AGRICULTURAL EDUCATORS AWARD REPORT



What Makes a Successful Learning Environment for Teaching Livestock Skills? A Study Trip to North American College and University Farms

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AGRICULTURAL EDUCATOR AWARD REPORT

TITLE	What Makes a Successful Learning Environment for Teaching Livestock Skills?
Scholar	Gus Cassie BSc (Hons) MRCVS BVM&S
Objectives	Visit university and commercial farms in North America to investigate how to make a farm an excellent educational space.
Countries Visited	Canada and USA
Key Messages	**Theme 1:** Consideration of place and environment is the best starting point to design a strategy for a teaching farm and make it unique. **Theme 2:** A teaching farm should prioritise profitability. Commercial projects can have a beneficial effect on staff, students and the community. **Theme 3:** Small design choices are the most important, and design is not necessarily a limiting factor to the farm. **Theme 4:** There are many different methods to accommodate groups of student workers. When done well, 'working to learn' has a profound impact on students. **Theme 5:** It is possible for commercial farms to create successful and independent educational projects. External bodies, including veterinary practices and universities, can help in supporting these projects.

The Farmers Club Charitable Trust

The Farmers Club Charitable Trust was founded in 1981 and is dedicated to supporting the agricultural community in the UK through education, leadership and innovation. Our mission is to enhance the agricultural sector by providing financial assistance to advance education and training within the food farming, and associated industries.

The Agricultural Educator Awards are part of a suite of initiatives; these are open for applications every Autumn and awards are made every March.

Full details can be seen on the Trust's website www.tfcct.co.uk.

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(The views in this report are those of the author only)

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Introduction

I am a farm animal veterinary surgeon, and during this study period I worked as a university lecturer at the Royal (Dick) School of Veterinary Studies (R(D)SVS), University of Edinburgh. I have a strong interest in promoting and teaching practical livestock skills to support stock workers and vets, having seen firsthand the benefits that good training can have on livestock health, farm business success and the farm team. Practical farm skills can take many forms: whether it is the basics of safe handling, good milking technique, responsible use of medicines, nursing care, or interpreting and acting on farm data, to name a few.

Nationally, there is a pressing need for skills development in agricultural workers. A recent survey conducted by Arla Foods and Harper Adams University found that over a third of farm employers 'lacked confidence in recruiting skilled staff' and over 80% of farmers with job vacancies reported they had 'very few or no applicants with the right skills to fill them' (Harper Adams, 2025). The workforce is ageing – in 2025, government statistics reported that 70% of agricultural workers in England were over 55 years old (GOV.UK, 2026) – and attracting and supporting young people through a farming career is a continual challenge. Furthermore, the modern skillset needed for success is broadening. On top of husbandry and management skills, it is becoming increasingly important that staff have a strong understanding of subjects such as animal welfare, data interpretation, and environmental management. More than ever, we need to have excellent facilities to train people up and provide relevant CPD.

The veterinary industry has its own set of workforce challenges. It can be difficult to recruit and retain graduates in rural areas. Vet schools need to prepare students for the increasingly specialised field of farm veterinary medicine.

In my position as Lecturer in Applied Animal Husbandry at R(D)SVS I taught the next generation of vets, and with my work as part of Farm Steps community interest company I help run accessible livestock skills training courses for workers in the UK.

At the R(D)SVS I spent a lot of time planning and delivering classes at the university-run sheep and dairy farms. These facilities support a significant volume of teaching and research alongside their commercial activities.

Langhill dairy farm runs approximately 220 high yielding Holstein Friesians in a conventional milk contract with a Scottish milk processor. It is a closed herd, managed on an Autumn block system. The farm has a well-equipped teaching shed, with its own separate section of cubicles to house the teaching cows and custom-made stocks to hold the animals during classes such as cattle handling, clinical examination and rectal palpation. In semester time, there are multiple classes going on in all farm facilities (the parlour, calf shed, cubicle shed, teaching barn and classroom) and during holidays, students work with staff as part of one- or two-week placements. The farm is also host to varied research projects that occur throughout the year. Overall, Langhill has over 2000 student visits per year, along with events hosted for farmers and some community groups. The farm is very accessible to the students – at about a mile from the main

campus. Students can either take a short bus ride to the farm, or if the weather is good, walk over to class.

Easter Bush sheep flock is a lowland farm, consisting of approximately 300 Cheviot mule ewes that produce Texel and Beltex cross prime fat lambs. It runs a similar, but smaller, operation of teaching, research and placements. The sheep farm is directly on campus, right next to the main teaching building.

Recently the university has introduced practical pig classes to the curriculum, using a teaching herd of 15 weaned pigs purchased from a nearby commercial farm. The pigs are kept for four months in straw pens, where they are used in classes, and then sold for pork. The herd is kept in an older shed that needed some minor refurbishment – however it works effectively for these classes. Farm redevelopment is up on the vet school agenda, with plans to enhance and upgrade facilities in the future.



Cows grazing at Langhill farm (top left) and the Easter Bush Sheep Unit at the base of the Pentland Hills (top right). Cheviot mule ewes in a sheep handling class (middle left) and staff working in the cattle teaching barn (middle right). Students conducting a pig housing assessment (bottom).

The idea for this Farmers Club Charitable Trust project was conceived after reflecting on my teaching work to date. Am I making best use of the farm environment for my classes? How can a farm be improved to create the best setting for teaching?

Some questions for the project included:

- How can I make better use of space and facilities for my own teaching?
- What design features can help improve a farm delivering teaching?
- How can we encourage the best engagement with facilities by students?
- What is the best way to balance the needs of farm staff, students, educators and researchers on the same site?
- How can commercial farms be used for teaching?

Summary of Study Visits (September – October 2025)

- **Ontario Veterinary College, University of Guelph** (Ontario, Canada)
  Visited dairy client farms with Dr Dave Renaud. Toured farm, research and teaching facilities at Elora Research Station and Ontario Veterinary College (OVC)
- **Upper Grand Veterinary Services** (Ontario, Canada)
  Visited dairy client farms with Dr Rob Swackhammer and met practice staff
- **Keseca Veterinary Clinic**, Geneva, (NY, USA)
  Visited client farms with Dr Brenda Moslock Carter and met practice staff
- **Cornell University College of Veterinary Medicine and PRO-DAIRY** - (NY, USA)
  Toured the farm facilities at the Cornell Dairy Teaching Barn with Dr Carolyn Kokko and Dr Daryl Nydam
  Visited Cornell University Ruminant Centre (CURC), Sunnyside Farm and Cornell teaching facilities with Dr Daryl Nydam.
  Met with PRO-DAIRY extension team (Robert Lynch, Kathy Barrett, Lindsay Ferlito, and Quin Kolar)
- **Polyface Farms** (VA, USA)
  Toured the farm with Joel Salatin and met with Polyface farm stewards and staff
- **Virginia Tech University**, School of Animal Sciences (VA, USA)
  Toured dairy, beef, swine, sheep, equine and meat processing facilities. Met with many of the Animal Sciences faculty and students. Delivered a lecture to animal science undergraduate students. Particular thanks to Dr Dave Gerrard, Dr Katie Heidersheit, Dr Cindy Wood, Kathy Duncan, Dr Dan Eversole, and Chad Joines.
- **North Carolina State University, College of Veterinary Medicine** (NC, USA)
  Toured clinical and farm facilities at NC State College of Veterinary Medicine with Dr Derek Foster and visited Howling Cow Dairy Education Center and Creamery with Dr Derek Foster, Alex Ives and Stephanie Ward.
- **Delaware Valley University** (PA, USA)
  Toured teaching and farm facilities with Dr Robin Shedlauskas, Dr Broc Sandelin and Darren Mayer. Delivered a lecture to undergraduate students.

North America as a Study Location

There are a number of farms in the UK that host teaching and training to a high standard. We have strong agricultural and veterinary university programmes, a varied spread of industry groups running farmer courses, and a healthy atmosphere of knowledge exchange. In my interview at the Farmer's Club, the panel rightly wanted to know – what sets Canada and the USA apart?

Historical Context: The American *'Land Grant University'*

The USA has a uniquely long history of government support to post-secondary educational institutions that provide training in science, engineering, and importantly, agriculture.

This started in 1862, when congress passed the pioneering Morrill Act. The new bill gave all states a large allocation of federal land, under instruction that the proceeds were to be used to develop 'Land Grant Universities'. The function of these universities was to provide education to working people – specifically in subjects such as engineering and agriculture - who had previously found access to this type of schooling very difficult. The Morrill Act had a huge impact on the upskilling and development of the American workforce, and it is argued that it was a significant factor in USA's strong economic growth and rise as an international economic power in the early twentieth century (Ehrlich et al., 2018). It is important to note that the act's legacy is controversial: the original federal land allocations included land ceded and seized from Native American Tribes. The considerable damage to indigenous communities is an example of settler colonialism that has since been acknowledged by institutions, but not repaired. (Nash, 2019)

Further legislation introduced in the early twentieth century bolstered the support to land grant universities, while expanding their remit. Land grant universities now featured 'agricultural field experiment stations' - set up to conduct research that could be used to inform the regional farming community. This model, known as '*cooperative extension*', made a distinct difference to regional farm productivity, and continues to exist to this day, more than a century later (Congressional Research Service, 2022). All land grant universities have extension departments, with teams of specialists using the latest university research to help support state producers and the wider industry. In return for their work in the three crucial areas of *research*, *extension* and *teaching*, land grant universities receive significant federal funding, which is generally matched by state contributions.

