermont Tech

COMMUNICATIONS & MARKETING TEAM
Met 8 times

- Kate Finley Woodruff – Chair
- Megan Smith, former Commissioner, Vermont Department of Travel & Tourism
- Mary White, Vermont Farm Bureau
- Amanda Chaulk, Vermont Tech (Marketing & Communications)
- Jessica Van Deren, Vermont Tech (Admissions)

What were the stages of the project?

Large group visioning sessions, small group listening sessions, and an alumni and Randolph area survey fed into two initial work teams (**Culture & Curriculum Team** and **Program Models Development Team**) which explored the kind of curriculum and program format and delivery model would best serve the state's agriculture and food system needs (including dairy farm management specific educational needs). The teams also explored how the Vermont Tech farm connects to needed learning objectives. Each team developed a set of recommendations that have been handed to a Business Case team for their consideration. The **Business Case Development Team** then met to explore the financial viability of the proposals coming out of the two prior Teams, developed multi-year financial projections, enrollment targets and a capital expenditures budget and developed a program business plan. A deep dive into the viability of various enterprises on the Vermont Tech farm was also undertaken and a new set of 6 enterprises have been recommended, along with selling the milking herd. A **Communications & Marketing Team** worked with staff at Vermont Tech to better understand the market demand for the program, developed core messaging to attract new students to the program, and developed a plan to publicize the program.

In addition to the four large community meetings that were held between June, 2020 and April, 2021 to gather additional stakeholder involvement, numerous listening sessions with current and former faculty and staff, various producers (e.g., beef producers, goat industry members, value added food manufacturers, alumni and UVM 2+2 Program graduates, dairy heifer grazing practioners, and others), and neighboring farms also took place to solicit input and feedback.

Along with a number of faculty and staff of Vermont Tech being involved throughout the Transformation process, the Leadership Team met twice with both the President's Executive Team and with the full faculty and staff of the School of Agriculture, Plant and Animal Sciences. Helpful input and feedback were received over the course of the year-long effort.

An FAQ and Interim Report were developed by the Leadership Team and placed on the Vermont Tech Transformation web page. Scopes of Work were also developed so that 4 contractors could be hired on an interim basis over the coming year to assist staff and faculty with further exploration of needs (e.g., identifying internship sites) and implementing pieces of the transformation project (e.g., setting up a meat processing 'lab' once funds are secured). Presentations on our recommendations were also made to a joint hearing of the House and Senate Agriculture Committees and to the VSC Board of Trustees. And finally, a meeting with potential funders was organized for the purpose of helping to identify interim funding sources during the first three year 'ramp-up phase'.

This Final Report was delivered to President Moulton on June 1, 2021 so that she may consider our combined recommendations, and make decisions regarding moving forward with the implementation steps as she deems workable.

Vermont Tech Survey Results (Sept-Oct 2020)

191 total responses

- 29% Randolph area residents
- 28% Other stakeholders
- 20% Alumni*
- 17% Food business owner/farmer
- 5% Staff/faculty

*** Alumni Profile**

38 total responses
Graduation dates 1967-2018; 14 after 2014

Hands on course work, relationship development, and internships are needed in …

1. Business management
2. Production methods
3. Financial literacy
4. Public interaction, communications

From the 141 Public Respondents

How important is VTC to the future of Vermont agriculture?
Average response was 92, 7 respondents were neutral or below

How important is the VTC dairy farm to the future of Vermont agriculture?
Average response was 77, 44 respondents were neutral or below

Clusters of Responses to Open Ended ??s

What is most important re: program delivery?

- Hands-on learning
- Focus on degrees/certificates other than 4-year Bachelors
- Hybrid learning models (hybrid, remote, low-residency)
- Integrate more into the community, high school system, and Vermont's farming/food system

What is most important re: curriculum?

- Focus on grazing, diversified agriculture, and organic/sustainable/regenerative practices
- The dairy program is good, keep it as is and/or modernize

Other:

- Incorporate social/racial justice and indigenous techniques, and try to attract more diverse students (BIPOC, etc.)

Program Model Development Team Final Report

October 20, 2020

BACKGROUND DOCUMENT
(*see accompanying overview presentation*)

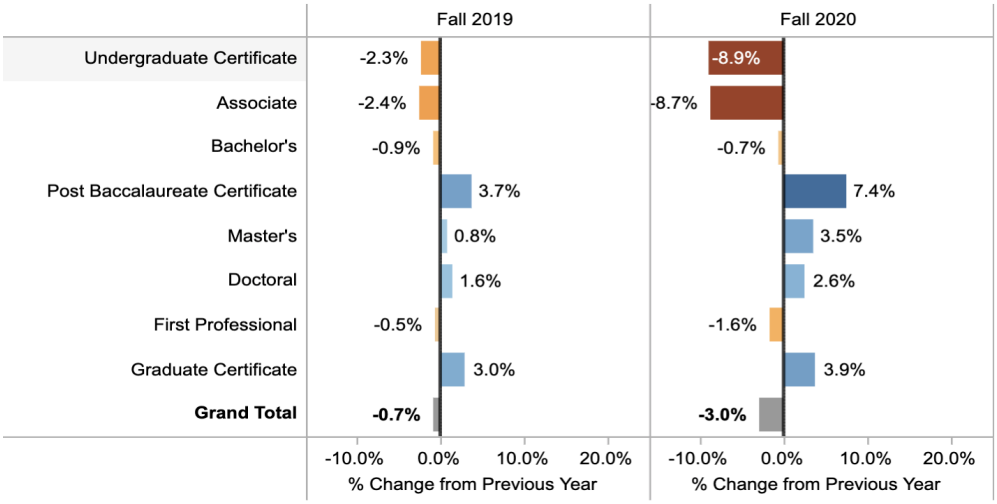
TEAM MEMBERS:

- Philip Ackerman Leist – *Chair*
- Regina Beidler – *Steering Committee liaison*
- Dan Gingue, Dehm Associates, alum
- Dan Tobin, UVM Community Development & Applied Economics
- Sherry Lussier, former Career & Technical Education Center Director
- Grace Oedel, Executive Director, NOFA-VT
- Kate Duesterberg, Cedar Circle Farm
- Chuck Ross, former Secretary Agency of Ag, former director UVM Extension
- Sarah Danly, Vermont Farm to Plate (VSJF)
- Molly Willard, Vermont Tech

CONTEXT

Vermont Tech's experience with enrollment declines is not singular. Instead, it reflects fast-moving national realities in higher education, as reflected in the figure below, excerpted from an illuminating new report from the National Student Clearinghouse Research Center that warrants careful attention in planning for next steps at VTC. Vermont Tech's next steps should take into consideration documented student trends, job opportunities, industry needs, Vermont Farm to Plate strategies, and innovative integration of current institutional resources.

Figure 3. Enrollment Changes by Credential Type



Reliance on a realignment of academic offerings on its own, in all likelihood, will not result in significant increases in student revenues until Fall 2022. Therefore, the realignment of programming should itself be considered a form of rapidly raising new capital from philanthropy and business to support a compelling new vision and the required resources to achieve it—in a post-pandemic economy.

Recovery, Revitalization, Resilience: Any pragmatic prognostication on the pandemic and post-pandemic economy results in the same conclusion—recovery will precede revitalization and resilience. Both Vermont Tech and its student populations will be in recovery mode for several years to come, and any targeted changes should reflect this reality. The degree to which Vermont Tech's education is geared to supporting individuals and the surrounding region as we all face immediate economic recovery and food systems challenges will likely impact Vermont Tech's ability to resource the funds needed to make the necessary curricular, organizational, and infrastructure changes. Thus, the proposed changes -- in particular the overarching implementation of the Center -- should better prepare Vermont Tech to access hoped-for state and federal economic recovery funds, as well as philanthropic gifts and student revenues.

ESTABLISHMENT OF A CENTER FOR AGRICULTURE & FOOD ENTREPRENEURSHIP

The establishment of a Center is an essential piece in creating clear branding, a cohesive structure and coordinated programming while packaging all of these integrated assets into one place. Our Team's recommendation is to bring the Institute and the farm under the current School of Agriculture, Plant and Animal Sciences, renaming that as the Center for Agriculture & Food Entrepreneurship. This focused work will reflect innovation, acceleration, incubation, boot-strapping, and boot-camping.

The Center should be administered by a director/associate dean, ideally hired through a national search based on the emergent vision put forward by this current process. The director should have faculty status, be charged with oversight of the School of Agriculture, Plant, and Animal Science, direct all related professional and continuing education programming, and report to the academic Dean.

The Center represents a $3-$10 million campaign opportunity. The Center should be strongly branded with Vermont's reputation and targeted to real needs and opportunities in the Northeast. It should be designed and promoted to optimize inbound marketing (including website design, SEO, etc.) and external reputation-building to provide an immediate funding opportunity for philanthropists, businesses, and grants through state and federal government, perhaps including some monies dedicated to post-pandemic recovery efforts.

AAS DEGREE PROGRAMS

Degree programs should guide students' interests and emergent professional aspirations while also maximizing flexibility. Flexibility requires methodical and intensive advising, as well as flexible scheduling and a combination of onsite, online, and hybridized delivery. Too many formalized majors or concentrations require ever-increasing numbers of faculty in specific realms of expertise. Four areas of focus seem important for Vermont Tech to cover:

- Livestock degree(s)
- Plant Science & Technology for Working Landscapes degree(s)
- Food System Technology degree(s)
- Veterinary Technology degree(s)

Plant Science & Technology for Working Landscapes can encompass annual and perennial crops, as well as forestry, horticulture, and greenhouse management.

Food System Technology provides a broad umbrella for encouraging students to explore and engage in technical-related aspects of the food chain that involve the off-farm and allied services aspects of the food system. Whereas the other two degrees might be directed by a more structured curriculum, the Food System Technology degree can be more self-designed in nature and allow students to engage programs and resources in other parts of the College to create a major that best serves their academic and career aspirations.

PROFESSIONAL & CONTINUING EDUCATION

In order to attract and serve a more expansive demographic—in the vein of current and prior Ag Institute and CEWD offerings—the Center will offer structure, staffing, integrated scheduling, and clear messaging about what Vermont Tech has to offer in both professional education and continuing education. Workshops, professional certificates, credentials of value, and continuing education credits (CEUs) should be aimed at a broad demographic comprised of targeted audiences. While onsite experiences are ideal for much of the technical training Vermont Tech does well, expanding hybridized courses that bookend onsite experience with online resources helps to optimize student learning while maximizing value for the College.

ALLIED SERVICES CURRICULAR OPPORTUNITIES

One of Vermont Tech's greatest assets is its array of allied services for agriculture and other aspects of the agriculture and food value chains. However, if those assets are not clearly integrated or evident as possible resources, there is little likelihood that students or the College will reap value from those curricular areas. The complexity of the agriculture and food value chains means that content from multiple areas of the college are relevant and necessary to students working on both sides of the farm gate. Relevant areas of study at Vermont Tech include Diesel Technology, Vet Tech, Forestry, RE/Green Energy, Electrical Engineering Technology, Manufacturing Engineering Technology, Entrepreneurship, HVAC, Architectural Engineering Technology, Computer Software Engineering, Electromechanical Engineering, Software Development, Web Development, Construction Management.

COLLEGE FARM

While the precise details of the farm remain to be determined, it does seem clear that Vermont Tech can remain true to one of its preeminent core values—hands-on experiential education—only some version of the farm remains as the on-campus nexus point for theory and praxis. Requisite curricular diversity creates a parallel necessity for a diverse farm enterprise. Scale is less important than pedagogical value and excellence in management and infrastructure.

OFFICE FOR ADVISING, EXTERNSHIPS, & APPRENTICESHIPS

This proposed new office is central to and at the center of the Vermont Tech educational experience, particularly the degree programs. With a limited number of faculty now and in the near future, this office is critical to the success of the educational enterprise and, just as importantly, the academic and professional success of students. This office will be structurally housed within the proposed Center. It will require at least one full-time administrator/counselor and an administrative assistant.

Recruitment, Revenue, and Reputation-Building Opportunities

The list of potential initiatives below represents opportunities that seem congruent with Vermont Tech's mission, core values, and achievable resources.

1. Whenever possible, any given education deliverable should be considered in terms of the ability to offer the same core content (subject matter) to different audiences and for different credentialing opportunities--perhaps with different modalities of delivery (onsite, online, hybridized). This strategy allows the opportunity to maximize efficiency and diverse revenue streams.
2. Each of these suggested initiatives should be examined further to assess audience, cost, and return on investment.

Concurrent Enrollment, CTE, and VAST

Vermont Tech should assess current programs and relationships that could boost revenue while cultivating high school students who might choose to enroll at Vermont Tech for additional programs after high school. Funding exists to support students and institutions in these programs. Relationships with CTEs should be deepened, and Vermont Tech facilities and instruction should at least match if not exceed those capacities at the CTEs.

Governor's Institute for Farm & Food Systems
Vermont Tech should reassess the potential for offering an annual Governor's Institute focused on what has been one of Vermont Tech's core areas of focus, both in order to attract students and recognition and to increase summer revenues.

Free Teaser Courses & Workshops
Vermont Tech can offer free courses and workshops onsite and online in order to attract potential students while also building its reputation and network throughout the region.

Low-Cost Skills Intensive Courses
Vermont Tech should continue to offer affordable skills intensive courses that serve the local community as well as a broad demographic. Grant funding and sponsorships are more likely to support those courses and yield a positive ROI than relying upon tuition revenues.

One-Year Tech Diploma
An intensely-focused technical diploma typically requires a multi-month or one-year time commitment. Technical diplomas tend to be focused on the needs of local/regional industry and businesses and are designed to support persons preparing for or advancing in the designated realm of employment.

Associate's Degree
For the Center to function structurally, four associate's degree programs seem appropriate in terms of scope: Livestock Agriculture; Plant Science & Technology for Working Landscapes; Food System Technology; Veterinary Technology. Note that a values-based descriptor (sustainable, regenerative, organic) might be appropriate for each major to connote aspiration and also yield more refined classification and search results. Having a degree program that goes beyond livestock and plant-based agriculture and captures the technical aspects of the food supply chain beyond the farm gate allows for a more diverse array of students and capitalizes upon related curricula and resources in other parts of the college.

Professional Certificates
Professional certificates are growing in popularity with post-baccalaureate and older students, as well as among employers. With careful planning, professional certificates can be both standalone and embedded within existing degree programs. They also serve as a key component of increasingly popular "stackable credential" education pathways.

Continuing Education
Continuing Education credits (CEUs) can attract working professionals who need to maintain their professional certifications and licenses. Typically, 10 contact hours are required for 1 CEU. Courses and workshops designed and targeted appropriately can serve broad audiences while also offering CE credit.

NEXT STEPS
Some of these recommendations require more detail including definition around programs such as the BT degree and the one-year tech diploma, and the structure and placement of the Center within the Vermont Tech organizational chart. This will be accomplished through coordination with the Culture and Curriculum Team. Restructuring into a Center that provides alignment and cohesion between elements will bring new vitality to the long standing, applied program at Vermont Tech.

Culture & Curriculum Team Final Report

October, 2020

TEAM MEMBERS

- Marc Mihaly – *Chair*
- Louise Calderwood – *Steering Committee liaison*
- Emily Wright, dairy nutritionist, alum
- Dr. Kim Crowe, Vermont Tech
- Emma Marvin, Butternut Mountain Farm
- Katie Ballard, Miner Institute
- Vern Grubinger, UVM Extension
- Steve Schubart, Grass Cattle Co, alum
- Laura Ginsburg, Vermont Agency of Agriculture

Dairy Sub-Committee of Culture & Curriculum Team: Met 6 times

- Laura Ginsburg – Chair
- Steph Nault, Vermont Tech, alum
- Chelsea Sprague, Sprague Farms
- Henry Pearl, Hillview Farm, Vermont Tech alum, UVM 2+2 Program
- Ryan Andrus, Bridgman Goat Farm
- Brent Beidler, former organic dairy farmer, Vermont Tech adjunct prof
- Linda Dimmick, Neighborly Farms
- Jamie St. Pierre, Pleasant Valley Farms
- Meg Nelson, Nelson Farms and Shadagee Farm, alum

INTRODUCTION

The next step is for the Team to formalize its work to date in the form of recommendations to the Steering Committee. These in turn can be combined with those of the Program Models Development Team to form a joint product that goes to the Business Case Development and Communications & Outreach Teams. We have prepared recommendations for your review and further development.