The modern land grant university is a highly attractive prospect for a young person seeking out a career in agriculture. Over the last century they have generally developed strong reputations, and, having the long-term stability of large federal- and state-backed funding packages, have been able to confidently invest in their facilities and programmes. These institutions have broadened their offerings to include many

programmes in fields such as law, medicine, veterinary medicine, humanities and the arts while maintaining roots in engineering and agriculture.

The present-day American farming community remains very familiar with the concept of extension, and will often use extension services to help their farm businesses. The long history of the scheme, coupled by the fact that it is available in every US state, makes it an important influence on US agriculture. Reading *Hoard's Dairyman*, a leading nationwide dairy industry publication, it became apparent that the majority of information and advice articles were written by extension specialists, rather than private consultants. This information is generally well received and respected by farmers.

There are comparable services in the UK. In particular, Scotland's Rural College (SRUC) provides comprehensive support for Scottish farmers with a similar remit to the Land Grant universities. However, the history and scale of US agricultural extension did create a distinct culture that reinforced the role of these universities in being in service to the farming community.

Geographical Context: The Livestock Workforce

North America has been subject to varied economic and political influences, giving rise to a diverse agricultural workforce that has been subject to a range of education types.

The demographic most similar to the UK was found in Ontario, Canada. The province has a quota system in place for dairy farms, governed by Dairy Farmers of Ontario. To ship milk, farms need to purchase an allocation of quota – determined by kilograms of butterfat produced per day. Quota is expensive (around $24,000CAD / £12,500 GBP per kg) and not always available to purchase, making it difficult both for new entrants to get started and for existing farms to expand. As a result, the average herd size in Ontario is around 100, half that of the UK. (Gov of Canada, 2025).

However, once bought in to the system, farmers can expect milk prices that are predictable and realistic with cost of production. Farmers could make a respectable income, even with modestly sized herds, and run a stable business that could be passed down in the family. Indeed, a high proportion of dairy farms were family-owned.

The Ontario farms visited on the trip consisted of cows - predominantly Holstein, with some Jersey - fully housed in well-maintained cubicle, or 'free stall' barns. Staff tended to be multiple generations of one family, and there was a low presence of migrant workers. Labour-saving technology, such as robotic milkers and feeders, were becoming increasingly popular. Farmers had often grown up on the farm and learned many of their skills from parents or family members. Like the UK, farmers had access to agricultural colleges and universities for qualifications or degrees; however, this path was not taken up universally. Anecdotally, the security offered by the quota system, along with its barriers to expansion, meant that farmers did not have the same incentive or pressure to constantly innovate and develop as in farms south of the border.

Crossing into the USA, things were markedly different. There are no quota protections for dairy farms, and with much more exposure to free market conditions farms were generally having to 'go big' or shut down.

In New York State, the dairy industry was in a strong and optimistic position. There was a large presence from dairy corporations and herds of over 1000 cows were common. A large dairy processing company, Fairlife LLC (a subsidiary of the Coca Cola Company), was finishing construction on a new processing plant in the region set to drive demand for milk, economic growth and herd expansion in the region (Sharp, 2025).

The majority of the workforce keeping the dairy industry so buoyant was made up of Hispanic migrant workers, from Mexico and Central America in particular. Indeed, the whole US agricultural industry is largely reliant on a Hispanic workforce. Dairy farms that hire migrant labour make up 79% of the national milk supply (Adcock et al., 2015).

Some of the larger farms visited on the trip managed their staff similarly to that in a corporate office environment. Buildings featured immaculate staff rooms and conference rooms. They had a clear hierarchy of roles and routes for career progression. This was quite a contrast to the smaller Ontario family farms. Indeed, at one particularly impressive unit called Sunnyside Farms (milking 5000 cows) there were six 'core values' written to guide staff.





'Core Values' poster along with fluorescent tabards for staff, Sunnyside Farms September 2025

Motivated staff had the ability to learn many skills including ultrasound pregnancy scanning, complex obstetrics, intravenous fluid therapy, and specialist treatments, for example for a left displaced abomasum (LDA). This training typically came from senior colleagues, visiting veterinary surgeons, or extension specialists. Due to the high stock numbers on these farms, staff could chalk up their caseload - and therefore their experience and skills – relatively quickly. Communication on the farm was often in Spanish, not English, and it was beneficial for local vets to learn the language (even if

just key phrases). Migrant staff were more likely to learn fluent English if they aspired for middle management or general manager positions.

Farm managers or owners were more likely to be American born and hold qualifications such as a university degree (from a land grant university). In the larger herds it was common for there to be a hierarchy of management positions with middle and senior jobs. These roles required development of skills in financial planning, leadership, staff management - along with herd health - and as a result were generally well paid. Good farm management was necessary for the business to stay healthy.

It was impressive to see how staff could develop such an advanced level of livestock skills on the larger farms, which subsequently boosted cattle health and performance (most clearly seen at Sunnyside farms).

The position of many migrant workers in the USA is, however, very precarious. Many migrant farm workers in the USA are undocumented – and therefore may not have full legal rights to work and reside in the country. Regardless of legal status, migrant workers face many risks such as unsafe working and living conditions, inadequate pay and exploitation. Under the current US administration, immigration-related arrests and workplace raids have risen significantly, exacerbating the already heightened fear and tension in these communities (Angulo, 2026). (Unfortunately, this project did not have the scope to investigate these issues. An excellent book that explores the lives of migrant workers in American dairy farms is *Milked: How an American Crisis Brought Together Midwestern Dairy Farmers and Mexican Workers* by Ruth Conniff, 2022)

Going south into Virginia and South Carolina, the dairy industry played a much smaller role in state economies with relatively higher proportions of beef, pork and poultry. Units consisted of both family farms, and large units like those described above.

Other notable workforce types included small Amish and Mennonite family farms. These conservative Christian groups tend to eschew, to varying degrees, modern technology such as television, cars, or the internet. Some of the Amish and Mennonite farms visited on the trip were small and more reliant on (cheap) family labour to make the business viable. Their way of life meant that they could be isolated from general society and much less likely to have attended university. Trusted advisors, like the local vet, and farming publications, for example the *Hoards Dairyman*, were typical sources of educational information.

This varied agricultural workforce had a range of capabilities and needs, meaning there was great opportunity to see several different training approaches and educational environments.

Cultural and Personal Context

It was insightful to spend time amongst Canadian and American people and appreciate some cultural differences. In general, people were earnest, warm, and very hard-working. Universities often started their lectures at 8am and would expect full attendance from students (something that would cause uproar back in Scotland!). Farmers, vets, academics and students showed tremendous commitment to their work and had pride in sharing it. Institutions projected huge confidence and fostered a strong sense of loyalty amongst alumni. Bold approaches to solving problems were encouraged. It was valuable to see the impact of this culture in person, and it is thanks to the generous support of the Farmer's Club Charitable Trust who made it possible.

One particular experience on the trip summed up the American attitude. I spent my first weekend in Ithaca (home of Cornell University), and on the Sunday evening went out for run. My route headed through quiet farmland and forestry in the hills around Ithaca, and at one point the path cleared to give a fantastic view of sunset over the town. I stopped to appreciate the scene, along with a student who happened to be walking the same path. We chatted for a moment, and I turned to continue my run.

I left with the usual British response - "see you later!" and the student, with full American sincerity, shouted back to me "YOU GET AFTER IT, MAN!!". I learned that they certainly know how to get after it.

Theme 1 – Place and Environment

It became clear from the outset of the trip that for a teaching farm to be successful it must make sense in, and belong to, the surrounding region – just as a commercial farm must match the land with the right type of system.

Each area I visited had unique geography, climate and economy, and the more that a teaching farm could complement and leverage these factors, the more likely it was successful. In particular, teaching farms needed to:

- Reflect the agriculture going on in the area already and in doing so, make commercial sense to exist if research and teaching on the farm were to cease
- Be of interest and relevance to the local agricultural industry – including farmers, vets, businesses, and trade groups – which lays the foundation for subsequent national (and international) interest.
- Tailor activities to support what makes the region unique

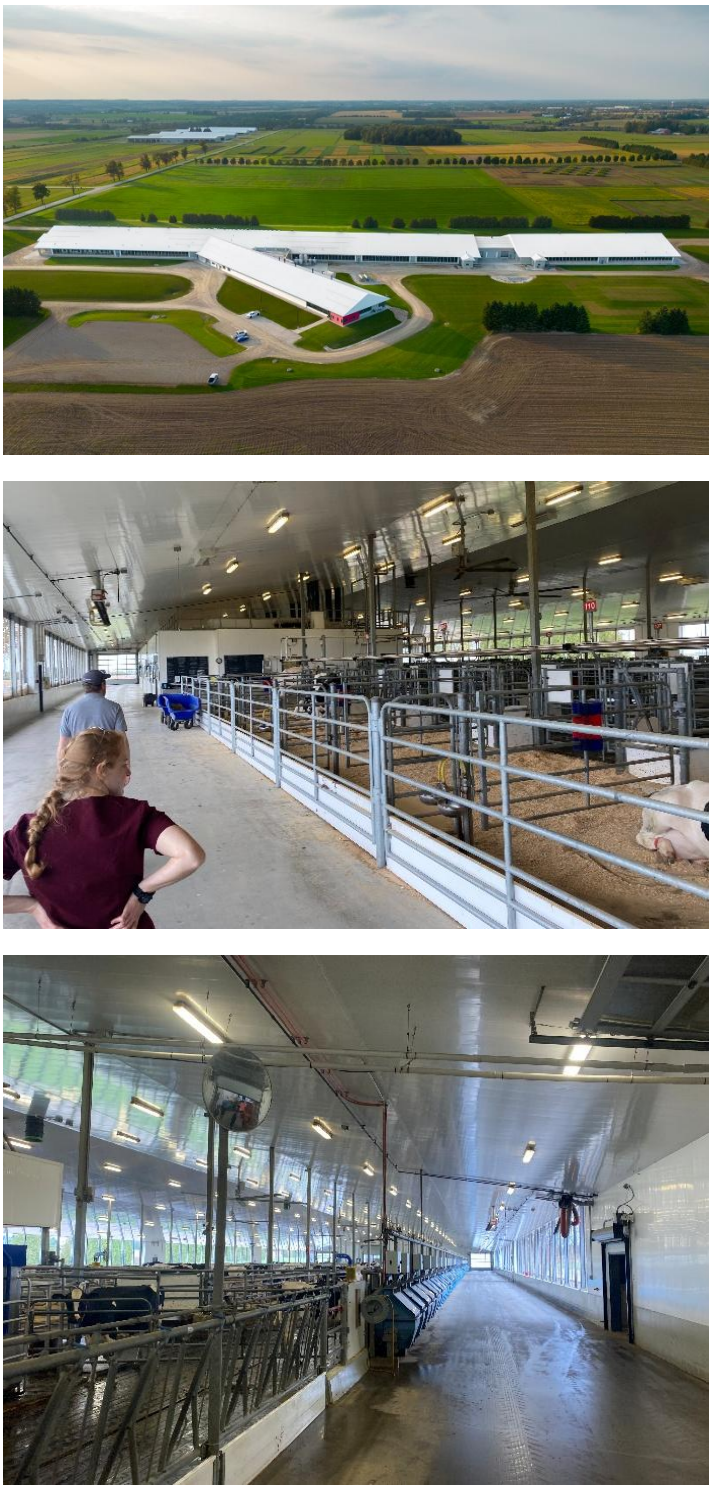
Position in Industry and Regional Infrastructure- Ontario Dairy Research Centre at Elora Research Station and Cornell Summer Dairy Institute

Elora Research Station in Ontario, Canada was a particularly impressive farm that had positioned itself as a leader of the regional dairy industry. Completed in 2015 at a cost of approximately $25 million CAD, the farm hosts approximately 300 cows and 300 heifers used for research and teaching. The facility is large and multifaceted. Cows can be housed in free stalls (cubicles), tie stalls, and specialised close-up dry cow pens. They can be milked in a voluntary milking system (VMS) robot, a rotary parlour, in the tie stall barn or in individual maternity pens. Rations are measured using highly precise weighing and mixing equipment, and individual cow feed intakes are continually recorded to an equal degree of accuracy. With the range of technology in place, it is possible to measure the complete feed intakes of an animal for its entire life - from the day it is born, all the way through growth, lactation and eventually shipping.

The Research Centre is located near Guelph, Ontario, and is surrounded by hundreds of dairy farms supported by the Dairy Farmers of Ontario (DFO) quota system (as described in the introduction). There is a heavy industry presence in the area (in fact, the head office of Semex, a multinational breeding and genetics company, is a ten-minute drive away). A lot of stakeholders have an interest in advancing dairy production by way of practical, on-farm research, and so have associated themselves with Elora.

The research station has managed to leverage this interest successfully. To help fund the considerable construction costs, they were able to attract donations and grants from varied sources. Primary support came from the provincial and national government along with DFO, but as can be seen from the photograph of the donor wall below, over thirty institutions and companies supported the project. The centre continues to facilitate research that has a direct application to farms and industry, and as a result the

farm is in high demand. As of September 2025, there was a 2.5 year waiting list to conduct research on transition cow management, such was the number of research groups applying to work there.



Elora Dairy facilities: A view of the facility (top) (photo credit, BSN architects 2025) specialised maternity pens (middle) and rows of blue RIC2Discover feed intake scales in the free stall section of the barn (bottom)

The visit day to Guelph was facilitated by Dr Dave Renaud – veterinarian and researcher at Ontario Veterinary College. Half the day was spent touring Elora facilities, and the other half was spent attending to nearby dairy farmer clients. Because of Elora farm's central location, researchers like Dr Renaud are able to seamlessly move between world class research facilities and coal-face clinical work every day - a great example of how to effectively link research with real life.

There was a beef research centre adjacent to the dairy farm. It had similarly impressive and high-tech infrastructure. There was, however, a noticeable reduction in cattle occupancy and ongoing research projects. Beef production in Canada is primarily based around the provinces of Alberta, Saskatchewan and Manitoba. Beef industry groups and expertise were not quite as present in Ontario compared with those in dairy production. The contrast was most marked when comparing the supporters' plaques on the walls of respective units.



Supporters and donors for Elora's dairy (left) and beef (right) research centres.

Cornell University, New York, USA is in a similarly dairy-heavy environment to Ontario Veterinary College. In addition to its established position in the regional dairy industry, Cornell has fostered a strong national and international reputation for dairy science (like the University of Wisconsin-Madison, USA). One of their most successful on-farm projects has capitalised on this reputation: the annual Cornell Summer Dairy Institute. The 6-week course is open to final year or just-graduated veterinary students and is hosted at the vet school and the Cornell Teaching Dairy Barn (more details in subsequent chapters). Participants have access to industry-leading vets, farmers and scientists who provide training in specialised dairy herd health skills that are increasingly needed by the modern farm vet. The course attracts attendees from the

USA, Canada and abroad, and is described by organisers as a capstone to Cornell's dairy vet curriculum. Students are put up in a fraternity house in town, giving them an authentic American college town experience. By utilising the strengths that are unique to Cornell and its position, the summer institute – and the excellent Teaching Dairy Barn - has served to influence new generations of dairy vets and cement the university's reputation as an international leader in dairy science.

University Farms in Highly Populated Areas – North Carolina State University

North Carolina State (NC State) University's College of Veterinary Medicine is found in the city of Raleigh, part of the 'research triangle' – the large metropolitan area that has developed alongside the three universities of NC State, Duke University and the University of North Carolina at Chapel Hill. The region is dominated by towns and suburbs, where there used to be fields and barns.

The university campus is surrounded by a mix of housing, major roads and typical urban infrastructure and so has very limited space to maintain a teaching farm. Instead of moving these facilities out of the area, meaning students would need to travel to external sites, the decision was made to develop new, small-scale farming operations that could function in a suburban location.

The **College of Veterinary Medicine Dairy Barn**, completed in 2024, is just a couple of minutes' walk from the main lecture theatre. There are 25 milking cows in the herd, housed in a modern freestall system with spaces to accommodate any future increased to the herd size. The footprint of the farm is incredibly small. There is a small grass paddock to provide outdoor access to cows, but otherwise no grazing platform or cropland. Cows are fed a mix of alfalfa hay and concentrate feeds that are bought in. Slurry is managed in conjunction with city infrastructure – the liquid portion goes into the human sewer system and the solid manure kept for use on the campus land.

The university also has a small herd of around 30 Aberdeen Angus cattle. They are kept outdoors, grazed in fields next to a highway and golf course. For classes, the cattle are herded into a covered race and crush. Observing a class, it was noticeable how docile and amenable the cows were for teaching. Once let out of the crush, the animals calmly grazed close to the students before heading back to their paddocks. Alongside the beef cattle there was a small flock of sheep, goats and teaching horses.

As discussed on the visit, costs per head are high for a small system like this, particularly with feed. However, the payoff is that that the practical teaching opportunities for the students are very accessible. It is possible to fit in farm classes alongside a busy day of lectures as there is no transport time needed. It was also easy for students to pick up part-time work at a farm (more information in Theme 4).

NC State has another, larger dairy farm nearby. The **Howling Cow Dairy Education Center and Creamery** milks approximately 150 cows in a conventional system. It is

just on the outskirts of the city of Raleigh, with the skyline from the centre of town visible from the farm. The area is densely populated, with high volumes of traffic moving along the adjacent main road. Again, rather than selling the farm and moving operations out to more peaceful farm country, NC State has leaned into the changes to the local environment by encouraging the many locals to come to the farm. Howling cow operates a highly popular visitor centre, museum, and ice cream shop. Nearly 5000 people will tour the education centre every year to learn about cows and dairy production. On a good sunny day, there will be hundreds of customers coming through the ice cream shop. It is particularly popular as you can have the ice cream while enjoying a brilliant view across a lake to cows grazing in a meadow – the ultimate pastoral image, and only a fifteen-minute drive from town. Howling cow is well known in the community and successfully connects city people with farming. These business initiatives have been very commercially successful and are powered by a small army of student workers (more on both of these in subsequent chapters).