RECOMMENDATIONS

The Culture and Curriculum Team recommends the following for a revised Vermont Tech curriculum:

An Overall Curriculum Goal to Reach New Types of Students:

We need to expand the potential demographic for the Vermont Tech agricultural curriculum. The overall program design must appeal both to Vermont Tech's traditional Vermont on-farm students and also to an expanded audience. The latter include students from elsewhere in the northeast, students aspiring to start new food businesses or farms, career changers, active professionals, and others simply seeking applied knowledge of farming and the food system.

This means that:

- The curriculum must provide content that can lead to a variety of careers in agriculture and the food system.
- The courses must be flexible to be combinable into a variety of educational products that include both the traditional associate and bachelor degrees, but also can be assembled into shorter, focused degrees, certificates, professional executive degrees, and simple one course offerings.
- The curriculum must be offered in a variety of delivery formats that allow remote or partially remote access (see recommendation re: on-line learning below) and maximize opportunities for applied learning in labs and guided practical education.

Addressing the potential diversity of student types in an expanded cohort presents challenges that Vermont Tech will need to explore and address. Career changers and other experienced students have different needs and potentially different cultural backgrounds than the Vermont Tech current cohort of farm students. Some students will need basic education, others will arrive with no farming experience, and some will seek granular specific knowledge. While a curriculum can be constructed to address many of these needs, the school must evaluate each type of student, acquire more information about their needs, and ultimately may face substantial choices as to what students it can realistically serve.

A General Education Program Teaching Foundational Skills:
The curriculum must provide foundational math and writing skills. Reasonable English and math skills are essential for any business owner or employee as are other basic skills such as basic civics and scientific literacy. Basic life skills such as goal setting and self-awareness provide a basis for all learning.

The recommended curriculum should therefore contain a General Education component taken either at CCV or at Vermont Tech that is offered in multiple times and formats so that it is available to all students early in their experience at Vermont Tech.

The Team recommends:

- Vermont Tech should explore the possibility of CCV as the unique provider of both the English and math portions of the general education program. It may be that Vermont Tech can leave that element to CCV thus freeing up more time in the Vermont Tech first and second semesters for important experiential elements and core curriculum classes.
- The content of the skills review and in-semester General Education courses – whether at CCV or Vermont Tech — should be *required* unless students test out of them.
- If CCV is not the only option, a portion of the General Education program could be offered both in block program form in the latter part of a summer semester and in a January term (both discussed below).
- With or without the CCV option, Vermont Tech should offer an introductory program to provide a hands-on “boot camp” for those students without farm experience.
- Again, unless we rely completely on CCV, in addition to the summer or January term skills review courses in general education, the first and second semester curriculum should contain full courses to advance student knowledge in English and math.
- In addition to the basic math and English courses, the faculty director and staff of the Center for Agriculture and Food Entrepreneurship (discussed below) should help agricultural faculty develop their course curricula to emphasize writing and math elements wherever possible in order to teach more advanced elements of good writing and more specific math skills. Special projects containing writing or math elements could be provided in selected course possibly for one additional credit.

A Core Curriculum that teaches fundamental knowledge and common to different careers:
Vermont Tech should provide degree students with a base of knowledge that enables them to choose any of the varied careers open to them and to transfer that knowledge to different environments as profound and inevitable changes in the food system requires them to change as well.

While specialized substantive knowledge and skills are provided through electives and stackable certificates, the core curriculum should be delivered through courses and externships that are required for degree students. The Team has created a list of learning outcomes and arrayed those into a prototype curriculum. Its key knowledge and skill outcomes include:

- ***Core business skills*** including employee management, basic HR, markets, marketing and brand development, basic accounting, operations and management, and an understanding of debt and credit.
- ***Communication, organization and people skills*** including goal setting, teamwork, presentational skills, and self-awareness.
- ***Agriculture and food economics and policy*** including the history of food policy, current policy issues and options for future directions, the Farm Bill and other elements of the federal/state regulatory and economic interplay.
- ***Environmental processes and regulation*** including principles of ecology, pollination, decomposition, basic water quality chemistry and regulation, hydrology and water systems, testing and analysis, and climate and weather.

A Summer program and January Term:
The Team strongly recommends a January term ("J-Term") and a summer semester as essential elements of a program that attracts new audiences and thrives in an environment outside the traditional fall and spring semester model.

The January term of two to three weeks would offer multiple course options between the Fall and Spring semesters. Both the summer semester and the J-Term provide opportunities to offer varied educational products to an expanded group beyond traditional college students.

The Team recommends:

- Both the summer semester and J-Term could offer courses on the "block basis" where students take one course at a time at approximately one credit per week of class. Vermont Tech full-time faculty could teach these courses. This format also allows working food system professionals or farmers to bring their concrete experience to teach as adjuncts for one or two weeks rather than over a full semester. Students can focus on one course at a time which facilitates labs and experiential learning without concern for scheduling conflicts with other courses.
- The Summer Semester and the January term can offer the General Education review courses and a multiplicity of one or two-credit specialized courses that would carry out our goal of expanding the Vermont Tech student body by appealing to individuals of varied ages and educational goals. Two and four-year degree students could take the courses to complete specialty tracks and to obtain stacking specialty certificates in addition to their degrees. Non-degree students could obtain certificates or simply take the courses to acquire the substantive knowledge. Part-time students could take a "summers-only" approach. The Summer Semester and J-Term make possible the General Education review program and accommodate a multiplicity of subject-specific courses in a format that allows teaching by adjunct practitioners and is available to degree, certificate and non-degree students.
- The summer semester assures that the facilities are utilized more efficiently on a year-around basis and students have opportunities to take applied classes during the growing season.

An increased experiential education component through a semester-in-practice and on-farm labs and other internship opportunities:
The Team and its Dairy Sub-Committee strongly recommend a substantial increase in hands-on experiential education as part of degree programs and certificates. A hands-on approach contributes to Vermont Tech's unique niche in the competitive agricultural education environment. Hands-on experiences motivate students who struggle with traditional academics; it provides a context that then enables them to absorb material delivered in the classroom setting.

The overall goal of the experiential program would be to assure that two-year AAS students are exposed at least briefly to multiple types of enterprises and one in depth learning opportunity during a two-year AAS program, with opportunities for broader and more in-depth exposure for four-year students (BS/BT), as well as experiential elements for specialized courses utilized by students seeking just credits or stackable certificates.

The curriculum should increase the share of experiential learning in the ratio of hand-on to classroom learning via:

- A 9-credit guided semester-in-practice on a farm(s) or elsewhere in the food system depending on the student's interest. These internships would occur at locations pre-vetted for educational value, with mentors on site, faculty visits, specific educational goals and student writing reflections required.
- An increase in the lab portion of classroom courses. These labs could be located on the Vermont Tech farm or on nearby farms or other elements of the food system.

This internship component would require both dedicated staff to select and review internship locations and faculty time (with course credit equivalents granted) to review and react to student reflections.

An enhanced student advising component:
The Team strongly recommends a robust faculty and staff administered advising program with dedicated personnel familiar with every element of the agricultural curriculum and all the experiential options.

Vermont Tech's goal is to attract an expanded student body with a greater variety of students. That requires that College's curriculum offer more options as to content, format and modality; thus the shift towards a large array of in-semester, summer semester, and J-term courses as well as possible multiple concentrations and certificates. This attractive range of options also can confuse students, and thus requires a highly developed guidance function where staff and faculty familiar with all of the options can advise full-time and part-time students on a career path, and guide students about which of the courses and educational products offered can advance their career goals and match their life-situation.

Multiple modalities:
The Team recommends that Vermont Tech offer many elements of the curriculum in several modalities—campus based, distance learning and hybrid format. The block summer and J-Term courses are ideal for offerings in both on-campus and distance formats. The on-campus format will attract students located in the northeast and the distance format will attract students from literally anywhere, especially if the on-line courses are offered in e-synchronous format.

The Team recommends that Vermont Tech investigate offering the AAS and other degrees, and shorter, focused certificates in a hybrid format which would include fully on-line classroom material combined with an initial orientation at the school; a semester-in-practice; and internship residencies on-farm or within the food system. This hybrid approach would facilitate a cost-effective model to students to achieve an education that meets their career goals within a variety of price points. Depending on the student's residence, the semester-in-practice and internship residencies could be located in Vermont or near the student's home.

A Center for Agriculture and Food Entrepreneurship at Vermont Tech:

The Team supports the Program Models Development Team's concept of a Center for Agriculture and Food Entrepreneurship at Vermont Tech because it will provide a superior method of implementing many of the goals and recommendations described above, including: management of the summer and J-Term programs; recruitment and supervision of "permanent" experienced adjuncts who would constitute an expanded part of the Vermont Tech community; selection of the semester-in-practice and internship locations and supervision of participating students; and the enhanced advising function. The Center could also seek grants and could market the overall program to new students. To accomplish its purpose, the Center would need executional capacity including a faculty director with as reduced course load and staff. The Center could have an advisory board.

Communications & Marketing Team Final Report

April, 2021

TEAM MEMBERS:

- Kate Finley Woodruff, Chair, Associate Dean, UVM College of Agriculture and Life Sciences
- Megan Smith, Former Commissioner of Vermont Department of Tourism and Marketing
- Mary White, Vermont Farm Bureau and Chair of the VFB Dairy Committee
- Amanda Chaulk, Director of Marketing and Communications, Vermont Technical College
- Jessica Van Deren, Assistant Dean of Admissions, Vermont Technical College
- Regina Beidler, Co-Chair of the Vermont Tech Farm and Food System Transformation Project

Overview of work completed:

- ✔ Design and conduct a student alumni focus group to gather perceptions and feedback
- ✔ Review current brand strategies and marketing initiatives
- ✔ Analyze enrollment and retention by major and degree
- ✔ Identify barriers, benefits and competition for enrollment in Vermont Tech's agriculture program
- ✔ Make recommendations for degree offerings
- ✔ Make recommendations on center name and market positioning
- ✔ Recommend structure and considerations for internships
- ✔ Suggest communication and marketing strategies
- ✔ Develop ideas for strategic partnerships

Mission Statement for Vermont Tech:
"We provide career-focused technical and professional education in a caring community which prepares students for immediate workplace success and continued learning."

Mission Statement for agriculture and food programs at Vermont Tech:
Vermont Tech builds on its long history and strengths, offering a strong core agriculture and food curriculum and diverse opportunities for applied and practical experience in meeting the needs of the current and future food system.

Our Motivation:

1. Ensure that Vermont Tech Randolph campus does not close down; a key aspect of this is for a revised agriculture and food system educational program being financially sustainable which means substantially increasing enrollment and ensuring the Vermont Tech farm at least breaks even in its expenses and revenue;
2. Re-vision the agriculture and food system educational program to be rigorous and relevant to an evolving food system and the jobs that are emerging in it;
3. Re-vision the agriculture and food system educational program so that Vermont Tech becomes THE place for applied, hands-on ag and food system education in the Northeast, with a clearly defined niche that enables Vermont Tech to recruit a much broader, more diverse student body from both Vermont and the Northeast. [note: students from Vermont dairy farms will still experience a strong dairy program]; and
4. Re-vision the role and focus of the Vermont Tech farm, its facilities and 250 acres to better align with the core of what is being taught in the re-envisioned agriculture and food system educational program.

Team Focus:

1. Build academic programs that prepare learners for jobs in agriculture and food systems through applied education and experiences.
2. Provide learners with the professional and academic skills and knowledge to build a successful, meaningful career.

SWOT Analysis of Vermont Tech's current agriculture programs

STRENGTHS	WEAKNESSES
● Small campus creates a welcome, close-knit environment for students ● Known for hands-on, practical skills ● Reputation as an applied agriculture school ● Strong job placement rate ● Access to nearby farmers and food producers ● Strong alumni active in the agriculture sector ● Extensive land base offers opportunities for new and diversified use. ● Opportunity to blend majors to provide a skill-based education with less focus on strictly dairy (agribusiness vs. dairy)	● Limited number of faculty and staff dedicated to the agriculture programs ● Financial struggle to maintain farm without increase in student enrollment ● Outdated barn with conventional "out-of-date" systems ● Low philanthropy support ● Limited direct involvement from alumni ● Undefined niche in the marketplace ● Rural setting may not appeal to students looking for a traditional "college town" ● "Suitcase" community limits student engagement on weekends ● Label as a "tech" or "trade" school may be falsely positioning the academic offering to potential audience ● Outdated campus facilities that may not compete with other like institutions
OPPORTUNITIES	**THREATS**
● Positioned to build on Vermont's reputation for food production and entrepreneurship (Farm to Plate) that could appeal to multiple audiences ● The COVID pandemic has reinforced the importance of a local food system, including food production, access, and distribution ● Potential new and untapped markets such as adult learners, refugee and migrant workers, etc. ● Proximity to New England markets allows opportunity to grow student base beyond Vermont ● Many opportunities to work in Vermont food systems after graduation ● Partnerships with other Vermont academic institutions (UVM) that could provide education offerings without overhead ● Extensive opportunities for externships with agriculture and food partners in Vermont ● COVID pandemic may have created a new comfort level for online engagement	● Decline in the number of dairy farms, as well as existing farms becoming larger make current academic programs more challenging to stay relevant ● Decline in student base nationally ● Fewer Vermont students going on to traditional four-year programs ● State funding unpredictable ● Announcement of closure created lack of confidence in stability of institution ● Vulnerable to Vermont State College system decisions ● COVID pandemic may delay college starts and/or create financial instability in the target audience(s)

Target Audiences:
Currently, 86% of the students enrolled in the agriculture programs at Vermont Tech (including the A.A.S. and B.S. programs) are Vermonters. 63% of our current students identify as female. 85% applied for financial aid and of those, 48% are low income (Pell Grant eligible). Of current students, only 56% entered Vermont Tech as a first-time, first-year student. It's also important to note that 37% of the current class are transfers from another institution.

The following populations have been determined as primary and secondary targets audiences for academic enrollment at Vermont Technical College. Additional considerations for audiences *specifically for the food and agriculture programs* indicated in red.

PRIMARY

(PRE-COLLEGE) Prospective in-state and regional high school students …

- Care about making an economical choice for their studies
- Want hands-on, applied instruction vs. lecture-only format
- Value honest, down-to-earth communications
- Want to have fun while they are in school
- Consider post-college outcomes in making their college decision
- Are largely drawn to their first major of choice
- Traditionally come from family farms, or have direct interaction with agriculture through 4-H, FFA, neighbor and relative's farm, or part-time job
- Show interest and wish to explore a career in working in food and agriculture but have not yet had experience in those areas

Trusted Advisers: parents and family members, peers

- Care about an affordable choice with a good return on investment
- Want their student to be successful in school and upon graduation
- Want to know their student is safe and will not be lost in the back of a classroom
- Will not prioritize the social aspects of their student's college choice, but understand how those features will help sell their student on their school of choice
- May be an alum or have another connection to the college

SECONDARY

High School Teachers/School Counselors/VSAC Counselors

- Care about the quality of education available to their students and about safety nets for academic support
- Care about alignment of curriculum and outcomes, which lead to quality careers for their students
- Care about the economics of college choice for their students
- Want to know about the demographics of the current student population to understand best who will be a good fit for our college
- Would benefit from greater understanding of where their students go after graduating from Vermont Tech
- Want to support the public option to maintain open access in Vermont

Alumni

- Are not engaged with the college to the largest degree
- They associate themselves with their major over the college as a whole
- Notable portions of alums recommend the college to prospective students, but may need further education about current college information
- A small number of alums donate, volunteer, or present at the college

Employers

- Those with Vermont Tech employees are very willing to hire graduates in the future when opportunities arise
- See Vermont Tech graduates as reliable, hardworking, and competent, but not necessarily as leaders or forward-thinkers
- Can connect the dots on how Vermont Tech positively affects their business when graduates work for them
- Are less likely to understand the value of the college if they lack a Vermont Tech employee

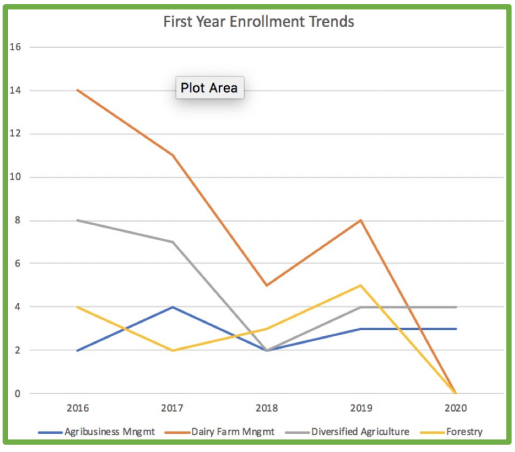
Non-Traditional Learners

- Second career track students seeking practical education or an opportunity to test interest in a new area
- Professionals seeking certification opportunities to meet or enhance the requirements of current positions
- Employers whose employees need additional certifications to meet the needs of a changing marketplace

The audience for the agriculture and food programs at Vermont Technical College mirror the overall assumptions of other programs. However, drawing from an audience with direct farm and agriculture experience can be expected to decrease with the changing landscape of Vermont agriculture and the decrease in the number of dairy farms. It is important that our academic programs respond by creating curriculum that allows students to be introduced to careers in food and agriculture with very little experience.