Farm facilities with city buildings nearby in Raleigh, North Carolina. (Photo credit Walter Magazine 2024)

Providing Farm Education in the Region without a designated teaching farm – PRO DAIRY, Upper Grand Veterinary Services and Keseca Veterinary Clinic

PRO DAIRY is a dairy extension initiative helping fulfil Cornell University's Land Grant commitments, conducting applied research, consultancy and training programmes. They have developed a few different educational projects that cater to the particular needs of dairy producers in New York state. Reaching dairy workers can be challenging – with long work schedules, it isn't feasible for most to travel to Cornell's own teaching barn for courses. The team at PRO DAIRY have experimented with different approaches for how to work with dairy staff across the state.

They have found the approach of *going to* the workers effective. Usually, this would involve recruiting a host farm in a particular region that was willing to have a group of workers from the area over for a training course. Careful consideration had to go into the teaching activities for these types of events. If working with the host farm's livestock, it is important to choose cows that are lowest risk for being handled (for example, avoiding heavily pregnant and fresh cows) and to use a well-laid out section of the farm. As long as the owner was approached respectfully, they did not tend to have any issues working with host farm animals. To reduce reliance on live cows, courses would try to incorporate models, including cow dystocia and calf stomach tubing simulators, which can be very advanced and realistic. For courses with larger groups or on farms with limited facilities, the team were able to bring in infrastructure to support the host – for example, providing portable restrooms on a trailer. The team had good success with these types of events. As well as learning from the extension specialists, dairy workers would appreciate the opportunity to see someone else's farm and pick up on how things were being done differently.

PRO DAIRY also leverages the expansive local dairy network to help run courses. A high concentration of dairy cows in upstate New York means a strong industry presence, and consultants would make the most of this by partnering with dairy and veterinary companies to sponsor events. These industry connections helped secure some of the more expensive teaching models and allow funds to hire Spanish translators, encouraging attendance from the many local Hispanic dairy workers.

Another example of PRO DAIRY matching their activities to the area is their successful farm management courses. Many of the large dairies have hierarchical management systems (see introduction) meaning there were a lot of staff who had been promoted to, or aspired to, middle management positions. While adept at managing the cows, they may not have gained experience in leadership and labour management, skills that are important for further career progression. Identifying this skills gap in New York State's dairy environment, PRO DAIRY started running a successful biennial Operations Manager Conference that provides education and networking opportunities (Cornell CALS, 2026).

Online programmes had also become a useful part of their training package, with short courses on topics including calf and heifer management, milk quality, transition cow management, forage management. These are run from the PRO DAIRY website, at a cost

of $250 for six months of access. The team had found that asynchronous courses (where the user progresses in their own time) were the most popular and accessible; but did require a high time commitment to monitor and update. Use of software was another consideration. In the past they had required participants to complete 'homework' activities, but with some workers not having copies of Microsoft Word or equivalent, this became challenging. In-browser quizzes, although simpler, tended to have far fewer problems with compatibility.

Visits to **Upper Grand Veterinary Services**, Ontario and **Keseca Veterinary Clinic**, New York resulted in productive discussions around the private veterinary practitioner's role in livestock skills training. Both practices had found success when, like PRO DAIRY, they were able to tailor their approach to specific farms or scenarios, however this could be resource intensive. Clinics engaged with clients on courses – for example, Upper Grand had recently run classes on calf intravenous therapy and foot trimming – and discussed plans to expand what they offered. Farm veterinarians were well respected and trusted as advisors, like in the UK, which meant they were well placed to provide educational services. For most vet practices, it is easier to host classes with live animals on a host farm rather than at (usually limited) practice facilities. Discussions were had about the feasibility of making a more permanent teaching base for clients– either purchasing land and stock or partnering with a local farm. In combination with a 'wet lab' this could provide a whole range of in-house specialised courses. There is certainly potential for a vet practice to expand significantly into the education sector, with the critical factor being financial feasibility.





Upper Grand Veterinary Services, Ontario and Keseca Veterinary Clinic, New York – both practices with an interest in farmer client training

Theme 2 – Commercial and Business Ventures

Compared to Europe, the USA is more capitalist-leaning in its laws, culture and public conscience, and this was apparent on the study trip. Many of the American university farms visited were pushing various commercial ventures and trying to maximise their business performance. The most successful farms were not dependent on grants or university funding. They were profitable, able to support most (or all) of their activities, and in some cases were distributing their income to assist their fellow animal units. In setting ambitious business targets, farms had a more entrepreneurial atmosphere (like on a purely commercial farm) which seemed to have a positive effect on staff. There was a feeling of pride and purpose when the farms could offer good products or services to the public.

By their nature, university farms have some competitive advantages. They can access the wider university's resources, expertise and connections. They also have a large pool of undergraduates to use as an affordable labour source (more information can be found about student labour in Theme 4).

<u>Food Products – Cornell, NC State and Virginia Tech</u>

Ice cream production was a big hit on two campuses visited for the project.

On Sundays **Cornell University's** Ithaca campus is mostly deserted, except for the building where their Dairy Bar is located, where, within minutes of opening, a queue will quickly materialise for delicious milkshakes and ice cream. All the milk comes from the teaching dairy barn (less than a mile away) and it is processed on campus. They have strong branding and a consistent online presence. During the week, students will use the dairy bar, and at weekends there will be a higher proportion of local residents visiting. All aspects of milk production, processing and retail have involvement from the students and can be used as part of the curriculum.



Cornell Dairy Bar, located on the Ithaca campus



Produce from Cornell Dairy bar included milk, milkshakes, ice cream, and of course, merchandise!

NC State's Howling Cow Centre ran a similar business. A reported 90-95% of the farm's milk went into the creamery and ice cream shop, which supports employment of approximately thirty part-time students. The shop had both indoor tables and outdoor seating with great views over to the cows. The herd manager reported that two thirds of the farm's income came from the ice cream sales, with the final third from the state and university. The ice cream income took pressure off the dairy unit operations. It allowed the farm to accommodate high numbers of students and visitors without worrying about the reduction in efficiency and higher costs of production that inevitably result. The café supported jobs and did an excellent job of connecting the public with the university and dairy industry.



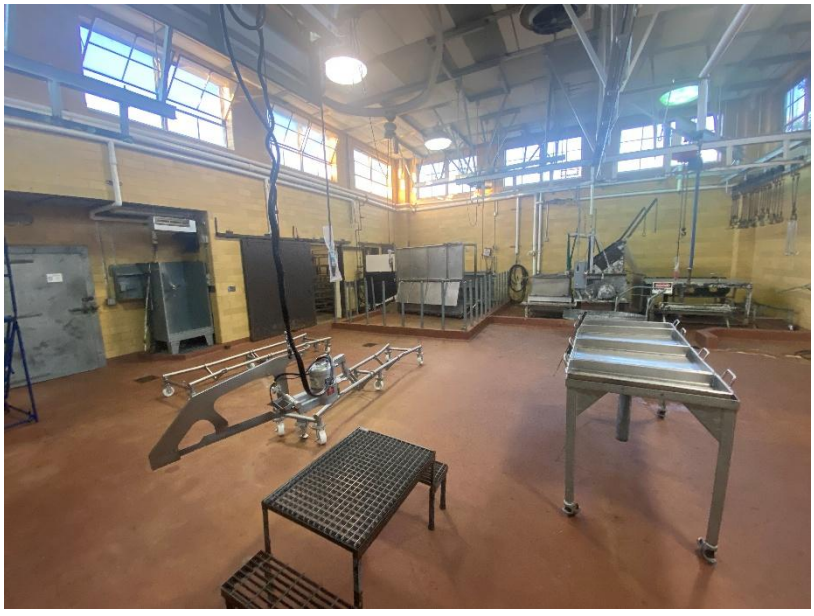
Another successful dairy business – this time, ice cream with a view.
Similar products and merchandise were available.

Virginia Tech School of Animal Sciences has their own small-scale, fully state inspected meatpacking plant on campus. With the help of meat science students, cattle, sheep and pigs could be slaughtered and processed into cuts and products for retail. It was an invaluable experience for students to be involved in the full process in a controlled manner. The produce was highly sought after by the university community and locals. It is very difficult for a private business to manage a small-scale abattoir - with administration and inspection costs creating significant overheads that can only be overcome with a high throughput of animals. A Land Grant University (such as Virginia Tech), however, can absorb these costs more easily, and will likely already have academics with public health or food safety backgrounds to help with oversight and planning. This enables them to run this abattoir with a low throughput and in a low-pressure environment – giving students proper space to learn the practical skills of meat processing and inspection.





A compact and highly functional space where small numbers of animals could be processed by students under supervision. The center enjoyed strong sales and regularly sold out of all produce.



Livestock Sales

Cattle raised at the **Virginia Tech's** Blacksburg campus are sold as part of a unique and longstanding annual event called the *Hokie Harvest Sale*. The university beef unit, managed by Chad Joines, has a reputation for high performing stock with good genetics and is held in high regard by farmers in the region (a number of whom are alumni). The sale is run almost entirely by students, and as well as being a key business venture, has become a highlight of the curriculum.