Enrollment:

The enrollment in programs within the School of Agriculture, Plant, and Animal Science has always been small, with a maximum number of 14 students in a single program over the last five years. However, in the past two years, we have seen a sharp decline, with two programs yielding no students. Upon review of recent data, we concluded:



Over the last five years:

- Overall enrollment has decreased by 75%
- Inquiries to applicant rate 41% in 2020 compared to 34% in 2016
- The average yield over five years for each program ranges between 50-60%
- In 2020, 50% of the programs yielded no students

Retention:

There is a significant difference in the retention rate of students enrolled in associate degree programs vs. the bachelor degree offered in Diversified Agriculture. Over the past five years, the bachelor's degree has consistently retained students after two years at a significantly lower rate than students graduating at that

time with an associate's degree. Furthermore, almost no students who enrolled as first year students in a bachelor's program ended up graduating with the degree. This does not reflect students who may have transferred to other degrees or programs at the college.

Reflecting on how few alumni the bachelor's degree has produced in recent years, it is suggested that marketing and curriculum efforts be focused on delivering an associate's degree that is consistent with the current demand of the potential audience. It does make sense to keep the bachelor's program as an offering, but perhaps lead with the strength of an associate degree relevant to food and agriculture trends. There is some concern that the VTFARMS 2+2 program discourages students from enrolling in the Diversified Agriculture B.S., but could also be considered a critical recruitment tool for the associate's degree.

Perceived and Real Barriers to Students:
The audience for the Vermont Tech agriculture programs may be identified accurately based on demographic, geographic, and behavior factors. However, it is important to consider real and perceived barriers that may prevent the audience from ultimately deciding to enroll in a two or four-year food and agriculture program. The following knowledge and beliefs may be considered. Many of these concerns can be addressed through creativity in academic delivery, and marketing alumni success.

Potential Barriers

(PRE-COLLEGE) Prospective in-state and out-of-state high school students and recent graduates:

- Expensive to attend, especially for out-of-state students. Many students need to work and cannot attend college full-time
- Perception that Vermont Tech agriculture programs are limited to dairy, not innovative, lack modernization, appears older and less technical
- Not a lot to engage students on campus, especially on weekends
- Reputation of "tech schools" position Vermont Tech as a non-rigorous option
- Residential halls and common areas outdated compared to the competition
- Given that many students attending Vermont Tech are Pell-eligible and first generation, many students may struggle to navigate the processes for application, financial aid process, etc.
- Vermont Tech may not have brand recognition to out-of-state students and less recognition for some areas of Vermont

RETENTION CONSIDERATIONS:

There is a significant difference in the retention of students enrolled in the two-year vs. four-year program.

- How is this relevant?
- Why might this be the case?

AGR Retention Comparison

	Associate		
Cohort Yr	Entry Headcount	RET 2Y	% 2Y
AY15	11	7	63.64%
AY16	18	15	83.33%
AY17	17	14	82.35%
AY18	6	4	66.67%
AY19	14	10	71.43%
AY20	3	0	0.00%

Associate degree data includes AAS.AMT and AAS.DFM

	Bachelor's						
Cohort Yr	Entry Headcount	RET 2Y	% 2Y	RET 3Y	% 3Y	RET 4Y	% 4Y
AY15	5	3	60.00%	1	20.00%	0	0.00%
AY16	6	6	100.00%	2	33.33%	0	0.00%
AY17	11	6	54.55%	2	18.18%	1	9.09%
AY18	2	0	0.00%	0	0.00%	0	0.00%
AY19	6	3	50.00%	0	0.00%	0	0.00%
AY20	5	0	0.00%	0	0.00%	0	0.00%

Program Transfer (Total Fall 2015 to Fall 2020)

Admit Program	Transfer Program	Number
AAS.AMT	AAS.BUS	1
AAS.AMT	AAS.EQS	1
BS.DAG	BS.BUS+2	1
AAS.AMT	BS.DAG	2
AAS.AMT	AAS.DFM > BS.DAG	2
AAS.DFM	BS.DAG	3
BS.DAG	AAS.AMT	1

Provided by Erica Dana 2-19-21

- Parents may express concern about job availability and security in the agriculture/dairy sector and therefore not encourage their student to make the educational investment in our program

Perceived and Real Benefits to Students:

Potential Benefits

(PRE-COLLEGE) Prospective in-state and out-of-state high school students and recent graduates:

- Vermont Tech is small and I will make friends and fit in
- I can still work on the weekends and go to Vermont Tech during the week
- I will get a job after I earn my associate's degree, and therefore Vermont Tech is a smart investment

Competition and Competing Behaviors:
Vermont and regional high school juniors and seniors are considering many options when evaluating career plans and higher education options after graduation. Therefore, competition exists for converting an admitted student to enrolled in a Vermont Tech degree program. Some considerations for competition include the following:

Competing colleges and universities:
Both in-state and regional higher education institutions with a focus on agriculture and food programs provide alternatives for our target audience. Some of these include the University of Vermont, University of Massachusetts-Amherst, University of New Hampshire, University of Maine-Orono, and SUNY Cobleskill. Sterling College offers competitive programs in food, agriculture and sustainability, but appears to be positioned as more of a competitive and expensive program.

Not attending college:
The competing behavior of not attending higher education at all after high school graduation seems to be a growing trend amongst Vermont high school students. One reason may be the concern over financial debt and lack of understanding of the payoff in an investment in higher education. Given the high percent of Pell-eligible students typically attending Vermont Tech, we can assume that perhaps financial instability may be a factor in high school students needing to work immediately after graduation. This may limit options for beginning even a part-time college education, but could also offer opportunities for customizing course offerings and methods of delivery to meet the needs of this audience.

Program Value Proposition:
Vermont Tech offers a practical, applied education in a small, intimate, rural setting in Vermont. We educate the future producers, business owners and managers in the Northeast Food Shed, honing critical thinking skills by combining classroom learning, hands-on learning and real-world experience on farms and in other areas of the food system.

This happens by:
Application of different learning modalities to meet a variety of student needs.
- Close working relationships with regional farm and food businesses and organizations.
- An advisory that assesses, on a continual basis, the skills needed to succeed in an ever-evolving farm and food system.

Focus group:
The Communication and Marketing Team invited recent graduates of the agricultural programs at Vermont Tech to discuss their perceptions and experiences of the college. The event was held as a live

TEAMS call on February 2nd and included eight recent graduates. All were recipients of the VTFARMS 2+2 program, and were either juniors, seniors at the University of Vermont, or had recently graduated. The following themes emerged from our conversation:

> *"When my car broke down at VTC, I just lifted the hood and waited for the Diesel students to come by. At UVM, I called a tow truck."*

- Vermont Tech provides a sense of belonging and community
- Vermont Tech provides a hands-on educational experience
- The agricultural program lacks diversity in instructors and perspective
- The program helps students' network with Vermont agricultural leaders.
- Farm is not "cutting edge" and innovative and have gaps in technology
- Not a lot for students to do on campus; many students go home on weekends to work

Students were asked what might bring them back to Vermont Technical College to take continuing education and workforce development courses. The responses included:

- Introductory welding class
- cooking class
- mechanics class
- business classes for the farm
- leadership training-managing people
- HR training
- hoof trimming courses
- business tax course
- selling and marketing value-added farm products

Other notable comments include:

- The "MATH" focus in the "SCIENCE + MATH" campaign intimidates some students thinking of attending college
- Vermont Tech is seen as a "safety school" for less academically successful students
- Reputation and market position of "tech high schools" hurts Vermont Tech
- "Someone visited my high school from Vermont Tech. It had a positive impact on me."
- "Reputation that 'tech grads' are 'essential workers'."

Positioning Statement:
With a clear understanding of the competition, our own strengths and weaknesses as a program, and perceived and real barriers and benefits to students considering Vermont Technical College, we propose a positioning statement to articulate our niche in the market:

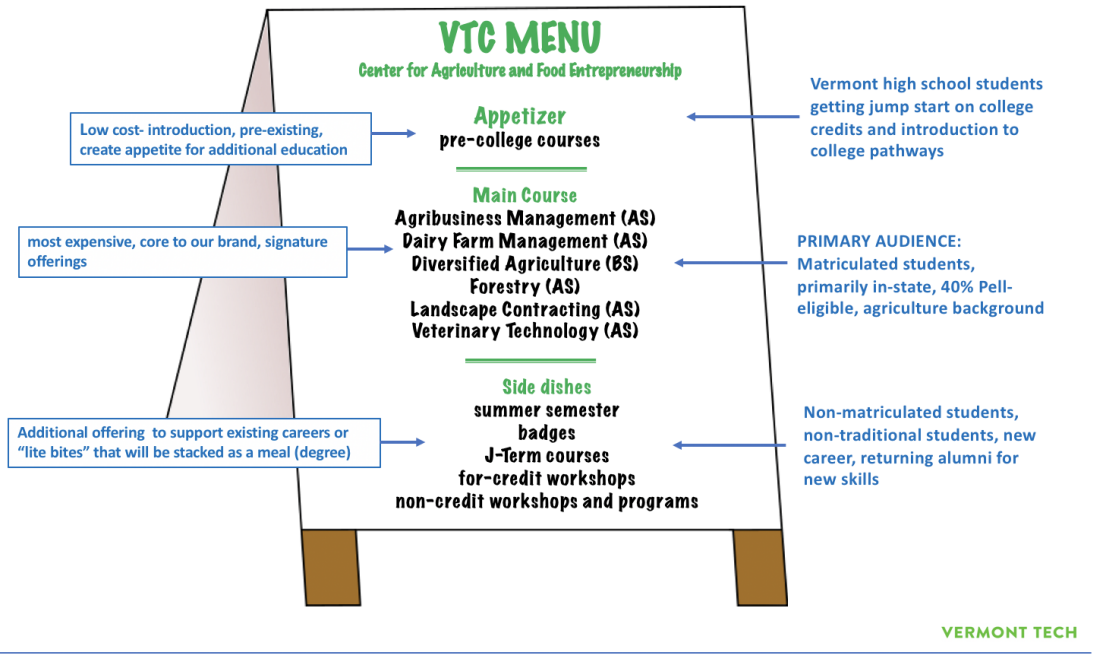
"The Vermont Technical College agriculture and food programs offer relevant, hands-on education to prepare students for a rewarding, meaningful career, mentored by a community connected and committed to a sustainable farm and food system."

Academic Offerings:
Vermont Tech currently offers both associate and bachelor's degree within the School of Agriculture, Plant, and Animal Science. The degrees are as follows:

Agribusiness Management (AAS)
Dairy Farm Management (AAS)
Diversified Agriculture (BS)

Upon review of the two associate degrees, the Team was concerned for the amount of repetition within the course requirements. This may cause confusion to the potential audience, struggling to differentiate the area of study and career paths. Given the trends toward diversification both in Vermont and the Northeast region, positioning a degree that recognizes and supports value-added dairy, diversified food and animal production, and other career options supported by the food system, may provide another opportunity.

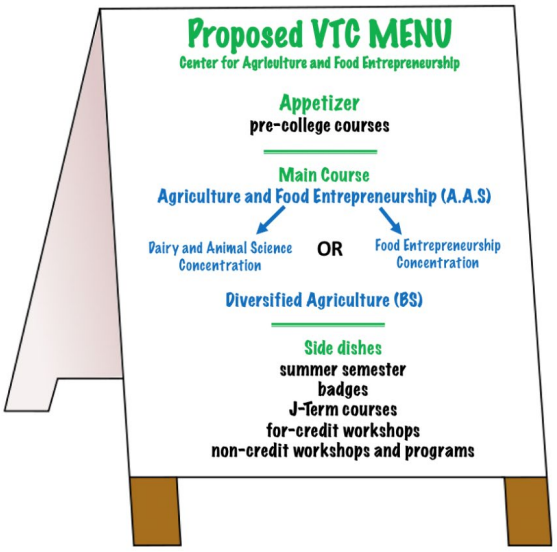
Academic offerings:
As several groups have discussed there is an entire menu of academic offerings, ranging from non-credit short courses to bachelor degrees that can engage various audiences including pre-college students, matriculated students, and lifetime learners re-launching careers or expanding their skill set. Each academic offering requires resources to design, market, implement and evaluate outcomes. Continued market research is needed to evaluate demand and competition. The menu of courses can be illustrated as follows, identifying key audiences for each offering:



For the purpose of this work, the focus is primarily toward the Agribusiness and Dairy Farm Management associate degrees, and the Diversified Agriculture bachelor's degree. Given the current trends in enrollment and retention for our "main course" programs, there is concern that the associate degrees are not differentiated and curriculum requirements are too closely aligned to be marketing as two distinct degrees. Students may be confused with two options for management. Furthermore, dairy farming is also agribusiness, so it is unclear how these degrees will lead to earning different skills and knowledge.

The website has recently been updated, but until recently portrayed the portal of these two programs to be exactly the same, perhaps adding to confusion. This has since been edited.

Recommendation for ONE Associate's Degree:
Upon further review of the coursework required for the two existing associate degrees, Agribusiness Management (A.A.S) and Dairy Farm Management (A.A.S), it was identified that most of the requirements are the same. The redundancy creates lack of clear focus as to the niche and expertise of each program, and requires resources to support both. It is our recommendation that ONE associate degree be offered, and be named **Agriculture and Food Entrepreneurship (AAS).** This degree could provide a foundation in issues of food and agriculture such as policy, business skills, environmental issues, and more. Many of these courses may exist or have options to cross-list existing courses in the business program. An intensive hands-on and internship experience would be included in every semester, resulting in ¼ of credits required.



Proposed Curriculum for VTC Agriculture programs
Adapted from Culture and Curriculum Committee and COM Committee 3-1-21

Knowledge and skills courses
Basic Farm skills
} Assuming no credit-part of orientation?

VTC General Education Requirements (20 credits)
English 001 (3cr.)
Technical Communication (3cr.)
Natural and Physical Science (4cr.)
Information Technology (1 cr.)
Arts, Humanities or Social Science (6 cr.) (must take specific courses below)
Math (3cr.)

Agriculture and Food Entrepreneurship Associate Degree
Requirements (23 additional credits)
Introduction to Agriculture Economics and Policy (3cr.) fulfills General Education requirement
Business Skills for the Food System (3cr.)
Emerging Issues in Food and Agriculture (4cr.) fulfills General Education requirement
Environmental Issues (3 cr.)
Internship (15 cr.)
Career Preparation Capstone (1 cr.)

Dairy and Animal Science Concentration
(**Choose at least 18 credits below)
Agronomy and Soils
Animal Mgmt., Behavior & Welfare
Soil Science, Health & Nutrient Mgmt.
Livestock Nutrition
Livestock Reproduction
Production, Mgmt., & Marketing
Advanced Mechanical Systems
Use of ARCGIS
Livestock Systems and Buildings
Forage Crop Production and Mgmt.
Additional Dairy mgmt. courses (electives)
*Up to THREE 1cr. Credential courses**

OR

Food Entrepreneurship Concentration
(Choose at least 18 credits below)
Introduction to Specialty Foods
Soil Science, Health & Nutrient Mgmt.
Mechanical Aspects of Food Systems
Entrepreneurship Skills in Food Systems
Production, Mgmt. & Marketing
Fruit & Veg. Production, Mgmt., and Marketing
Specialty Foods
Advanced Mechanical Systems
Diversified Ag courses (maple, dairy goats, etc.)
Additional Business related courses (electives)
*Up to THREE 1cr. Credential courses**

Total Credits: 60
(includes an A.A.S Degree 15 cr. Internships, a concentration, and possibly earned credential courses

**Credential courses could include certifications such as tractor safety, HAACP, Pesticide Applicators etc.*
***Requirements for the VTFARMS 2+2 scholarship would be determined as part of the Dairy and Animal Science Concentration*

The foundational courses lead to the opportunity for a student to choose a track or concentration to specialize in Dairy and Animal Science or Food Entrepreneurship. This allows VTFARMS 2+2 students to continue to meet the requirements to transfer to the University of Vermont, but allows flexibility for other students interested in value-added food production and entrepreneurship. Additional tracks could be added in the future as courses are clustered to create depth in an area.

Internships:
The work of the Culture and Curriculum Team resulted in a proposal to include an intensive internship experience during the student's final semester of a two-year Associate Degree program. This could result in a "win-win" for our agriculture and food sector of our economy by providing not only valuable interns, but access to trained employees ready with the knowledge, skills, and hands-on experience upon graduation.

Semester ONE:

- Focus on hands-on introductory experiences at the Vermont Tech farm, learning about general animal care and handling and agricultural practices that offer applied learning immediately and will support retention.

Semester TWO:

- Focus on understanding the Vermont food system. Service-learning as a class could include work with farmers markets, field trips to manufacturers, wholesalers, and distributors to provide a full understanding of the farm to consumer to plate opportunities for careers in the food system. Examples include:
  - Cohort works with local farmers market to enroll vendors, review applications, policies and local rules, consider pricing and marketing strategies, and reflect on the challenges and opportunities of direct sales
  - Follow the milk from farm to consumer. Trace milk after it is picked up at the farm, understand the role of milk quality and inspection, take a tour of a processing facility, follow distribution and final retail location. How does the price of the product reflect the value added?

Semester THREE: Introduction to Internship (3 cr.)

- Placement at a local farm or food company with the goal to learn about the organization and identify a specific project with the mentor (employer) for the final semester. Recommend internship on Tuesdays and Thursdays.
- Participate in a once a week or every other week in a seminar to bring interns together as a class to reflect on skills learned and needs on the farm and food industry

Semester FOUR: Advanced Internship (6 cr.)

- Student continues internship placement Monday, Wednesday, and Friday to work on specific project
- Advance responsibility at the organization
- Participate in a once a week or every other week in a seminar to bring interns together as a class to reflect on projects (similar to a thesis)

To build a robust, engaging, cohesive internship experience over the four semesters of an associate's degree, resources would need to be dedicated to establish the program. In addition:

- An internship of 15 credits in one semester would require a student to be almost full-time at an internship site. This would essentially remove the student from campus in their final semester which may be difficult both socially and academically to complete all on campus requirements in three semesters.
- Oversight, coordination, and monitoring of interns in these intensive placements will require dedicated resources. Learning objectives and outcome expectations would need to be clearly defined for both the student and the intern host.
- An internship coordinator will not only need to oversee placements but build relationships and identify needs in Vermont's agriculture and food sector for potential interns in the future.

Price Strategies:
The current tuition and fees (not including room and meals) for a full-time in-state student to attend Vermont Technical College is $16,471 and $28,128 for out-of-state students. A regional comparison to other institutions offering similar agricultural programs:

INSTITUTION	IN-STATE TUITION + fees	OUT-OF-STATE TUITION + fees
Vermont Technical College *	$16,471	$28,128
University of Vermont	$19,062	$43,950
University of Massachusetts, Amherst *	$8,219.50	$18,213
University of Maine, Orono	$11,744	$32,534
SUNY Cobleskill *	$8,591	$18,501
University of New Hampshire*	$18,938	$36,278
VA Tech*	$14,441	$33,585

*Indicates institutions with Associate Degree programs

How do we compare to the competition? What benefits can we suggest?
Consider reviewing competing programs: https://stockbridge.cns.umass.edu/onlinesustfarm and https://catalog.unh.edu/programs/#filter=.filter_40

RSP program opportunities: (https://www.vtc.edu/tuition-fees/discounted-tuition/)
Identifying potential scholarship opportunities to reduce the tuition to become more competitive to out-of-state students, as well as in-state students would reduce the financial barrier. Key questions to consider when assessing price incentives:

- What states could be potential market opportunities?
- Are there county demographics, high schools that would be ideal targets both in-state and out-of-state?
- What strategies could we suggest to reach them?

Develop Marketing Strategies: A Few Suggestions

	LOW COST	HIGH COST
LOW IMPACT MARKETING STRATEGIES	• Online short tour videos of campus & farm "life in the day of a Center for Agriculture & Food Entrepreneurship student" • Provide content to farming associations and clubs, "Women Can Do" • Social media • Personal outreach to school • Outreach to agriculture organizations	• TV ads • Newspaper ads • Direct mail • Sponsorship of farming associations and clubs • Attend college fairs for specific majors
HIGH IMPACT MARKETING STRATEGIES	• Market with partnerships/industry leaders • Market with prospective internship holders • Leader outreach with local programs (radio, TV/news, across the fence, etc.) • Alumni ambassadors (assuming alumni can self-organize) • Social media advertising • Student ambassadors • Pilot case-study – on-going school relationships & community service built into curriculum • Tell the alumni story • Track visitors to website and capture their details and retarget	• Stay overnight farm & campus tours • Offer some sort of "farm experience" • Farm events (meal events, farmers market, farm days, meet the farmer, workshops) • Camps (like Coder Camp) • Competitions (like Bridge Building) • Distribute branded goods to current students and alumni • Organize calling campaigns and letter writing with alumni and students • Offer alumni reunion • Select TV and radio • Host a Vermont Breakfast on the Farm event

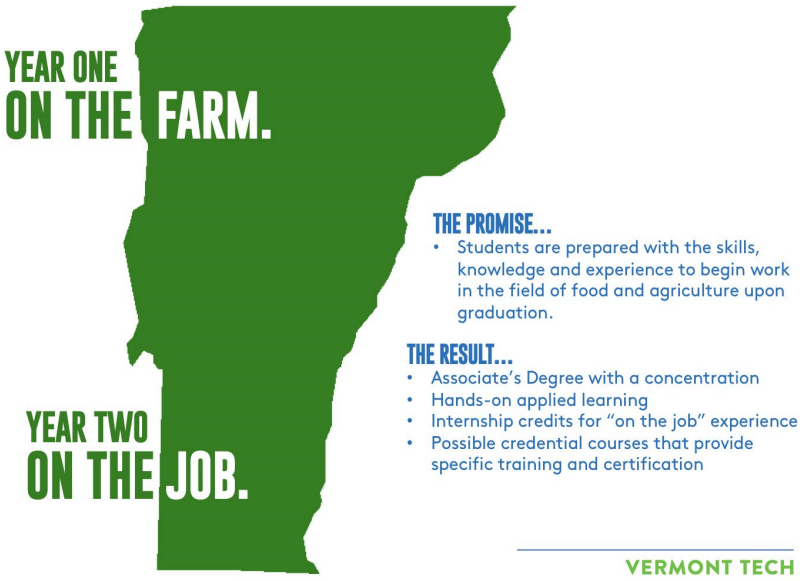
Branding and Messaging Considerations

The following are key messages currently utilized by Vermont Technical College:

- The college's small size affords students a close-knit community among faculty, staff and peers who care about them and their success.
- The successful outcomes of Vermont Tech graduates assure prospective students and families a good return on their investment.
- Applied learning strengthens the connections between rigorous subjects and comprehension. It makes learning that much more enjoyable too.
- Graduates of the Vermont Technical College are woven into the rural fabric of Vermont and New England.
- Vermont Technical College graduates are using technology, innovation, problem solving, and creative thinking to build stronger, more resilient communities.

Messaging the PROMISE:

- Vermont Technical College is known for applied, hands-on educational experiences. By focusing the first year on learning basic farm and food production skills at the Vermont Tech Farm and through field trips and guest speakers, students will be provided a foundation for an agriculture and food education
- An introduction internship in the fall semester of year TWO, followed by an advanced internship with more responsibility within the same placement will provide an opportunity for students to not only understand multiple aspects of the business, but also focus on a project with a valuable outcome to the mentor.



STRATEGIC PARTNERSHIPS:

Vermont Academic Institutions:

- Expand 2+2 articulation agreements with the University of Vermont as possible other institutions to include additional programs such as Food Systems, Agroecology, Community Entrepreneurship and others.
- Expand eligibility for the VTFarms 2+2 program to provide scholarships for students interested in dairy as well as food entrepreneurship and farm diversification to support the working landscape of the future.
- Promote the opportunity for a travel study option to the Miner Institute. This agreement is newly in place and an opportunity for students to gain experience at a larger dairy and equine facility than the Vermont Tech farm.
- Consider allowing students to take credits at other institutions that offer "for credit" study abroad short programs. For example, the University of Vermont offers a two-week Alpaca Boot Camp in Ecuador or a food systems and community development course in Kenya. This opportunity would require no resources other than accepting the transferred credit toward an associate degree.

- With the announcement of a merger within the state college system, what courses could be incorporated in other majors throughout Vermont or be allowed to count for the Vermont Tech major and thereby providing flexibility to the student. Should these courses be online or remote?

Collaborate with other programs at Vermont Technical College:
There are several opportunities to work with other programs at the college to design exciting collaborative events and competitions that bring together students and areas of disciplines to address issues in agriculture and food systems. This allows students to explore outside of their field and understand the connections discipline has to solving problems. For example:

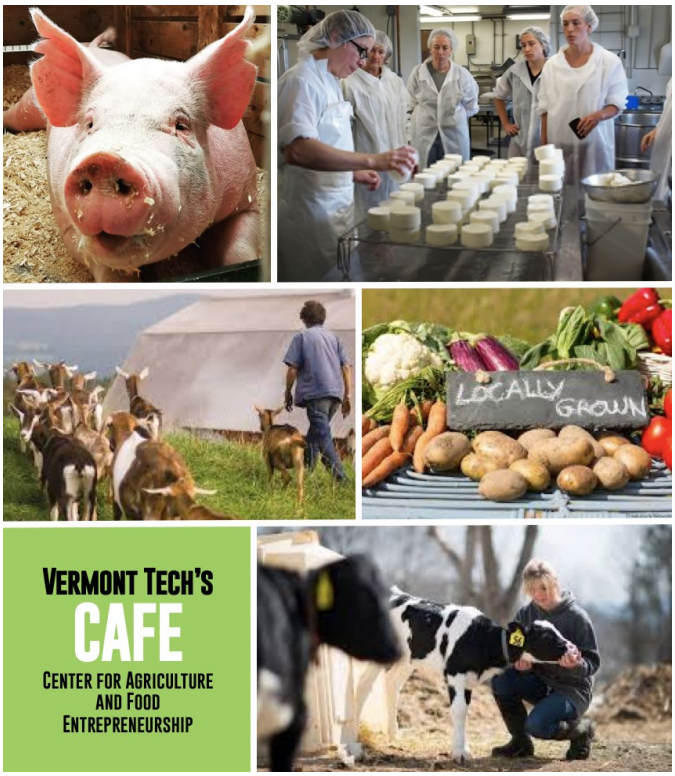
- Create a competition to create the best new business plan for a food or agricultural product. Teams must consist of students majoring in Business Technology and Management, Entrepreneurship, and Agriculture and Food Entrepreneurship. Scholarships could be provided with industry support.
- Create a competition to retrofit an existing barn structure to house dairy goats. Teams bring together student in the agriculture and food entrepreneurship and construction management
- Students combine teams across majors to engineer an innovative solution to food packaging, harvest, processing, etc.

Celebrate Alumni:
Marketing at Vermont Tech has already begun to tell the story of alumni and the careers they now enjoy after taking the first step in higher education by earning their associate's degree. However, the following messages and targeted promotions could elevate the visibility of alumni and reinforce the return on investment:

- Vermont Tech alumni of the agriculture and food programs are making a difference in your communities.
- Alumni hold leadership and management positions, as well as becoming successful entrepreneurs.
- A Board of Advisors could rotate membership and take a role in recruitment, internship placement, and student mentoring.
- Branded items could be shared with alumni to proudly declare their Vermont Tech roots.
- Alumni could participate in calling and letter writing campaigns.
- Alumni could be rewarded with free application for admission to any children, benefits for free apple picking at the farm, free admission to all sporting events, etc.

Branding the Center for Agriculture and Food Entrepreneurship (CAFE):
The branding of the CAFE as the Center for Food and Agriculture in Vermont provides an easily identifiable and marketable portal for prospective students to see the variety of available learning options. Other benefits include:

- The ability to place advising at the center of the learning process to assist individual students in meeting their individual learning and professional goals. There is a close connection to the activity in the classroom and on the farm and the ability to collaborate and coordinate closely with Continuing Education and other departments.
- Ability to strategically market, implement, assess, and continually enhance a suite of programs and learning modalities under the umbrella of the Center.



This leads to individualized advising for each student based on interests and career goals, access to a wide array of innovative and vital food and farming businesses in Vermont, pathways to skill development that leads to a desired career upon graduation across the food system from production, processing, manufacturing and distribution to the end user.

Considerations and critical questions for the future:

Does food technology offer opportunity at Vermont Technical College?
According to recent data from the IPEDS Database, degree conferrals in food science and technology and agriculture and food processing has increased since 2015, in fact, a 73% and 88% increase respectively for associate degree programs. What opportunities for food technology education could Vermont Technical College provide and what are the needs in our food production industry?

What role will the production at the Vermont Tech farm play in the delivery of education on the farm?
The Business Case Development Team has recommended several commodities be grown and produced at the farm in the absence of a milking herd. Given that the farm serves as a laboratory for academic programs, and is not currently utilized for additional purposes such as community events, research, etc., it is important to consider how investing in these specific commodities will support academic programming. The proposed concentration in animal science, for example, will utilize anatomy, animal care and handling, and other content relative to the dairy science concentration. How will this be delivered with no milking herd? Will these courses now travel to neighborhood farms? What cost does this add to the delivery of the course? Who are the partners willing to allow their farm to be an academic site?

Production of hogs and potatoes, for example, may provide concentrated academic delivery in production, breeding, animal care, etc., but is a siloed, one dimensional perspective for students interested in a more general food entrepreneurship focus. Will students develop business plans and assess inputs and potential return for these commodities? What about other aspects for consideration of the farm to table entrepreneur such as processing, distribution, food safety, marketing, etc.?

The program will take time to grow significantly and will need a champion.
The proposed restructuring and refocusing of academic opportunities as outlined will require substantial, consistent support and dedicated resources. Relationships and oversight of internships will be a substantial amount of work, and creating a vision to connect both for-credit and non-credit continuing education curriculum will need to be woven together under the mission of the Center for Agriculture & Food Entrepreneurship. Marketing and outreach will be critical for program development, as well as assessment of efforts.

Business Case Development Team Final Report

April 2021

EXECUTIVE SUMMARY

As part of re-visioning the Vermont Technical College's Agriculture programs ("Vermont Tech Ag"), the Business Case Development Team (BCD) was tasked with modeling a transformed Vermont Tech Ag Program's financial performance and challenged to devise financially feasible production enterprises for the campus farm. Previous project committees provided BCD educational goals and information on the proposed *Center for Agriculture and Food Entrepreneurship (CAFE)* to incorporate into modeling and analysis. This report will present the Vermont Tech Ag Program's existing conditions, financial performance expectations, current performance, proposed curriculum, proposed transformations, and anticipated results.

Agriculture is known to underpin the Vermont economy. The economic value is well documented and the working landscape is imperative to the state's tourism industry. The need for technical college education to support and grow Vermont's ag businesses is not in dispute. However, Vermont Tech's Ag Programs operate at a loss, and in the current economic environment, our team is very concerned about continuation of agricultural education at the college. The programs are at risk for elimination by the college or the Vermont State College (VSC) board. The VSC system is in a financial crisis and is working aggressively to reduce its losses.