Animal sciences undergraduates can enrol in a *'Livestock Merchandising'* course, run Dr Dan Eversole, where they are taught about the principles of marketing and livestock auctions. They are soon putting those skills into action: being given responsibility to organise the auction, produce the sale catalogue, and prepare their animal handling skills to lead stock into the ring. On sale day, students are in charge of events with staff supervising where necessary.

The Hokie Harvest Sale has run for more than thirty years and has included cattle, horses and swine. Cattle are a mix of pedigree and commercial with breeds - typically Simmental, Aberdeen Angus, Hereford and Charolais. Buyers will come from across the state. Some attend because it's a reliable source of good livestock; others will come to support the school which they once studied at. The 31st edition of the sale in October 2025 attracted 170 potential buyers, both online and on campus. 61 animals were auctioned, with an impressive total income of $328,500 USD. Since the livestock merchandising course was established in 1995, there have been over 2,000 students enrolled and total income is approximately $4.5 million USD. Proceeds for the sale have been put back in to both the beef unit and the other species units on campus. (Barlow, 2025)

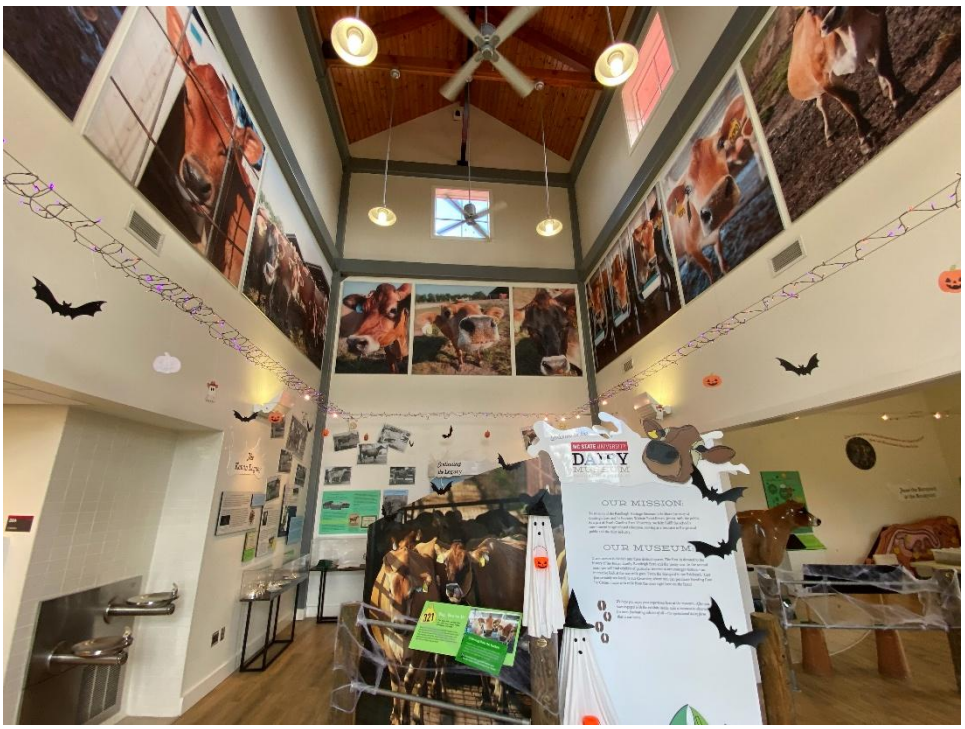
The sale was an example of the very best of what an educational farm can be. The material taught in class was valuable and relevant. Students were able to put their newfound knowledge straight into practice, taking on a high level of responsibility and making full use of the farm facilities. The sale was an important part of the local farming community and was relevant to the wider state agricultural industry. Moreover, the project is profitable and enhances the Virginia Tech brand. Credit is due to the academic and farm management staff who possess the leadership skills to pull off such an event.



Students monitoring for bids (far left) with course organiser Dr Eversole watching on (front row, far right) Photo credit: Virginia Tech School of Animal Sciences, 2025

Visitors and Agrotourism – NC State

Attached to **NC State's** Howling Cow farm and creamery is their *Dairy Education Centre*. It is common for teaching farms to offer tours for the public, but in this case, the university had invested in a full agrotourism attraction. Visitors go to the museum to learn about the history of dairy produce and farming and then tour the farm facilities and see the cows. The museum is compact and well presented, with plenty of interactive exhibits. The staff involved are knowledgeable, enthusiastic and strive to be transparent about all aspects of production when giving tours to the public. Typically, there are around 5000 visitors to the Education centre per year – particularly schools, local 4-H clubs (an agriculture-centred youth development programme), and groups of retired people. It does invaluable work in connecting the public with farming and the dairy industry and generates a gross revenue of approximately $200,000 USD a year.



Interior of the Howling Cow Museum - teaching visitors about dairy production

Importantly, the purpose of the education centre and farm tour is to show the public realistic and representative dairy farming - warts and all. Howling Cow's freestyle barn is not particularly new. It has a double 10 parallel parlour, typical of a normal commercial farm, which is over ten years old.

In the author's opinion, aiming to make a 'demonstration farm' or 'farm of the future' for the public is not a worthwhile pursuit. Firstly, expensive new infrastructure will quickly cease to be cutting edge and so has a limited timescale where it can be presented as

'leading' or 'futuristic'. Secondly, the more a facility incorporates high value equipment, uses automated machines and relies on technology for herd management, the less accessible it becomes for students who want to work and learn. Finally, the general public has much more interest in being connected to their food by seeing cows, sheep and pigs on the farm. The latest agri-tech inventions will not create the same impact or appreciation. Howling cow had taken a well thought out approach which has led to a valuable visitor experience and commercial success.

Theme 3 – Design and its Impact

Design on a Large Scale: Award-winning Architecture on a Working Farm

Cornell University and **NC State University** used the same architectural firm - Erdy McHenry - to design their dairy barns. It was an interesting choice - at the time of construction, this firm did not have a specialist background in farm projects, rather a portfolio of housing, commercial and public buildings. It did, however, have a track record of modern and bold designs that would make the farms stand out from a typical dairy with a standard freestall barn. In taking this design-focussed route, the building project costs were high (Cornell's barn cost ~$7 million USD in 2014; NC State's ~$5 million USD in 2024) but it made the farms truly unique, eye catching and highly practical for education. They are excellent flagships for their farm animal programmes.



Cornell Dairy Teaching Barn. The building is around a mile from the main campus and attracts a lot of visitors.



NC State's Dairy Barn. Note how the building structure makes reference to the original barns next door. Photo credit – NC State, 2024

Both barns are spacious, airy and bring in plenty of natural light. Cornell's barn has received several architectural awards (including the Gold Medal for design from the Philadelphia Chapter of the American Institute of Architects) and was particularly impressive to walk through. Cows were bedded on sand cubicles that were comfortable and easy to keep clean.

Classes were conducted in and around the barns and not in a separate teaching building. Groups of students can risk getting in the way of farm staff and animals, but both barns had taken this into account with their design. The free stall loafing areas were built to much roomier specifications than needed, so students and cows could coexist safely when working amongst the stalls.

Cornell had installed a concrete passageway that ran through the length of the building – starting at the milking parlour and going alongside all the free stall housing. The purpose of the passageway was solely for viewing the farm and not for day-to-day work, meaning that visitors and students could move through the whole farm at their own pace, without getting in the way of workers or machinery. It also made visits highly accessible for all - you could see the entire farm operation without needing to navigate gates, steps or uneven ground.



Cornell's viewing walkway – an excellent design feature that could be replicated on other teaching farms.

NC State only needed a small milking parlour (there were 25 milking cows at the time of the visit) but had built a spacious area around the milking machinery to fit a full class, along with a viewing area should a visitor want to watch.



NC State's milking area – making the perfect classroom to teach students in a bright, spacious and low stress environment.

Plenty of the farms visited also had smart and functional 'clean' spaces where students could work without needing waterproofs and wellies. Raised viewing areas, typically in the form of a classroom or conference room overlooking the parlour, were common. **Elora Research Farm** had an extensive network of classrooms, labs and meeting rooms so that scientists could work comfortably on-site when not in amongst the animals.

As much as it was inspiring to see these excellent flagship sites, top-class design and brand-new buildings will be out of reach for most educational farms due to cost. It was therefore just as interesting to see small and inexpensive design features that could be used by most teaching farms to help enhance their educational offering.