It is abundantly clear; the status quo is not economically viable. The Vermont Tech Ag Programs (including the Ag Institute) do not attract enough students, generate sufficient tuition or course revenues to cover the costs of the programs and the campus farm operations. It is imperative to recognize the farm is considered a lab and part of the Ag Programs' expenses. Students in other Vermont Tech degree programs ultimately bear the cost, subsidizing the Ag Programs and farm. Given the financial state of the VSC, this is no longer tenable.

For the Vermont Tech Ag Programs to truly transform, a new program model is needed. The proposed Center for Agriculture and Food Entrepreneurship would include a director tasked to oversee the Ag Programs, assist with recruitment, mold, and re-mold the program as appropriate. But essential as it is expected to be to the growth of ag program enrollment at Vermont Tech, Center for Agriculture and Food Entrepreneurship comes at a cost when cost reduction is the focus of VSC.

To address the need for hands-on teaching and training at a lower cost, diversified farm enterprises are proposed. The proposed farm enterprises reduce the farm losses dramatically but fall short of being profitable.

The re-visioned farm production enterprises reduce losses while the new Center adds administrative costs. Currently, there is an $800,000 gap between the existing program's financial performance and the expected performance of a Vermont Tech college program. To meet financial performance expectations with the re-visioned farm, the Center for Agriculture and Food Entrepreneurship will need student enrollment three-to-four times higher than today's Ag Programs. Additionally, the Center will need to develop a portfolio of profitable short courses. If the Center cannot achieve these metrics, external funding of $200,000-$300,000 annually and in perpetuity must be secured.

A full analysis could not be complete without considering the broad impacts of ending farm production activities on the Vermont Tech Randolph campus. The discussions on this subject did not end with clear conclusions on how such a move would impact the Ag Programs. Without an operating campus farm - either temporary or long term - there are real concerns around attracting students and limiting hands-on

educational experiences. The Ag Program would need to align with privately-owned farms to provide students all of the expected hands-on opportunities.

It will take time and a dedicated effort to establish the Center for Agriculture and Food Entrepreneurship. A temporary closure of the campus farm will reduce operational losses, and leasing land to neighboring farms will generate modest revenue in the interim.

BUSINESS CASE TEAM CHARGE

OBJECTIVES

- Review existing conditions and current financial performance of the Ag Programs
- Evaluate the financial implications and feasibility of the recommendations of proposed transformations by the Program Models and Culture & Curriculum committees as represented by The Center for Agriculture and Food Entrepreneurship (CAFÉ) concept.
- Quantify future performance expectations and the financial impacts of key success factors, including enrollment, programs, production enterprises, etc.
- Provide visibility for any gaps, as suggested by the modeling, that would need to be addressed in pursuit of long-term financial sustainability

CONTEXT

- Insufficient and downward-trending Ag Programs enrollment (27 and 22 students (AYs 19-20, 20-21))
- Higher per-student costs (almost $13k/student (AY19-20)) for the Ag Programs compared to other Vermont Tech programs
- Higher admin headcount, lower student/admin ratio (3, 9-to-1 (AY19-20)) for the Ag Programs compared to other Vermont Tech programs
- Significant and enduring production enterprise losses (avg $250k/yr loss (2016-2020)) due to the costs associated with operation of the dairy milking herd.

RESULTS & CONSIDERATIONS: OVERALL

- There is an ongoing need for technical education in support of the documented workforce development needs of Vermont's agriculture and food systems economy
- Continuing to have a working farm is viewed as critical for any growth strategy for the Ag Programs
- For long-term financial sustainability, the Ag Programs need to cover both direct (Ag Programs-specific) and indirect (overhead supporting all Vermont Tech programs) costs.
- As currently configured, the Ag Programs are not viable as they attract insufficient enrollment to generate the revenue needed to cover even direct costs
- At each proposed phase of transformation, there must be clear and defined stage gates that can inform all go/no go decisions.

This team is optimistic Vermont Tech can continue to offer ag degree programs and meet the changing educational needs of Vermont's agricultural businesses. Within the proposed scenarios are opportunities to grow degree, short course, or continuing education offerings. For the full vision of the Center for Agriculture and Food Entrepreneurship to be realized, along with a diverse campus farm, tough decisions must be made immediately followed by intense efforts to complete the envisioned proposal and meet enrollment targets.

RESULTS & CONSIDERATIONS BY TOPIC

ENROLLMENT

- Student enrollment will need to approximately triple (3X) for the Ag Programs to cover direct program costs; those levels would represent unprecedented enrollment success for the Ag Programs
- Once tripled, student enrollment will need to approximately double (2X) again for the Ag Programs to cover both direct and indirect costs
- Market research is needed to help determine under what, if any, conditions this scale of potential enrollment exists
- This research should precede any decision to define the job description or begin the hiring process for a Center Director

ACADEMIC PROGRAMS

- Ag Programs (including the Ag Institute) must function profitably
- Short courses, internships for credit, and other program features may play an important role in increasing profitability
- Other suggested models (J-terms, summer courses, etc.) are worth exploring for their contribution to a unique academic experience, but are unlikely to contribute to financial stability

PRODUCTION ENTERPRISES

- Current farm production enterprises meet core curriculum needs, but have shown that operation of a dairy milking herd is financially unviable
- A portfolio of diversified production enterprises, in conjunction with internships, is proposed to meet the core curriculum and hands-on teaching and training needs of the students, in lieu of a Vermont Tech dairy milking herd
- The production enterprises are best imagined as labs in support of the academic program and, while dramatically reducing current production enterprise operating losses, nevertheless are projected to fall short of breakeven
- The portfolio of production enterprises includes feeder beef, dairy heifers, feeder pigs, vegetable production, maple and orchards
- Value-added dairy was discussed at length, but is considered as a later phase project and not fully vetted here
- Reimagining a dairy milking herd with the installation of robotic milking equipment was fully analyzed, but not seen as a viable solution

CENTER & DIRECTOR

- Hiring of a Center Director for a defined contract with explicit goals relative to enrollment, enterprises and development provides a clear operations path to Ag Programs transformation, but comes with additional administrative costs, which are already out of line with other Vermont Tech programs and will require substantial enrollment increases to be justified
- The status of the Center Director role as faculty, administration or a combination is a critical consideration, but beyond the scope of our analysis
- The most difficult scenario to contemplate is where a Center Director is hired, succeeds in creating enrollment such that Ag Programs cover direct costs, but fails to cover indirect costs, thus not delivering on the long-term financial sustainability needed for the program

EXTERNAL FUNDING

- If the combination of enrollment, academic programs and production enterprises, with or without the Center, fails to meet expectations, additional permanent sources of funding will be necessary to maintain the Ag Programs
- This scenario is the one which appears to be most likely
- In a variety of scenarios modeled, the external funding needed may well be in the $200k to $400k level, annually, to ensure financial sustainability

I. BUSINESS CASE DEVELOPMENT TEAM AND APPROACH

The ten (10) members of the BCD met as a team weekly from November 11, 2020 to April 14, 2021. Additional weekly sub-groups were held throughout January and February to concentrate on enterprise and financial modeling respectively. The Enterprise Team (Calderwood, Colby, Gingue, Nault, Wood) focused on the production enterprises. The Template Team (Davis, Fowler, Hughes, Strange, Tyler) focused on the model used for analysis. The group met in total or in part on over three dozen occasions.

BCD Members

- Jed Davis, Agri-Mark/Cabot Creamery – *Committee Chair*
- Louise Calderwood – *Steering Committee Liaison*
- Jenn Colby, previously with UVM Extension
- Holly Fowler, Northbound Ventures Consulting, LLC
- Dan Gingue, AgriBusiness Strategies, LLC
- Greg Hughes, Vermont Tech Faculty
- Stephanie Nault, Vermont Tech, Farm Manager
- Marty Strange, retired, Randolph resident
- Lit Tyler, Vermont Tech Administration
- Andy Wood, Vermont Economic Development Authority

Our Team's Approach:
The BCD was tasked with combining the work of the Program Model Development Team (PMD) and the Culture and Curriculum Team (CC) to include a capital expense table and three-year transition plan for the re-visioned Vermont Tech faculty, staff and farm. The work was informed by the current enrollment and financial situation at the college and the mandate that the program transformation needs to be financially sustainable, including realistically increasing the number of students in the program. The three agricultural majors - Agribusiness Management, Dairy Farm Management and Diversified Agriculture - had a combined enrollment of 27 students at the start of the 2020-21 academic year. As can be seen in Figure 1, the cost per student of $12,828 (AY 19-20) for the agricultural majors is significantly (more than 3X) higher than for other majors, which range from $621 per student in Electrical Technology to $3,607 in the Nursing program. Additionally, the agricultural program requires more staffing per student due to the requirements of operating the farmstead.

Figure 1 also shows the average annual financial burden of $255,793 over the past five years (2016-2020) of operating the production enterprises of the dairy farm, orchard and maple operation. This loss in operating expenses has been covered by other academic programs at Vermont Tech.

FIGURE 1: SUMMARY COMPARISON OF VERMONT TECH PROGRAMS

Task At Hand
In Two Charts

FISCAL YEAR 2020 (AY 19-20)	AG	NURSING	PILOT TECH	ELEC TECH
FTE Enrollment	27	386	46	45
% Total Student Body	2%	27%	3%	3%
Administrators	3	6	1	2
Operational Cost (Net of Fees)	$346,346	$1,393,547	$114,562	$28,214
Cost Per Student	$12,828	$3,607	$2,470	$621

FISCAL YEAR	2016	2017	2018	2019	2020	5YR AVG
TOTAL REVENUE	$448,093	$398,604	$369,804	$354,012	$370,909	$388,284
TOTAL EXPENSES	($733,354)	($594,820)	($602,228)	($714,530)	($575,456)	($644,078)
LOSS	($285,261)	($196,217)	($232,424)	($360,518)	($204,547)	($255,793)

Source: VTC Farm Actuals from 2016-2020.xlxs; represents ag production only

VERMONT TECH

II. FOOD SYSTEM FACTORS

Vermont's first statewide strategic food system plan, *Farm to Plate*, was released in 2011 and established a set of goals, objectives, and priorities for continued agricultural investment, production and food sector economic growth. The Vermont Sustainable Jobs Fund (VSJF), which is tasked with administering the Farm to Plate Investment Program (10 V.S.A. § 330), tracks and reports progress of the plan each year. From 2011 -2020, Vermont's food system economic output expanded 48%, from $7.5 billion to $11.3 billion, which includes $3 billion (26.5%) from food manufacturing, the state's second-largest manufacturing industry. The food system added 6,560 net new jobs (11.3% increase). More than 64,000 Vermonters were directly employed by over 11,500 farms and food-related businesses. Local food purchases rose from $114 million (5%) to $310 million (13.9%) of the total $2.2 billion spent on food in the state annually. Vermont farms sold $781 million worth of products in 2017.[1] The success of the initial plan reaches far beyond the borders of Vermont, having inspired statewide planning across New England and the New England Food Vision of 50 by 60 (50% of sustainable, equitable, and just food consumed by New Englanders produced here by 2060). In 2019, the Legislature reauthorized another ten years of the Farm to Plate Investment Program to:

1. Increase sustainable economic development and create jobs in Vermont's food and farm sector;
2. Improve soils, water, and resiliency of the working landscape in the face of climate change; and
3. Improve access to healthy local foods for all Vermonters.[2]

The plan provides a wealth of information that reinforces the importance of Vermont Tech as a state institution. The college has a unique role to play in maintaining working landscapes across the state, launching successful agricultural operators and food entrepreneurs, and contributing to Vermont's economic health from the agriculture and food sector.

III. EXISTING CONDITIONS

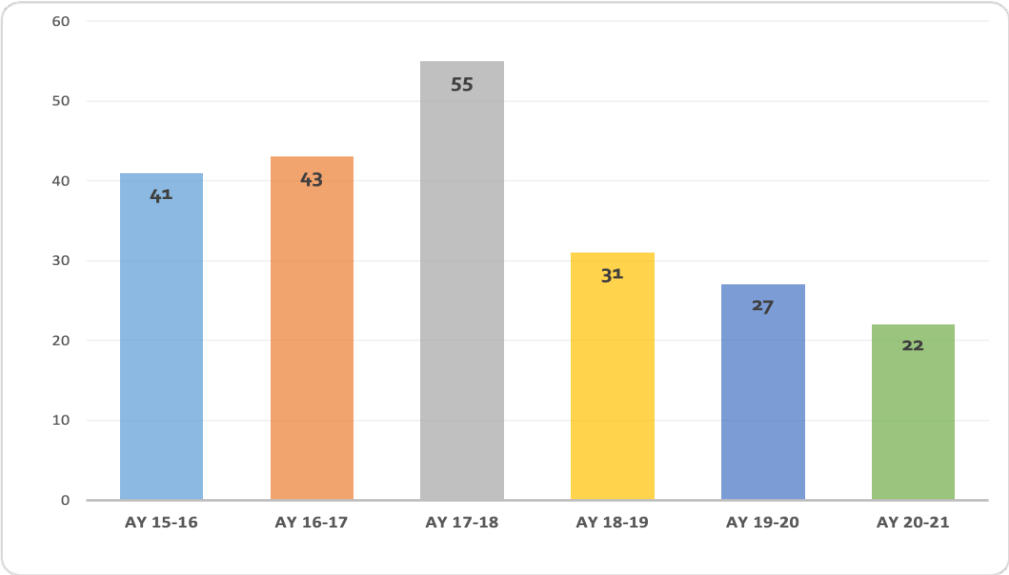
Enrollment in the Vermont Tech freshman year class for agricultural degree programs has declined, from 28 students enrolled in 2016 to seven students enrolled in the fall of 2020. As of early April 2021, eight students had been admitted to the program and one student had made a deposit. Figure 2 shows total enrollment across all Vermont Tech Ag programs for the last six academic years.

This is not the first time Vermont Tech's agricultural programs have suffered from declining enrollment. In the 1950's, the Vermont School of Agriculture, the forerunner to Vermont Tech, almost closed its doors. Nearly 300 dairy farms were going out of business each year and the school's enrollments were low. Then-Governor Joseph Johnson recommended closing the agricultural programs. In 1957 the school revised its curriculum to provide a greater variety of technical courses and the institution was given a new name reflecting this expanding mission: Vermont Agricultural and Technical Institute.

[1] Vermont Sustainable Jobs Fund. *Vermont Agriculture and Food Systems Plan 2021-2030.* pg. 5

[2] Vermont Sustainable Jobs Fund. *Vermont Agriculture and Food Systems Plan 2021-2030.* pg. 1

Figure 2: Headcount of Students by Academic Year (AY)
All Agriculture Programs



Vermont Tech's experience with enrollment declines is not singular. Instead, it reflects fast-moving national realities in higher education, as documented by a recent report from the National Student Clearinghouse Research Center indicating overall post-secondary enrollments declined 2.5 percent in fall 2020, nearly twice the rate of enrollment decline reported in fall 2019. Undergraduate enrollment was the primary driver for this decline, decreasing 3.6 percent or over 560,200 students from 2019.[3] Vermont Tech's next steps should take into consideration documented student trends, job opportunities, industry needs, Vermont Farm to Plate strategies, and innovative integration of current institutional resources.

The current Vermont Tech agricultural production lab consists of a 500-acre working dairy farm in Randolph with a herd of 80 registered milking Holstein cows and replacement heifers. Students are heavily involved with the farm's daily operations including, but not limited to feeding, milking, breeding, treatments and vaccinations as this aligns with their targeted course work. Aside from the management of animals, the farm grows and harvests all its own forage crops including dry hay, haylage, and corn silage. Milk produced is currently marketed in bulk through HP Hood.

In addition to the dairy farm, Vermont Tech maintains a complete maple sugaring operation, which includes two different sugar bushes. One sugar bush includes 700 taps on traditional 5/16" lines with vacuum. The other sugar bush is 1200 taps on 3/16" line. The maple operation serves as a working lab for the ag program but also as an elective to many other majors. Students are involved through laboratory and general work in the woods and in the sugarhouse, where they learn how to install and repair pipeline as well as process maple syrup. The syrup is sold in bulk to Sodexo, the institution's food service management company, for use in campus dining and a small amount is sold retail on campus.