Use of Beef Animals to Simplify Design Needs

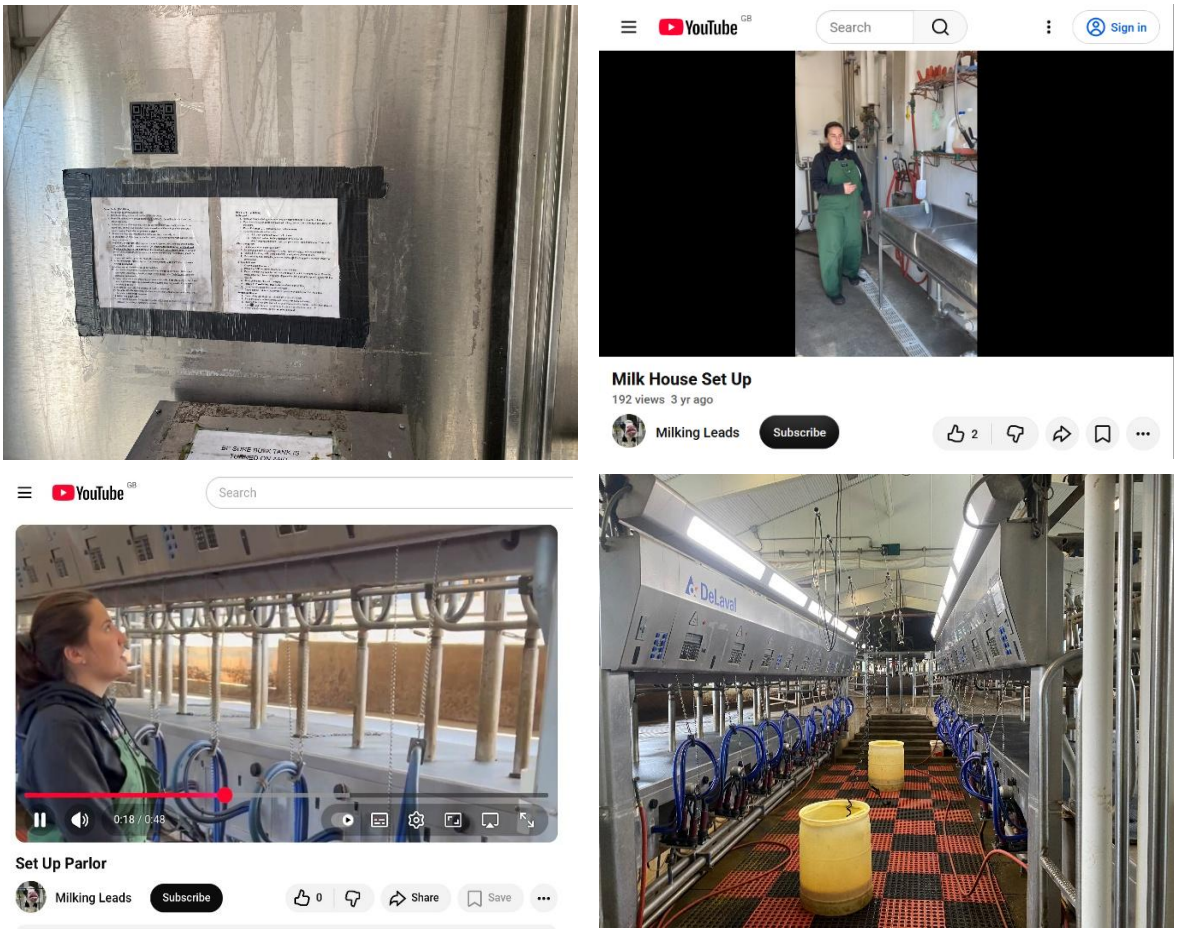
On commercial farms, it is generally accepted that because beef cattle are handled much less frequently than dairy cattle, they are more difficult and less safe to work with. However, many of the universities visited, including **Delaware Valley University**, **NC State** and **Virginia Tech,** were making good use of beef cattle in their practical classes.

They mostly used Aberdeen Angus and Herefords, both of which are breeds that make a good foundation for a docile herd. Using beef animals meant that farm design and infrastructure requirements were much simpler than for dairy. NC State were able to keep their Angus cows outside all year round, and the sum of their beef teaching facilities was one Arrowquip race and crush, plus a rain shelter. The cattle were all well-handled and good around the less confident students. A class was observed where cows were led through the race and then injected. All animals were very quiet and once released from the crush, hung around the students to graze and watch their herd mates, before heading back to the pasture. Delaware Valley University had similar success with their herd of beef cattle. At the time of the trip, they were actually planning to expand their numbers from 50 to 80 breeding cows. This is something they could do much more easily with beef rather than dairy animals.

Uses of Technology for Small Gains

Cornell University made very good use of QR codes around their teaching barn. The farm uses a lot of student workers (more in the next chapter). Some student workers were on farm regularly, but many would only work occasional shifts, and weren't totally familiar with all the farm protocols. To help reduce reliance on supervisors in these cases, senior staff had produced a series of instructional videos, linked to QR codes posted around the farm, that students could easily watch while on shift.

They were mostly positioned in the parlour and around the bulk tank. Milk processing tasks could be intimidating for students, who were conscious of maintaining hygiene and didn't want to break any equipment. Easy access to refresher videos helped reassure workers and reduce the chance of bulk tank failures. Similarly, milking routine videos were useful to keep standardisation across the large workforce.



Top left: detailed written instructions on the bulk tank, along with a QR code. Top right: online video from this QR code.
Bottom left: instructional video on how to set up the milking parlour. Bottom right: milking parlour (QR code located next to control panel).

Ontario Veterinary College (University of Guelph) had a basic online tool that allowed students to book out a rectal palpation slot with the teaching cattle in the tie-stall barn on campus. The booking system had a low uptake, which reflects the small numbers of veterinary students aspiring to do farm animal work. However, as reported by a recent graduate farm animal vet, for those farm-keen students it was an excellent way to regularly practise their manual palpation skills and prepare for their first jobs.

This online tool had a meaningful impact for a small and specific group of students, with minimal input required. The cows were in the tie stall barn already, and the booking system required very little maintenance. It should be noted that in UK vet schools it would not be recommended that students do unsupervised rectal palpation on teaching cows; however, there will be plenty of similar 'low hanging fruit' opportunities like this one that could help open doors to opportunities for the more keen students.

Necessity of Design?

Although top-class design can enhance a university farm in different ways, it was not the limiting factor to creating a top-class educational environment. Plenty of farm facilities seen during the project were not in the fortunate position of having large or recent investment - but were still host to fantastic teaching and student development. The more important factor was the actions of educators on farm, and the nature of the programmes they ran - in particular, with student worker initiatives, which are explored in the next chapter.

Theme 4: Students Working to Learn

Consistently, while on this study tour, the very best way that farms maximised their educational value was by recruiting student workers to help run the farms. The nature of the work varied (and different approaches will be explored below) but it was always separate to the core curriculum, and it pushed students by giving them responsibility and independence. Students got the opportunity to spend time on the farm without the more formal constraints of a practical class. By working alongside the permanent staff, they could gain a much better understanding of day-to-day management. In building up so many hours working with animals, they made leaps in their confidence with handing, husbandry and identification of good and poor health.

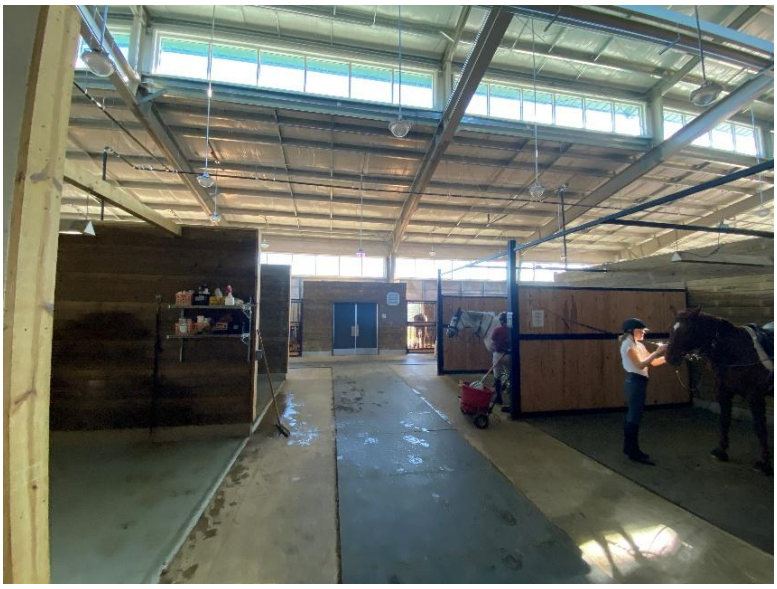
<u>What can students do?</u>

On the dairy farms visited, students would be heavily involved in milking. This could be as an assistant to the main staff or running the milking independently and unsupervised. They would also help push cows up, feed calves, clean and bed the empty stalls, wash down the parlour, and manage the bulk tank and associated equipment.

More experienced workers would be trained to administer medications, give dry cow treatments, and conduct artificial insemination. They would help train new recruits and do evening and weekends 'on-call' shifts. At the farms in the USA, students were also able to take on responsibilities operating machinery, including skid steers and tractors.

Other tasks given to students on teaching farms included (lots of) cleaning, data collection, and assisting visiting vets or researchers. In quiet moments, students might take on extra projects to help their fellow workers – for example, updating a standard operating procedure or making an instructional poster for new recruits.

Students were also given tasks that would help support the main curriculum, for example by helping to set up for a class or supervising junior students working with the animals.



Morning grooming duties at the Virginia Tech horse barn.



Classroom with a view! Undergraduate students at Virginia Tech learn artificial insemination, while supervised by post graduate students

Volunteers or paid workers?

The dairy farms typically employed paid workers. Most farms would have a core group of 10-15 student workers who would do up to 20 hours a week and gain a strong familiarity with the farm and its workings. **Cornell** was a slight exception to this: they had over 80 students on the payroll, with one group of dedicated, frequent staff, and another group of more casual workers who may only come once or twice a month. Universally, wages were low (minimum wage or slightly above) although this would not put off students from applying as they saw huge value in the experience they gained. In some cases, students had an opportunity to progress into a more senior role (at Cornell, known as '*section chiefs'* and at NC State, '*moonagers'*) and this came with a slight pay rise and added responsibility. Paid employment, even at a low wage, brought expectations of professionalism and encouraged students to take the work seriously.