Another enterprise the college currently manages is a five-acre apple orchard consisting of about 400 apple trees on the back side of the campus. The orchard is currently managed under the farm umbrella as a pick-your-own operation open to the community through cash sales for roughly four weeks in the early fall.

[3] NSC Research Center. Current Term Enrollment Estimates. https://nscresearchcenter.org/tag/enrollment-trends/. (Jun 30, 2020)

IV. MODEL CONSIDERATIONS AND INTEGRATIONS

Using input from the respective reports of the **Program Model and Development** team and **Culture and Curriculum** team, the BCD undertook the task of integrating the proposed educational model with appropriate production enterprises to support the classroom education component of the re-visioning process. It is proposed that Vermont Tech will engage in a variety of educational models to support the development of employees and entrepreneurs to meet many facets of Vermont's farm and food sector. These include two- and four-year degrees, short courses offered for credit or continuing education, and increased utilization of structured off-campus opportunities through two separate credit-bearing, paid internships.

The Culture and Curriculum development team started their work by assembling a group of subject matter experts. It was determined there was a need to expand the potential demographic for the Vermont Tech's agricultural curriculum to appeal both to Vermont Tech's traditional students from Vermont farm families and also to an expanded audience including students from elsewhere in the northeast, students aspiring to start new food businesses or farms, career changers, active professionals, and others simply seeking applied knowledge of farming and the food system.

The curriculum must provide foundational math and writing skills which are essential for any business owner or employee, as are other basic skills such as basic civics and scientific literacy. Basic life skills such as goal setting and self-awareness provide a base for all learning. Degree students should acquire a base of knowledge that enables them to choose any of the varied careers open to them and to transfer that knowledge into different environments, as profound and inevitable changes in the food system requires them to change as well.

Using input developed by the Program Model Development Team and the Culture and Curriculum Team, the BCD undertook the task of integrating the proposed educational model with appropriate production enterprises to support the classroom education component of the re-visioning process. It is proposed that Vermont Tech will engage in a variety of educational models to support the development of employees and entrepreneurs to meet many facets of Vermont's farm and food sector. These include two- and four-year degrees and short courses offered for credit or continuing education.

The final report from the Program Model Development Team stated that reliance on a realignment of academic offerings alone is not likely to result in significant increases in student revenues. Therefore, the realignment of programming should be considered in congruence with the establishment of a Center as an essential piece to create clear branding, cohesive structure and coordinated programming while packaging all of these integrated assets into one place. The Center director will ideally be hired through a national search based on the emergent vision put forward by this current process. The director should have adjunct teaching responsibilities and report to the academic dean or the president.

The Center should be strongly branded with Vermont's reputation and targeted to real needs and opportunities in the Northeast. It should be designed and promoted to optimize inbound marketing (e.g., website design, search engine optimization, etc.) and external reputation-building to provide an immediate funding opportunity for philanthropists, businesses, and grants through state and federal government, perhaps including some monies dedicated to post-pandemic recovery efforts.

It was further determined the customer base for Vermont Tech be structured in the following order:

1. Vermont students interested in degree-bearing technical, hands-on applied education.
2. Out of state students interested in degree-bearing technical, hands-on applied education.
3. Continuing education for second careers, life-long learning, short/intensive learning options.
4. High school students who want to start their college degree early (accredited).

The Culture and Curriculum Team gathered input from subject matter experts in all facets of Vermont agricultural production and food processing to develop a complete listing of skills and knowledge required for a successful career. Comparison of the list to the current Vermont Tech curriculum confirmed that, as described in the course catalogue, the current courses address the majority of the necessary learning outcomes and skills identified as essential. Course content, delivery methods and pedagogical quality will require significant review as the new educational structure is developed. The Culture and Curriculum Team suggested that Vermont Tech should strengthen its experiential emphasis through the addition of credit-bearing, paid internships. This requirement has developed into the inclusion of two credit-bearing, paid internships.

The Culture and Curriculum Team proposed development of courses that can be combined into a variety of educational products, ranging from the traditional associates and bachelor degrees to one-year technical degrees and stackable certificates. Development of a summer session and January term will increase course offerings and support students to identify unique educational opportunities that match their individual circumstances. Technical certificates and continuing education opportunities will provide campus exposure to potential students and increase the population from which to draw Vermont Tech students. Degree programs should guide students' interests and emergent professional aspirations while also maximizing flexibility. Flexibility requires methodical and intensive advising, as well as flexible scheduling and a combination of onsite, online, and hybridized delivery. Too many formalized majors or concentrations require ever-increasing numbers of faculty in specific realms of expertise.

Based on historical data of student retention, the stated needs of participants in many listening sessions, and market research by the marketing and communications team, focus on building enrollment in the associate's degree agricultural program at Vermont Tech has been prioritized. Although the National Student Clearinghouse Research Center data indicates sharply reduced enrollment in associates' degrees nationwide it has been determined that Vermont Tech occupies a valuable niche of providing two-year programs that prepare students for management positions in the agricultural workforce. Students who desire entrepreneurial opportunities could add more business courses to their education through seamless enrollment in a bachelor's degree at Vermont Tech. Reducing the number of associate degree choices and broadening the scope of a single associate degree will accommodate the interests of a broader variety of students. Adoption of this model will require review and acceptance through the faculty review process.

Figure 3 represents the proposed curriculum for the Agriculture & Food Entrepreneurship Associate of Applied Science (AAS) degree. From this foundation, students can choose a concentration in Dairy & Animal Science or Food Entrepreneurship. They will have the option of participating in the summer semester, J-Term, for credit workshops, and non-credit programs as well.

Figure 3: Proposed Curriculum for Agriculture & Food Entrepreneurship Associate Degree (60 Credits Total)

VTC General Education Requirements (20 credits)

- English 001 (3 cr)
- Technical Communication (3 cr)
- Natural and Physical Science (4 cr)
- Information Technology (1 cr)
- Arts, Humanities or Social Sciences (6 cr) (must take specific courses below)
- Math (3 cr)

+

Agriculture & Food Entrepreneurship Associate Degree (23 credits)

- Introduction to Agriculture Economics & Policy (3 cr) - fulfills Gen Ed requirement
- Business Skills for the Food System (3 cr)
- Emerging Issues in Food and Agriculture (4 cr) - fulfills Gen Ed requirement
- Environmental Issues (3 cr)
- Two Internships (3 cr and 6 cr) - supported by classroom work in the existing courses
- Career Preparation Capstone (1 cr)

+ choose 1 of 2 Concentrations

Dairy & Animal Science Concentration
(**supported by at least 17 credits from below*)

- Agronomy & Soils
- Animal Management, Behavior & Welfare
- Soil Science, Health & Nutrient Management
- Livestock Nutrition
- Livestock Reproduction
- Production, Management & Marketing
- Advanced Mechanical Systems
- Use of ARCGIS
- Livestock Systems and Buildings
- Forage Crop Production & Management
- Additional Dairy Management courses (electives)
- Up to THREE 1cr Credential Courses

Food Entrepreneurship Concentration
(supported by at least 17 credits from below)

- Introduction to Specialty Foods
- Soil Science, Health & Nutrient Management
- Mechanical Aspects of Food Systems
- Entrepreneurship Skills in Food Systems
- Production, Management & Marketing
- Fruit & Vegetable Production Mgmt and Marketing Specialty Foods
- Advanced Mechanical Systems
- Diversified Ag courses (maple, dairy, goats, etc.)
- Additional Business related courses (electives)
- Up to THREE 1cr Credential courses

*Credential courses could include certifications such as tractor safety, HAACP, Pesticide Applicators, etc.
** Requirements for VTFARMS 2+2 scholarship would be determined as part of the Dairy and Animal Science Concentration

V. DATA SOURCES AND ASSUMPTIONS

Key inputs of the business model rely on the following historical data, proxy or assumptions.

INPUT	DESCRIPTION
ENROLLMENT	Enrollment refers to the total number of students, full or part-time, in all Ag Programs. Baseline enrollment for AY20-21 is 22 and forecasted enrollment for AY21-22 (↓27%) are provided by the Vermont Tech Admissions Office.
RETENTION	The retention rates used in this model reflect ag program enrollment patterns over the past 5 years. Our data source is Fall student enrollment from the official registrar's snapshot, including # of credits enrolled, official student program, and the official student "class" (FR, SO, JR, SR). Our simplified "retention" methodology calculates the following ratio: the number of students in a particular class during a particular year are named in the denominator; the number of students in the subsequent class in the subsequent year are named in the numerator. In other words, for example, (# of Fall '19 Sophomores) / (# of Fall '18 Freshmen). Separate rates have been calculated for each class--FR → SO, SO → JR, and JR → SR. It is worth noting a characteristic of our student data which will influence these rates. When associate's degree students (such as dairy farm students) continue into a third year in pursuit of baccalaureate curriculum (such as business courses), if they do NOT officially file a change of program (as is often the case) their class will remain "SO", even though their course enrollments may be more consistent with those of a junior or senior. This idiosyncrasy could potentially upwardly skew the FR → SO rate, and downwardly skew the SO → JR rate. (In theory, the two skews should roughly offset--we therefore believe the aggregate effect on our model will be small.)
TUITION RATES	The AY21-22 maintains the tuition rate of the current year. Subsequent years assume a 3% increase.
RESIDENT v. NON-RESIDENT	There is a difference between in-state and out-of-state tuition, but out-of-state students receive more scholarship funding. Given this, we use "in-state" as the standard for all.
COURSE FEES	Fixed costs are allocated per production enterprise; variable costs are allocated as course fees.
TARGET MARGIN	The institution-wide margin needed from the college's revenue centers, its academic programs, to break even. The current margin is 74%.
INSTITUTE OF AGRICULTURE	Revenue from "for credit" and "not for credit" courses carries forward from AY19-20. This revenue is separate from the Center for Agriculture and Food Entrepreneurship.

INPUT	DESCRIPTION
COST OF DELIVERY - CENTER	The budget for the Center for Agriculture and Food Entrepreneurship is expected to be funded through outside sources for three years to include salary and limited operations.
MARKETING	Program specific marketing is not tracked. The marketing budget is over $600,000 for the entire college. It is proposed to add $50,000 to the marketing budget through external fund raising for calendar years 2022, 2023 and 2024.
STAFFING	The cost calculations are based on the staffing levels defined by the steering committee: 1 FT faculty; 1 FT Center for Ag staff; 1 FT Farm & Enterprise staff; a number of PT employees. This group finds it noteworthy that a single FT farm employee, while possible, may create some level of operational liability.
CAPITAL INVESTMENT	The Vermont Tech heifer barn and sugar house are production facilities in need of a minimum of $67,500 of deferred capital improvements. Transition to new agricultural enterprises in support of education will require new capital assets of $130,046. Recommended improvements are oriented toward flexible and multi-purpose infrastructure for changeable curriculum offerings and production enterprises (Appendix A), modeling for students a nimble approach to future production opportunities. It has been assumed that income generated from the sales of the milking herd and any associated equipment unnecessary or too single-purpose for the future enterprise mix will be applied back to deferred maintenance on production enterprises and associated capital investment for the new enterprises. *Please note that there are also important capital upgrades needed for bathrooms, office, classroom and parking area at the farmstead. These costs have not been estimated and could be significant.*

VI. ACADEMIC ADJUSTMENTS IMPACTING THE BUSINESS MODEL

CENTER FOR AGRICULTURE AND FOOD ENTREPRENEURSHIP

It is proposed to create a *Center for Agriculture and Food Entrepreneurship (CAFE)* within the Vermont Tech School of Agriculture, Plant and Animal Sciences to provide programming leadership. Alongside the existing continuing education delivered through the Institute for Applied Agriculture and Food Systems and general academic program, the Center will have the objectives of creating clear branding, cohesive structure and coordinated programming while packaging all of these integrated assets into one place. The Center for Agriculture and Food Entrepreneurship is expected to:

1. Provide a vision to build upon Vermont's tradition of innovation by coordinating the resources and delivery of a top-quality applied education to as broad an audience as possible;
2. Link technical education needs with market opportunities, environmental stewardship, and food security in the Northeast; and
3. Expand Vermont Tech's reputation as a centerpiece of Vermont's increasingly resilient food system.

Implementation Plan

Success for the proposed Center is dependent on increasing enrollment to a headcount of 125 students from the 22 students enrolled in the spring of 2021. The transition to the CAFE model will require significant market research to confirm the potential for 125 students. For financial planning it is necessary to focus on the number of full time equivalent enrolled students rather than the number of students admitted per year to Vermont Tech. Some students require more than two years or four years to complete their degrees and not all students complete a full degree program.

It will be necessary to secure external funding of $250,000 per year for three years to finance the launch and development of the CAFE with a focus on:

- Building total student enrollment by 103 students from the 2020 headcount of 22 students,
- Transitioning from commodity dairy to diversified production enterprises to support educational programming and,
- Build confidence in the Vermont Tech program among Vermont's agricultural business and policy leaders.

There is the potential it will be determined that enrolling 125 students is not possible. For this reason, the Leadership Team should agree to clear threshold data points for go/no go decisions. For example, if Vermont Tech cannot achieve 125 total enrollments, with a margin of 74% in 3 years after hiring a Center director, but can get to 80 students with a margin of 40%, is that then 'enough' to keep going and try to achieve 125 and 74% within 5 years? Success metrics sufficient to move forward and/or a process for making these decisions should be established as soon as reasonably possible.

Staffing

The transition to the CAFE model will require significant vision, leadership, and project management. A nationwide search should be conducted to identify a Center director with the necessary skills to realize the CAFE model. The director will be an administrative position (Level 15/16).

The primary focus of the director position will be to manage the Center as a magnet for attracting students and ultimately increasing enrollment. The director will act as a liaison with farm and food businesses, determine how to integrate value-added production into enterprise models, and work with the existing marketing group to increase enrollment. This role is seen as distinct from the role of the director of the Institute for Ag.

This role is envisioned as an initial three (3) year position with the option to continue if objectives of increased enrollment are met. The salary for this new role is set at $75,000 USD/year. A year-over-year increase is estimated at 5%, which reflects salary increase trends of 3-4%, but healthcare costs have been rising more rapidly. A second contract to teach up to eight (8) credits over a year may be offered to this staff person as well to augment total possible compensation. This part of a salary is budgeted into the course program costs.

In the interim, prior to hiring a Center director, the Leadership Team has proposed to hire part-time, independent contractors for one year to:

- Assess the market potential to grow the student population to 125 students,
- Design the reconfigured production enterprise facilities,
- Secure markets for the proposed agricultural products,
- Work with Vermont Tech staff to design the internship program and develop relationships for internship placement
- Assist the Ag Institute staff and Continuing Education and Workforce Development (CEWD) with additional short course development,
- Build out the meat lab (if funding is secured).

Internships

A hallmark of the new Center is the requirement to complete two (2) paid internships of three credits and six credits each in the third and fourth semester. The internships will be supported by preparatory requirements of resume development, career exploration, interviewing techniques and workplace skills development carried out as part of currently existing coursework. Internship locations will be fully reviewed by Vermont Tech faculty to assure delivery of a robust educational experience to students. Specific learning objectives and measurable outcomes will be developed in coordination with the host business, student and faculty. All internships are ultimately subject to existing institutional policy and approval.

Students will use experience gained from the internships for a capstone report developed as part of course work in their fourth semester of enrollment. The capstone report will address at a minimum a review of the operations, capital costs, employee requirements, legal structure and marketing plan for the host business. Students will be expected to review the existing businesses and develop a framework for future changes.

Other Course Options

Vermont Tech should consider development of alternative course schedules to include summer courses and January term ("J-Term") courses. The summer courses provide an opportunity to extend hands-on agricultural production education.

The summer semester assures that the facilities are utilized more efficiently on a year-around basis and students have opportunities to take applied classes during the growing season with a focus on vegetables and grazing. Summer courses are offered at Vermont Tech already, but would be new to the Agriculture program and likely target a different audience than has historically been Vermont Tech's focus.

A new J-Term of two to three weeks would offer multiple course options between the Fall and Spring semesters for students. The Summer Semester and the January term can offer the General Education review courses (e.g., basic math and English language) and a multiplicity of one or two-credit specialized courses that would carry out our goal of expanding the Vermont Tech student body by appealing to individuals of varied ages and educational goals. Two and four-year degree students could take the courses to complete specialty tracks and to obtain stacking specialty certificates in addition to their degrees. Non-degree students could obtain certificates or simply take the courses to acquire or increase substantive knowledge.

The Summer Semester and J-Term make possible the General Education review program and accommodate a multiplicity of subject-specific courses in a format that allows teaching by adjunct practitioners and are available to degree, certificate and non-degree students. An added benefit of the Summer Semester and J-Term is the opportunity to explore the demand for specific courses prior to submitting them for the required academic review for inclusion on the course catalogue.

Historically Vermont Tech students have avoided enrollment in courses outside of the traditional fall and spring semesters often citing the need to supply labor for their family businesses or earn money during these time periods. Development of moderate scholarships to offset the value of after-tax earnings could entice students to enroll in summer and J courses. Marketing to a student population beyond the traditional Vermont Tech cohort could significantly increase interest as well.

DAIRY GRAZING APPRENTICESHIP PROGRAM

Dairy Grazing Apprenticeship (DGA) Program coordinators across the country have noted that many aspiring or new apprentices come to the program with little or no experience with farms or livestock. This led to the idea of creating a two-week boot camp program to give those considering apprenticeship the opportunity to test out their interest, to increase their marketability to farm seekers and to develop some beginning skills before advancing to farm placements. Similarly, as Vermont Tech considers expansion to new target-student audiences, a similar lack of on-farm experience may be a barrier to enrollment. Vermont Tech is in conversations with the National DGA Program leaders to pilot a summer session focused on livestock care and handling, equipment, and infrastructure emphasizing applied application, field trips and practical skills work. If successful, the boot-camp model would serve the Vermont Tech and DGA education goals concurrently.

This two-week residential boot camp could begin in June, 2022 as a pilot. It is likely tuition income from the course will not cover operating expenses and the desired 74% margin return to overhead expenses at Vermont Tech. Investigations to date reveal external funders interested in supporting the initial phase of the program. Confirmation of external funding is an example of the gate keeping necessary for the implementation of new programming.

VII. PRODUCTION ENTERPRISES

METHODOLOGY

The enterprise review team started their task by reviewing the multitude of production and value-added enterprises which had been brainstormed over the course of the re-visioning project. The team briefly considered the option to cease all agricultural production on-campus and move all hands-on components of the academic program to neighboring farms. It was confirmed that the purpose of the enterprises is to explicitly support academics by providing students with access to production, marketing and financial analysis in an academic setting.

Starting with a list of 23 different production, processing and marketing topics, the enterprise review group applied a rubric of 12 questions to rank the enterprises based on four sets of criteria: economic sustainability, academic assets, workforce development, and marketability to recruit full time students to Vermont Tech. **Appendix B** provides the scoring rubric outline and the questions related to each set of criteria are described here:

1. **Economic Sustainability**. Is there more than one stable and consistent potential market or buyer for the enterprise product or service? Is the enterprise's product or service unique or otherwise competitive in the marketplace? Does the enterprise have the potential to be either cost neutral or to generate profit for Vermont Tech?
2. **Academic Assets**. Does the enterprise require assets that are unique to an educational setting? Are the existing facilities at Vermont Tech in good-enough repair and of a design to support the production enterprise? Can the enterprise be scaled up or down given the existing facilities, staff and faculty?
3. **Workforce Development**. Does the enterprise develop skills required for future job placement or business ownership? Does the enterprise develop skills in demand for the target industry segment? Are the skills developed through engagement with the enterprise best taught in an educational setting?
4. **Marketability to Draw Full Time Students to Vermont Tech**. Is the enterprise likely to attract more than one profile of student? Is the enterprise likely to attract students from within Vermont? Is the enterprise likely to attract students from outside of Vermont?

Although several value-added enterprises were included in the initial brainstorming list it soon became clear that, due to capital and staffing constraints, it is necessary to consider changes to the Vermont Tech production enterprises in a phased approach. Phase 1 will utilize production enterprises with simple marketing plans, realizing that processing and retail sales require very different skills than production and wholesale sales avenues. Ideally the school will be able to implement value-added processing and varied sales strategies as staffing and faculty are expanded.

Using the rubric and the phased approach to enterprise adoption the initial list was reduced to twelve potential enterprises which met the educational criteria and merited further review: value-added dairy production, a cow-calf beef model, year-round dairy heifers (with an emphasis on grazing), seasonal feeder-beef grazing, deep-bedded feeder pigs, sugaring, apples, and vegetable production. Following assessments of operating costs, capital cost, and the need to develop markets the list was further refined to include: year-round dairy heifers (with an emphasis on grazing), seasonal feeder-beef grazing, deep-bedded feeder pigs, sugaring, apples and potatoes.

The final list of proposed enterprises offers students a variety of equipment, animal and plant management opportunities along with a range of marketing experiences. The labor needs for the enterprises can be achieved with a mix of full-time farm management staff and student or contract labor.

Recognizing that processing and marketing of agricultural products requires very different skills and technical experience than production, it is recommended that for the next three years Vermont Tech should focus on production coupled with simple marketing of products. There is significant value for students to have access to processing and value-added marketing and those features must be considerations for future developments.

In the enterprise models recommended for the next three years, all of the livestock products will be marketed through identity-preserved wholesale channels. For example, the beef steers could be sold as whole animals to a business that specializes in the processing, sale and distribution of grass-fed beef. Opportunities exist to develop direct-to-customer and valued-added opportunities for maple, apples and potatoes.

It is recognized that the orchard and apples did not merit inclusion based on the rubric scoring alone. An orchard enterprise is included in the final model because it requires a minimum of infrastructure and operating expenses and serves as a valuable outreach medium from Vermont Tech to the surrounding community through Fall apple sales. Over a five-year period, the apple orchard either breaks even or returns a modest income to the school.

The BCD had considerable discussion and consideration of the elimination of the production enterprises and the continuation of the academic agricultural program without production enterprises. This would not provide the transformative and growth-focused program that this process has envisioned and therefore has not been fully analyzed in this report. However, in the event that the transitions envisioned through this process do not move forward, the BCD notes that continuing the academic agricultural program without the production enterprises does have the potential to provide a financially viable path forward. Modest increases upon existing enrollment numbers could provide a financially viable academic program if production enterprise losses are eliminated.

ENTERPRISES

Dairy Production and Value-added Dairy

Deep and thorough consideration of both the production dairy and value-added dairy brought the enterprise team to three (3) possible options requiring varying degrees of investment, management, and revenue:

1. Maintain existing herd
2. Move forward with a robot and lactating herd, retaining the option for value-added production on campus
3. Move forward without milking cows and focus on other enterprises. A decision to introduce value-added back in as an enterprise in the future would require either re-establishing a herd or purchasing milk.

A production dairy herd has been part of the fabric of Vermont Tech since the inception of the Agricultural School (c. 1910). Despite the great advantage and active symbolism of having these animals on-site for learning, it has become increasingly clear that the operational efficiencies necessary to make a dairy viable are not tenable in a campus setting, where pedagogy takes precedence over business management. At Vermont Tech, the primary business is education, not a dairy operation.

Dairy production was thoroughly assessed at several steps of the visioning process. The Dairy sub-group, a part of the Culture and Curriculum team, included producers with various sizes and types of herds as well as value-added dairy producers and dairy goat producers. This group developed a listing of essential skills and knowledge for dairy farm owners and managers and then discussed which topics were best addressed in the classroom or in a campus-based farm setting. The sub-group determined there was value in developing opportunities for students to be exposed to a variety of different farms through field trips, multi-week hands-on units at dairy farms in the greater Randolph community and internships throughout the state.

Dairy remains the foundation of Vermont's agricultural economy and retains the potential to drive enrollment. Using input from the dairy sub-group, coupled with a review of operating expenses from five previous years and knowledge of needed capital improvements to the farmstead, it was determined that there are a number of pathways for Vermont Tech to move forward with dairy. These options, each with different financial considerations, are presented below.

Option 1: Maintain existing herd

The existing 80 cow herd shipping commodity milk sustains a loss of approximately $200,000 per year. The enterprise review team also considered development of a value-added line of products to utilize some or all of the milk from the herd, affording an opportunity to reduce or eliminate the operating losses. It was estimated that a minimum of a 0.5 FTE would be required to oversee the processing enterprise at an approximate cost of $42,000 per year.

Option 2: Move forward with automation (robot) and lactating herd, retaining the option for value-added production on campus

The enterprise review team conducted an analysis of reducing the herd size to 55 cows and installation of a robotic milking unit. It was determined this scenario would reduce the operating loss to $62,000 and would require approximately $325,000 in capital purchases and improvements to install. This does not include costs for the fit up of the value-added dairy processing.

Given the estimated cost of a 0.5 FTE to oversee processing coupled with the $62,000 operating loss from the robotic milk production scenario, it is estimated that Vermont Tech would need to net a minimum of $100,000 in valued-added sales to break even in a dairy production and processing venture.

Recognizing the capital expenses and risk associated with value-added dairy are more than can currently be borne by the institution, the enterprise review team also considered the scenario of selling milk to a value-added processor which would garner a premium if milk quality could be maintained at required standards. This model could provide sufficient income to cover all of the operating costs and depreciation associated with a milking herd and merits further exploration although there is significant risk associated with the premium market due to required quality standards and the on-going desire of the value processor to purchase from Vermont Tech.

Option 3: Move forward without milking cows and focus on other enterprises. A decision to introduce value-added dairy back in as an enterprise in the future would require either re-establishing a herd or buying milk in.

Vermont Tech continues to believe in the importance of educating future dairy farmers and dairy industry professionals. Dairy programs will remain part of the educational offerings at the college. Campus learning will be supported and supplemented through partnerships with local dairy farmers through closely supervised work and internship opportunities coupled with robust farm and ag production facility visits and interactions. We believe the combination of diverse, applied experiences on campus along with exposure to the expertise of Vermont farmers will allow the delivery of the dairy curriculum without compromise and will afford Vermont Tech greater financial predictability and stability.

A value-added dairy enterprise was determined to be too complex to be initially implemented. Several factors led the team to recommend that this be considered as a second phase to the implementation of the transformation process. This enterprise will require a more in-depth business plan to determine its financial feasibility, and the additional management being proposed as part of this transformation process would be required to properly implement this enterprise. Key components of the business plan would include a complete market assessment and capital considerations for fit up of a production space at the Randolph Campus. Preliminary work did indicate that there was opportunity for this enterprise to cash flow.

Vermont Tech does own some processing equipment for small-scale production that is located at the Norwich farm. The equipment is currently used by Norwich Farm Creamery to produce fluid milk, ricotta, yogurt, and ice cream. The equipment is estimated to be worth $183,000.

If value-added dairy is to be incorporated in the future as an enterprise, the lowest-risk model to consider is to develop a system that can utilize the existing processing equipment and purchase milk from a local dairy farmer. The opportunity to purchase milk for this enterprise does exist in the marketplace. If production is desired to come from milk produced at Vermont Tech then there may be value to considering maintaining a smaller dairy herd to maintain a milk market. The value-added enterprise may have challenges matching production with the milk production from the farm and therefore being able to balance the excess production with an outside milk market could be valuable. Given the current status of milk markets, the college may not be able to access a commodity milk market in the future. This could pose a challenge if an outside milk market is needed to balance future production excess.

Dairy Heifers

Boarding dairy heifers as a component of a diverse farm enterprise structure was evaluated. Raising dairy heifers is a model that would keep livestock on the farm year-round for hands-on education for students evaluating animal health, animal handling, reproduction management and other skill training opportunities. These animals could be grazed seasonally, providing another educational component.

The farm currently houses and cares for 75-85 dairy heifers. This enterprise could be scalable; however, 50 heifers were used in the evaluation. This number would meet educational needs, and fit existing heifer facilities. The facilities do require capital investments due to deferred maintenance but would otherwise require only moderate upgrades to incorporate this enterprise.

This enterprise could be implemented as soon as the existing herd is sold and a client is identified. Members of BCD have names of farmers that may be interested in sending heifers to Vermont Tech. Alternatively, the college could raise the existing young stock and sell them as bred heifers in the interim.

Cross-Species Grazing Considerations
A transition of any livestock species at Vermont Tech toward management within a grazing system can be looked at separately from the specific species under enterprise evaluation, and in fact, establishment of a grazing system will provide flexibility and opportunity for Vermont Tech to be nimble in its ability to raise different livestock to meet changing demands. In order to establish a managed-grazing system useful for multiple species and situations, including beef and dairy heifers, capital investments will be required in perimeter and subdivision fencing, and water systems. In addition to physical infrastructure adjustments, there will also be the need for increased grazing management skills among Vermont Tech staff and faculty working directly with students to manage animals on the land across changing conditions throughout the seasons.

Starting assumptions for animal numbers and grazing approach have been calculated conservatively based upon the understanding of current forage/land production capacity. Changes in grazing management, soil type, and infrastructure establishment could leverage 30-50% more animal carrying capacity (in total animal numbers or length of time grazing) than the starting numbers built into the model. Realistically, these changes to land production will take 3-5 years or longer.

Grazing Cattle

Currently Vermont Tech does not actively manage cattle in a grazing system, and demand for grass-fed beef as well as the opportunity to fill a grazing-education niche prompted investigation of this enterprise under two possible models. Based upon the higher-profit potential, as well as the overlap with summer educational programming, the model of “feeder beef” has been proposed. The additional model of a cow-calf breeding herd may be considered at a later phase, as noted above.

The feeder-beef model would presume purchase of 40 weaned calves or mid-weight cattle in the spring, followed by active grazing management through the growing season, and sale of grown cattle in the fall. Under this model there is no assumption that animals would be fed or carried through the winter, and would require minimal feeding outside of grazing management. This period of growth in the animals’ life cycle requires lower grazing expertise than finishing animals strictly on grass, which makes it an easier “entry point” for students.

This enterprise could be implemented with a subset of animals (10-15) in the 2021 grazing season using existing infrastructure if needed, but would be more effective if staff energy were focused on planning and establishing grazing infrastructure this year for a start in May, 2022.

At the time of building out these enterprises we were unaware that a large amount of funding was being allotted to Vermont Tech to develop and teach out a meat cutting/processing facility and curriculum. As there is a significant and ongoing shortage of skilled meat cutters statewide, this gives potential to not only a large number of prospective students but also the ability to generate excess revenue from the beef enterprise. Additionally, processing in-house would give the program the ability to market the product from start to finish, a key component to teaching a successful Ag and Food systems model.

Hogs

Currently, Vermont Tech does not raise any non-cattle, non-ruminant livestock. Through the scoring rubric model, adding a meat enterprise based on “feeder” hog raising and contract marketing was determined to be a direct way to diversify livestock production, expand student educational opportunities, and connect with emerging markets relevant for Northeast producers. While future expansion into swine breeding is a possibility, a phase 1 addition of a hog enterprise would focus on purchasing/receiving weaned piglets and growing them to market weight in partnership with an end user.

The year-round production model has been evaluated as a group of 30 pigs, with a new group added/removed every six months. Pig housing would be a “deep-bedding” style using existing farm building infrastructure. This housing model is an increasingly common way to manage pigs on a commercially-oriented scale while managing manure, odor and animal welfare in a beneficial manner. With some fit up and light facilities improvement, the hog enterprise could begin in Fall 2021.

Vegetable Production

Vegetable production scored high in the scoring rubric model and therefore was investigated by the team. Vegetable production, as presented to the enterprise team, did not provide specific details to which crops to consider. As we looked to the vegetable production models it did not appear that a diversified vegetable production model would be feasible as an enterprise model that could effectively be managed by farm staff. There was discussion however about vegetable production being utilized within course labs, particularly with a potential summer semester. For example, a course that ran a small CSA could have good educational outcomes without requirements for oversight from farm operations.