Unpaid voluntary positions were also popular. **Virginia Tech's** equine and sheep units had a good offering of volunteer shifts that would always be oversubscribed. The volunteer work tended to be for fewer hours per week and would revolve around more basic jobs (for example cleaning, feeding and grooming). These were appealing to students who may not have much previous experience and were looking to get some basic familiarisation with these animals and management systems. From the permanent staff's perspective, the volunteers may need a little more supervision (especially at first) but could ease the burden of the more monotonous tasks. The sheep centre's volunteers

always worked in pairs and reported that even in a shift where they were mostly cleaning, working with a friend was fun and the time would pass quickly. The equine centre had both unpaid volunteers and paid employees. This system worked well - an inexperienced student could first learn the ropes as a volunteer, before increasing their commitment with a paid position once their skills had improved.

Both routes of recruitment could be equally successful. An interested teaching farm would need to consider what work the students could do, and how much responsibility they wanted to hand over.



Copenhaver Sheep Center volunteer board. This programme is well oversubscribed.

Summary of Student Workers at University Dairy Farms

	Example Shifts	Student Involvement	Non-Student Staff	Other
Cornell Dairy (~160 milking cows)	• 6.30am chore shifts • Afternoon/Evening 3rd milking shift • 'on-call' evening and weekend shifts	• Work is paid • ~25 students working about one shift week • ~60 students will work 1-2 shifts a month • 5 students are promoted to 'section chief' - areas include milking and herd health. This role has more supervisory responsibilities.	• Farm manager, farm veterinary manager, 3 general farm staff (of which there are 2 on farm per day)	Non-student staff leave the farm by around 3pm. Students then work independently, with section chief as backup 'on-call'
Virginia Tech Dairy – Kentland Farm (~250 milking cows)	• 5am-1.30pm (shortened if students have classes)	• Work is paid • 14 students employed on contracts • Students able to work up to 20 hours per week during semester (40 hours/week during holidays)	• 7 non-student staff: dairy farm head, 2 managers, 4 general staff. • A number of these positions are filled with Virginia Tech alumni.	Despite the farm being a short drive from campus and the pay being slightly less than working in the dining hall, positions are always in demand.
NC State – Campus Dairy farm (25 milking cows)	• 4pm-evening afternoon milking shift • Weekend (day shift)	• Work is paid • 8-10 student employees	• 1 farm manager. • All other labour done by students	At the weekends, the students work independently with on-call backup where needed.
NC State – Howling Cow (~150 milking cows)	• Calf feeding shift: 5-8.30am • Morning milking shift: 6.15-11am	• Work is paid • 12-15 student employees • Maximum 20 hours per week, most students do 8-12 hours • Students can be promoted to 'moonager' position with more responsibility	• Five full-time staff • 20-30 students also work in the creamery	There is a waiting list to join the dairy farm staff – in high demand.
Delaware Valley Dairy farm (~50 milking cows)	• 4am morning milking shift • Afternoon shift – general chores	• Work is paid • 15 student employees • 5 students per afternoon session	• 1 student manager at the dairy (position available for upperclassmen)	Gradual build up of responsibility - freshman can do a maximum of one shift a week, and this can be increased only after their second semester

Summary of Student Workers in Different types of Farms at Virginia Tech University

	Example Shifts	Student Involvement	Non-Student Staff	Other
Virginia Tech – Equine department (29 horses on site)	• Morning shift: 6.30-8.30am • Afternoon shift: 4.30-6.30pm	• 8 employed students, typically doing 2-4 shifts per week. Employed students must pass a stringent handling assessment to be recruited. (The equine unit has a total of 54 paid hours a week to offer to these workers) • An additional 4-6 unpaid volunteers per shift. They are supervised by the employed workers.	• 1 barn manager plus a part-time assistant manager	The program (workers and volunteers) is over-subscribed by a ratio of 2:1
Virginia Tech – Copenhaver Sheep Center (~200 breeding ewes)	• Morning shift: 7-9am • Afternoon shift: 12-2pm	• 25-30 students – all unpaid volunteers • Volunteers required to do two shifts per week, with two additional weekend shifts per semester.	• 1 sheep manager (who is enrolled in a master's programme alongside their farm responsibilities)	Students always work in pairs. Programme oversubscribed.
Virginia Tech – Beef Cattle Center (~200 breeding cows)	• Various shift patterns depending on time of year	• Four students employed at the beef unit. • Students able to do a variety of farm work and can pick up a high number of hours where possible (eg holidays) • Students need previous beef farm experience to apply (not appropriate for people without experience)	• Beef cattle manager and herdsman. Various other staff may be involved depending on time of year.	Due to reputation of the unit, this attracts students looking to work with beef cattle in the future.

Who are the best recruits?

In general, previous experience was not a limit on a someone's ability to thrive in a university farm job. If a student had energy and enthusiasm, they could rapidly develop their farm skills and soon become a useful asset. This is dependent on support and patience from the permanent farm staff. Consistency and clear protocols were also crucial – and this was most easily done by making standard operating procedures (SOPs) for everything that a student would do, no matter how simple the task. Students are used to following instructions and guidelines as part of their curriculum – a SOP is a natural extension of this. Although these protocols take time and effort to write, once running they help create consistency, and often the students themselves enjoyed taking on the task of managing and updating them. This could also help make clear lines as to what jobs were appropriate for students and what should be left to senior staff.

Staff across all locations shared the view that the vast majority of students who chose to work on the farm were very diligent and keen to pick up responsibility. There would always be a small number of students who would lose interest, turn up late, or miss shifts – but they were very much in the minority, and usually expectations were set high enough that a poorly engaged student would not expect to keep their position.



Feeding protocols for the show calves at Virginia Tech. The board was kept updated by the students.

What is needed from the farm?

Farms need to accept significant changes when recruiting a student workforce.

Primarily, there is a drop in efficiency – something discussed at multiple teaching farms. Recruitment, inductions, and training all take up time. Students need time to learn new tasks and will be slower than an experienced staff member (certainly at first). Senior staff feel more disruption as they are pulled away from their own work – whether to help a student, demonstrate their work, or answer questions. Student availability for shifts (influenced by their class timetables) might also affect workflow on some days. The rate of errors made on farm will increase, and it becomes hard for farms to operate at high levels of precision and performance. It appeared that demonstration-level farm performance was just incompatible with having lots of student labour. A high-pressure farm cannot foster a supportive enough environment for students to learn through their work. If there are higher consequences for making a mistake, students become less confident and their involvement will become stunted. (The only example in which a farm mitigated this student effect was at **Virginia Tech's** beef unit, where they capped the number of students to four, and required them to work more frequently so they were completely integrated in farm operations – making it more like an apprenticeship than part-time work.)

When farms stopped worrying about achieving these optimum parameters, however, it became possible to make truly excellent teaching spaces for large groups of students. Students help create an upbeat atmosphere and are inquisitive with their work. The farm exposure will be hugely beneficial on their formal studies, and creates high quality of graduates that will act as ambassadors for university, then attracting high-quality future applicants – and restarting the cycle.

One particularly good example was at **Delaware Valley University**. 'Delval' is a small, private university in Pennsylvania, set on a very picturesque countryside campus. The university does not have the same resources as a large land grant university – instead, it makes excellent use of smaller farm facilities which provide a very high standard of practical education to students. Their dairy farm milks around fifty cows and has been managed by Darren Mayer for two decades. Students enjoyed a great amount of responsibility with all aspects of the farm and were really given space to push themselves and risk failure. They were milking, blood sampling, disbudding, vaccinating, and artificially inseminating the herd with a great degree of autonomy. Darren explained that for this approach to succeed, management must avoid getting distracted by herd production targets. He would much rather have an environment where the herd calving index is a little high because students have been given the chance to try, fail and improve at artificially inseminating the cows; or where milk yields are below average because the herd is made

up of five or six different dairy breeds, giving students experience with a range of dairy animals. It was very refreshing to see this approach and its positive outcomes: competent students, and staff who enjoyed meaningful and productive educational work.

Dr Carolyn Kokko of **Cornell University** reflected that because most students had so much pride in their work, they would take most mistakes to heart and would be determined to learn from what went wrong. It was rare for students to be ignorant or lazy, and she was much more likely to need to give a student a little pep talk than a disciplinary chat.

There will always be a risk of tension between the student workers and the permanent staff on teaching farms. It can be frustrating for a staff member to deal with lots of different people occupying the same spaces, needing supervision, or making mistakes. Permanent staff can become unhappy if they feel that students are doing tasks out with their remit. There is also a risk that this sentiment can go up to the level of farm management. At worst, farm managers can become hostile to new faces trying to get involved with the farm – and this was described on some visits. It can be challenging to find the right type of managers for a teaching farm who can prevent these types of tensions from rising.