It did however seem appropriate that the farm staff oversee a limited number of crops that could be sold at a moderate scale. Fall storage crops were considered a strong opportunity as traditional fall semester students would be able to be on campus during harvest and marketing of these crops. This could provide exposure to these crops. Potatoes and winter squash were both considered as storage crops. Both could have presented a feasible option. These are crops that could be efficiently managed at a moderate scale and would not require any substantial infrastructure for production and harvest. Potatoes were selected as the primary crop as they are slightly more efficient to store. The proposal by the enterprise team was to grow the amount of potatoes that could be stored in the existing cooler space, which was estimated to be ½ an acre of potatoes. If additional cold storage could be accessed the storage crops could be scaled up to a few acres in size to create a quality demonstration. The crops could be sold to Sodexo for use on campus.

The enterprise team also considered tomatoes and winter greens grown in a high tunnel. The analysis by the enterprise team did generally support that these could be viable, but given labor concerns (discussed below) these were not included as a production enterprise managed by the farm. These could present good opportunities to tie to labs for course work and be managed by students in these courses/labs.

The enterprise team does have concerns that the expertise to produce a vegetable crop at scale may not align with the skills needed for other farm production enterprises. This may lead to a delay in implementation or additional considerations for the proper implementation of a vegetable production enterprise. While the enterprise team felt the vegetable production enterprise brought value to the academic experience (particularly with the diversified ag degree) it also notes that elimination or delayed implementation of this enterprise may not have a substantial impact on overall production enterprises.

In a relative sense, the vegetable production enterprises, particularly potatoes can be stood up in short order as there is minimal infrastructure necessary. The key resource for this enterprise will be ensuring that Vermont Tech farm has the appropriate management and marketing relationships aligned prior to implementation of this enterprise. It does not appear feasible that this will occur for the 2021 growing season given existing limitations of farm staff and therefore the 2022 growing season would likely be the first growing season.

Maple

Vermont Tech has had a maple operation on the Randolph Center campus farmstead since 1923. Over the years it has evolved and grown. Currently we have 1185 taps on the original sugarbush below the farm, and 725 taps across campus. The current operation is fairly modernized with an oil-fired arch and large reverse osmosis (RO) for processing. All of the sugarbush is on a pipeline system, and fully utilized throughout the maple course. The average current production of the maple operation is 350-400 gallons of syrup a year. Most of the sales are direct to Sodexo and provided to the students

in the dining hall. The admissions department sells a small amount in retail. The maple operation has always been a diversified part of the farmstead. This enterprise is ongoing and so there is no timeframe to ramp up.

Orchard
Currently the Vermont Tech orchard consists of four acres on the south end of the Randolph Center campus containing about 400 apple trees as part of the U-pick operation. The current orchard ranges from 40-80 years old, and is managed as a fairly labor-intensive orchard. All current sales are direct from the shed on the premises, which is open for roughly 4 weeks through mid- September to mid-October. Financially the Orchard supports itself, and can be utilized in conjunction with forestry students and also Diversified ag students as a laboratory. The community seems to seek out the Vermont Tech orchard as a part of their fall festivities, which helps connect the community to the school. This enterprise is ongoing and so there is no timeframe to ramp up.

Other Enterprises
Two livestock enterprises were not included in the initial set of recommendations, but may wish to be considered in the future: cow-calf beef production and a year-round sheep flock. These models, while not as high-priority as other enterprises evaluated, may present additional educational value for breeding and birthing management, full life-cycle nutrition balancing, and multi-species grazing systems.

Dairy goats were not included in the final grouping of enterprises. Vermont is home to a handful of goat milk processors who purchase milk from multiple dairy goat farms. There are also several goat milk processors who use milk from their own herds. The enterprise group recognizes the role of dairy goats in the Vermont working landscape and feels goat-specific management practices should be addressed in course work. Like the many specialty areas of dairy production (confinement, organic, grass-based, etc.), students can pursue goat-specific experience during their internships or summer employment opportunities.

Land Use
In recent years, the Vermont Tech production land base has been mainly used for forage production of hay and corn for the dairy herd. Approximately 26 acres near the farm complex have been used for low-rotation grazing and cow exercise. A shift toward more managed-grazing in the educational program and production enterprises would require increased use of the land base for direct livestock grazing (feeding) as well as some capital investment in additional perimeter fence, paddock subdivisions, laneways and livestock watering. A key component to active land management in a grazing system is to match the land forage production needs with animal nutrition needs through the changing conditions of a growing season; the enterprises prioritized are integrated in such a way to provide 1) practical education in matching land and livestock, 2) emphasis on balancing farm profitability and responsible land management, and 3) flexibility in production enterprise(s).

The enterprise team evaluated use of approximately 140 acres of open land accessible from the Vermont Tech campus. Grazing land around the farm complex and upward hillside behind the solar installation comprise approximately 85 acres of good and medium-quality grazing land. This pasture acreage is estimated to be able to carry 50 dairy heifers and 40 feeder beef for a significant portion of the growing season, based on management. Current cropland comprising roughly 54 acres could be kept for crop production (hay, haylage, corn, other grains) to support the needs of the year-round heifer enterprise, which would be the primary ruminant feeding operation in the winter months, as well as produce feed for the hog operation.

In grazing systems, typically grass growth outpaces animal numbers in May/June and slows in later months. Combining groups of animals that are solely on grass (as the feeder beef group is designed) with groups that can be more flexible to enter or leave the system (such as the dairy heifer group) would set up Vermont Tech well for changing conditions.

Farm Labor

A key consideration of the enterprise team was labor demands. In reviewing the Vermont Tech farm's financials one of the key deviations compared to traditional farms is a high cost of labor due to the inefficiencies of an educational farm and the costs of employee benefits that are not typical of the agricultural industry. One of the key challenges for the existing dairy operation has been the high cost of labor. The dairy operation requires 2 full time Vermont Tech staff members plus additional student or part time labor.

The enterprise team's final combination of enterprises was partially determined due to their ability to be managed by only one full-time staff member with additional student /part-time labor. The enterprises considered do not have the same daily requirements that a lactating dairy herd does and therefore this staffing model appears appropriate. There are many reasons why the college may desire additional staffing of the farm enterprises (risk of turnover, weekend coverage, liability, vacation coverage, etc.), however the enterprise team did not feel that from a financial perspective an additional staff member could be justified. The primary financial benefits of the proposed production enterprises are the reduction in labor costs. There may be ways for the college to find additional cost-effective methods to add additional coverage for the farm through items such as part-time contracts, contracts across departments (such as part-time farm and part-time maintenance) or faculty release time. These types of arrangements would still need to be done sparingly as they could easily cause significant harm to the financial viability of the production enterprises.

Enterprise Implementation Timeline

Recognizing that the enterprises will either be continuing or introduced at different times, the Enterprise Team mapped an implementation timeline (Table 1) to more specifically inform the five-year financial model. Continuity of any enterprise assumes upgrades and improvements as needed will be addressed.

Table 1: Enterprise Implementation Timeline

Enterprise	AY 2020-2021	AY 2021-2022	AY 2022-2023	AY 2023-2024
Dairy Heifers	Begin June'21	Continue	Continue	Continue
Grass-Fed (Feeder) Beef	Plan/capital improvements	Begin May '22	Continue	Continue
Hogs	Plan/capital improvements	Begin Aug/Sept '21	Continue	Continue
Vegetables	Plan/implement capital improvements	Begin January '22 (Depending on the use of greenhouse for starts and whether additional crops to potatoes are chosen.)	Continue and add crop diversity	Continue
Maple	Current	Continue	Continue	Continue
Orchard	Current	Continue	Continue	Continue

Additional options			Introduction of additional diversified enterprises, June '23	Continue

VIII. FINANCIAL ANALYSIS

The Template Team began by gathering historical data and finances related to revenue streams, program expenses, staff and faculty numbers and costs, enrollment, and tuition. This information was then combined with the Enterprise Team's financial analysis to build a *5 Year Annual Cash Budget*. To further determine the optimal path forward for the Vermont Tech Ag Program, the full team used an interactive scenario model to test different combinations of possible options (e.g., farm, center, revised enterprises) against success conditions. Figure 4 illustrates the four scenarios considered and is followed by the team's assessment of each. The BCD has reservations about the ability of the program to hit the financial targets (particularly enrollment) necessary to achieve long term viability based on these recommendations.

Figure 4: Vermont Tech Ag Program Scenarios

ESTIMATED "STEADY STATE" ANNUAL REVENUE & EXPENSE FY2021 DOLLARS	SCENARIO #1 Status Quo		SCENARIO #2 No Enterprises No Center	SCENARIO #3 Rev. Enterprises No Center	SCENARIO #4 Rev. Enterprises With Center
Net Matriculated Student Revenue	$259,146	$1,591,326	$523,311	$908,802	$1,469,056
All Operational & Other Revenue	$470,600	$470,600	$94,600	$240,755	$240,755
REVENUE	**$729,746**	**$2,061,926**	**$617,911**	**$1,149,557**	**$1,709,811**
Academic Program Expense	$186,452	$484,220	$227,326	$320,050	$454,810
Enterprise Expense	$593,000	$593,000	$0	$232,820	$232,820
Institute of Ag Expense	$107,795	$107,795	$107,795	$107,795	$107,795
Center for Ag Expense	$0	$0	$0	$0	$187,225
Other Expense	$0	0	$20,000	$0	$0
EXPENSE	**$887,247**	**$1,185,015**	**$355,121**	**$660,665**	**$982,650**
NET REVENUE (EXPENSE) *WITHOUT INST. O/H*	**-$157,501**	**$876,911**	**$262,790**	**$488,892**	**$727,161**
INST. O/H TARGET MARGIN = 74%	**-18%**	**74%**	**74%**	**74%**	**74%**
INSTITUTIONAL OVERHEAD	**$656,563**	**$876,911**	**$262,790**	**$488,892**	**$727,161**
NET REVENUE (EXPENSE) *WITH INST. O/H*	**-$814,064**	**$0**	**$0**	**$0**	**$0**
Enrollment Status	CURRENT	BREAKEVEN	BREAKEVEN	BREAKEVEN	BREAKEVEN
Enrollment Headcount	**22**	**135**	**44**	**77**	**125**
Revenue $$ / Student	$11,779	$11,779	$11,779	$11,779	$11,779
Additional Cost / Student*	$2,833	$2,833	$2,833	$2,833	$2,833
*assumes 1FT faculty per 30 students					

Scenario One: "Status Quo"
As previously mentioned, there is overall understanding that the status quo is not an option. The net revenue loss of $157,501 means the program falls short of meeting its annual contribution target (direct and indirect/institutional overhead costs) by $814,064. This creates a financial strain across the institution, as revenue from other programmatic centers is drawn to cover the Ag Programs' negative net revenue and negative contribution to organizational overhead.

Scenario Two: "No Farm Production Enterprises/No Center"
While potentially the hardest to contemplate, the BCD Team did consider and model a scenario where the farm production enterprises would be discontinued and no Center established. It envisions the preservation of the existing curriculum structure of Vermont Tech's agriculture programs. However, this scenario would not include production enterprises located on campus or managed by Vermont Tech. Agricultural producers and processors would be recruited to help teach the students and use their facilities as teaching labs. The curricula in the AAS programs in Agribusiness Management and Dairy Farm Management would be maintained as is. The curriculum in the BS program in Diversified Agriculture would be reviewed to ensure it meets the needs of students in such fields as specialty crops, specialty foods and emerging livestock opportunities. Within this curriculum, there are 30 credits of free electives, where new or improved courses could be offered to meet the needs of emerging markets. Students in the Diversified Agriculture program could also earn a Minor in Entrepreneurship. The advantages of this scenario are its immediate implementation and savings and its alignment with historical enrollment levels. The disadvantages are that this option is not transformational and there is nothing different proposed to draw students and increase enrollment; it might even negatively impact enrollment. Alternatively, absence of a farm might cause a paradigm shift and new emphasis on the diversified ag program, which is seen as having room to grow as described. The other expense of $20,000 is costs anticipated to accomplish the internships.

Scenario Three: "Revised Farm Production Enterprises/No Center"
This scenario represents the work of the Enterprise Team to develop a revised suite of enterprises that reduce labor cost, compress expense structure, and decrease reliance on the commodity milk market, while maintaining marketability and career opportunities for the students. The breakeven under this scenario requires an enrollment of 81 students versus a breakeven enrollment of 139 calculated under scenario one. This reflects the improved efficiencies of the revised enterprise models. Importantly though, this scenario does not yet include additional marketing or capacity to address enrollment scale up and internship development. This scenario reduces losses, but there is no change to the academic model and nothing to drive enrollment.

Scenario Four: "Revised Farm Production Enterprises and Center"
Scenario Four models the revised farm production enterprises with the addition of a Center for Agriculture and Food Entrepreneurship. This involves adding necessary marketing and coordination capacity in the form of the Center's director. This additional overhead and marketing cost increase the break-even enrollment to 125 students (~90 FTE per 100 enrolled). A concern of the group is that this level of enrollment, as it has not been seen historically, may be unrealistic as well as unattainable. Current trends in Vermont high school technical programs reveal that of the 600 students enrolled in agriculture and forestry programs, only 30% are going onto college. The BDC recommends that a study be conducted to evaluate the feasibility of reaching this level of enrollment, whether from this potential pool or others and in consideration of potential employment outlets. To develop Scenario Four requires fundraising to cover approximately $200,000 of annual operating expense for the Center.

APPENDICES

Appendix A: Estimate of Enterprise Related Capital Expenditures

Immediate Deferred Maintenance Line Items	
Heifer Barn	$52,500
Sugarhouse	$15,000
Subtotal Deferred	**$67,500**
Fitup/Equipment Purchases	
Round Bale Wrapper	$18,000
Mixer Wagon (Net After Trade)	$10,000
Grazing Systems	$72,446
Potato Equipment	$12,500
Hog Equipment	$17,100
Subtotal for Diversified Fitup	**$130,046**
Total	**$197,546**

Appendix B: Criteria for Enterprise Selection

The Enterprise Team used a rubric with 12 criteria to score 23 enterprises and narrow priorities to eight (8) enterprises that were further considered by team members. Enterprises receiving additional analysis were cow-calf beef, contract dairy heifers, stocker beef, deep bedded hogs, maple, orchard, potatoes, and value-added dairy (robotic).

Enterprise Economic Sustainability	
1	There is more than one stable and consistent potential market/buyer for this enterprise product/service.
2	This enterprise's product/service is unique or otherwise competitive in the marketplace.
3	This enterprise has the potential to be cost neutral or generate profit.
Academic Assets	
4	This enterprise requires educational facilities unique to Vermont Tech.

5	The facilities/capital needs of this enterprise/course exist in good operable condition at Vermont Tech now.
6	This enterprise/course is scalable given existing facilities, staff, and faculty.
Workforce Development	
7	This enterprise/course develops skills required for future job placement, business ownership.
8	This enterprise/course develops skills in demand in the target industry segment.
9	The skills developed as part of this enterprise/course are best acquired at Vermont Tech or one of its partner institution/farm.
Marketability to Draw Full Time Students	
10	This enterprise/course is likely to attract more than one profile of student/client.
11	This enterprise/course is likely to attract students/clients from within Vermont.
12	This enterprise/course is likely to attract students/clients from outside of Vermont.

Vermont Tech Farm Transformation Budget

	Deferred Exterior	Deferred Interior	New Enterprises
Main Barn	$135,869		
Heifer Barn	$2,671	$52,500	
Equine Vet Tech	$4,308		
Small Animal Barn/Hoop Barn	$22,680	$2,000	$13,600
Hay Barn	$5,459		
Sugar House	$697	$15,000	
Equipment Shed	$1,743		
Grazing Infrastructure			$73,321
Cattle chutes			$7,600
Vegetable Equipment			$15,000
Bathrooms, office, parking, classroom	$25,000		
Total	$198,426	$69,500	$109,521

Summary of Farm Capital Needs	
Income estimate	
Dairy herd sale	$65,000
Norwich proceeds	$100,000
Total income	$165,000
Buildings, grazing, equipment	$377,447
Net Capital Needs	$212,447

Other Documents Produced During the Transformation Process:

Answers to Frequently Asked Questions (FAQ): https://mk0vermonttechn1rsw8.kinstacdn.com/wp-content/uploads/2021/03/VT-Tech-Ag-Transformation-Project-FAQs_2.22.21.pdf

Interim Report: https://mk0vermonttechn1rsw8.kinstacdn.com/wp-content/uploads/2021/03/VT-Tech-Ag-Transformation-project_INTERIM-REPORT-12.31.20.pdf