However, when a farm has tolerant and supportive staff, they can have a profound impact on the students around them. One student from Cornell University explained how they arrived as an undergraduate with no farm experience, having grown up in a large city. During the pandemic, they reached out to one of the universities' dairy research farms to ask about working with the cows – despite the fact the farm was not advertising a vacancy. The manager, impressed with the proactive approach, took a risk and employed them. This student worked at the farm part-time until they graduated from their undergraduate degree, then transitioned to a full-time position as they enjoyed it so much. This student is now enrolled on the veterinary programme, works as a section chief at the teaching dairy barn, and aspires to be a production animal vet when they are fully qualified. Thanks to this initial leap of faith, this student has been on a strong progression into the field of production animal vet work and will no doubt make a highly skilled clinician. There are many similar examples across all the universities that are willing to invest time into student workers.

Limitations of University Farm Experience

Even the best teaching farms will remain, to some extent, insulated from the wider industry. In a meeting with some of the senior students at Virginia Tech it was noted that despite getting a lot of experience from the varied campus facilities, they were organising external work experience too. They understood the importance of seeing different systems, and wanted to embed in the community and industry more – for example, by learning the regional terminology or making new contacts.

Delaware Valley University bridged this gap with their *E360* programme. As part of their degree programme, students were required to complete work experience, internships or community service placements off-campus. These were typically with private companies, charities, or government bodies. Many E360 placements were hosted in Pennsylvania, with others out of state and even in other countries. If providers had a good experience with Delval students, they were likely to host more placements in future. This had led to the university building up a wide range of opportunities for their students.

The initiative worked well. Students could build on the skills they had started developing in campus facilities and apply them to real industry environments. It helped them form external networks, find opportunities in the region, and enhance their CV's for future jobs or postgraduate applications.

Theme 5: Do It Yourself – Polyface Farm



The Salatin family - owners of **Polyface Farm**, Swoope, Virginia - has for decades defiantly stood apart from conventional, or 'big ag' farming. Joel Salatin, the figurehead of the family, explains how they have made such success by living up to the name of the business - it is a 'farm many faces'.

On a management level, this means a host of animal production systems that interweave, overlap and work with nature. Land is grazed by 'salad bar beef' cattle on a rotational system, followed by layer hens in mobile housing, who scratch out cattle dung and act as a 'sanitation team' to cut the worm and fly egg burden. Corn is sprinkled through the cattle herd's straw winter bedding, so when it is removed from barns in springtime, pigs will delight in rooting through and acting as a natural composter to save labour and machinery. All strategies are done to find symbioses between animals, the environment, and the humans working the land.

The farm's success in these regenerative systems has given them broad appreciation nationally and internationally, particularly amongst nature-focussed and regenerative farmers, homesteaders, and alternative health and wellness movements.

Their business model is just as multifaceted as their farming management system. Polyface runs an on-site shop, and packs produce to be shipped nationwide. They host multiple farm tours, homesteading conventions, and training courses. Joel has published several books (titles such as 'Salad bar beef' and 'Everything I want to do is illegal'), writes a popular

online blog, and appears on podcasts that attracts hundreds of thousands, and sometimes millions, of views.

Amongst all this activity they also run a home-grown, longstanding apprentice and steward programme.

The *summer stewardship* programme is run for four months from May to September and is open to up to eleven applicants. Competition for places is very high – in fact, on discussion with Joel, it became apparent that the acceptance rate was similar to that of UK vet schools. Polyface is more focussed on attitudes and work ethic and therefore encourages people with little to no farm experience to apply. Applicants come from across the country – some with backgrounds in commercial farming and homesteading, but with a significant number with little farming experience.

The farm's senior staff took the application process seriously and professionally. The panel working the selection process reviewed all applications individually, agreeing not to discuss their initial thoughts with colleagues to avoid influencing opinions. In an admissions meeting, the team would each submit a personal shortlist of candidates, who are then allocated points as part of a standardised system. At this stage there would be a group discussion and selection. The overall shortlisted applicants are invited to a two day 'check-out' session on the farm, after which the staff will repeat the selection process to finalise those offered a place on the stewardship. The lengths that the team went into selection really encapsulated their attitude towards the programme: they wanted to have a highly valuable training scheme, and they really cared about giving this valuable experience to the people who could develop the most.

The summer steward programme is centred around the farm's broiler chicken enterprise. Within the four-month period it is possible to work on all aspects of the production cycle – chick rearing, growth, finishing, slaughter and processing. Stewards will also work with the other farm species and help with machinery and fieldwork. It is an intensive and character-building summer, working full time and living in on-site accommodation. As the website describes:

'Warning: you will be sore, aching, dead tired, and might even be sick for 3 days in your first two weeks. Once you get acclimated, you'll be more physically fit than you've ever been in your life'

By the end of the summer the majority will head home, with 2-4 individuals selected to remain on the farm for another 12 months as an *apprentice* on the M*aster's Programme*. Apprentices work through full annual cycle on the farm and deepen their understanding of all species and associated work. Their tenure finishes with the next year's summer steward scheme, where they are given responsibility as mentors to the new starts.



The centre of Polyface farm – home to a produce shop and the base for the summer steward and master's programmes.

Polyface's educational approach has similarities to colleges and universities. The programme is structured around a set of core learning objectives (LO's), and the stewards are responsible for covering these as the weeks go on. Once they feel they have developed a LO to an appropriate standard, they will approach a supervisor to get it checked off. Stewards will learn by mixed methods: studying from a manual of farm standard operating procedures (SOPs), practical sessions with senior staff, farm chores, working with peers, and attending a small number of lectures delivered by Joel Salatin. The apprentices (on the annual programme) also attend an evening book discussion group through the winter. In the 2024-25 winter, apprentices explored themes of team management and leadership with the book '*Extreme Ownership: How U.S. Navy Seals Lead and Win'*.

It was inspiring to learn about the success of the programme and hear positive feedback from the current apprentices. It is rare to see an individual farm create and sustain an educational programme that remains high quality and robust. Certainly, a huge amount of time and effort from multiple staff was necessary every year to sustain this.

The schemes are not affiliated with, or quality assured by, a university or similar institution. The farm is renowned among non-conventional/nature friendly/regenerative farming circles to the point that graduation from its training schemes is highly valuable on its own – and perhaps made more valuable to these groups because of the absence of conventional land grant university affiliation.

The main benefit of the programme is the development of countless enthusiastic and driven young farmers. The rate of skills development is rapid, and students will leave the farm having gained considerable confidence and a new network that can support them in their careers. The Salatins had a genuine interest in supporting the next generation of farmers and using education as a service to their community, which was admirable.

Joel Salatin discussed ways in which the scheme had helped their business too. Over the years, it has become one of the best sources of top quality and permanent members of staff. A constant stream of motivated and entrepreneurial workers has also helped foster an atmosphere of innovation on the farm. A recent apprentice saw an opportunity to start a holiday cottage business on an underused corner of the farm that had great countryside views, and proposed it to the Salatins, who were supportive. The holiday rental business has been running successfully for a few years, has added another revenue stream to the business and enabled them to take the apprentice on as a permanent member of the team. New ideas and initiatives are just as likely to be found internally on the farm as they are from other farms.

Could this be replicated in the UK?

Part of their success was that the farm already had an established reputation for regenerative agriculture. Apprentices did not get a national qualification in the way that a British college apprentice would, but this wasn't an issue as for those seeking to become regenerative farmers or homesteaders as the Polyface brand held a lot of weight. Not being beholden to the bureaucracy of a higher education organisation, the programme could be nimble and adaptable.

The selection process and syllabus were comparable to something that would be expected at a college or university. The Polyface team had clearly spent significant efforts on developing their own curriculum and selection process, which is necessary for the scheme to be robust and accountable. This may be a barrier for UK farms who do not have experience in this area – they may need support for these planning stages. Another important consideration would be ensuring that the learning environment remained appropriate, professional and safe. Certainly, in the UK, external oversight is often the most effective way to manage this.

In the UK, farm animal vets could have an important role in this form of education: either assisting a farm that is setting up an independent apprenticeship or creating an animal health summer apprenticeship in partnership with farms.

Conclusions

This study trip was hugely insightful and left a lot to reflect on. The main findings, arranged in themes, can be summarised here:

Theme 1: Consideration of place and environment is the best starting point to design a strategy for a teaching farm and make it unique.

- This was well illustrated at the Elora Dairy Research Station in Ontario, Canada, where the farm had significant buy-in from regional and national groups and felt like an active component of the regional dairy industry.
- It is possible for teaching farms to exist successfully on a small scale and in less rural environments, as shown by NC State facilities.

Theme 2: A teaching farm should prioritise profitability. Commercial projects can have a beneficial effect on staff, students and the community.

- This finding was unexpected. Rather than distracting from teaching, all the commercial projects seen on the trip actually enhanced the education work on farm. There are many different ways for a university farm to create revenue streams, and it is something that should be explored more in UK institutions.

Theme 3: Small design choices are the most important, and design is not necessarily a limiting factor to the farm.

- Cornell's teaching dairy barn was a particularly impressive and inspiring farm that I would encourage anyone to visit. If a university has the financial means to build a new flagship site, Cornell is a brilliant model to follow.
- It was, however, encouraging to see the many ways that small design choices could lift up a farm and enhance the student experience. Existing university farms that are not planning imminent redevelopment should still consider what changes can be made that have impact at a lower cost.

Theme 4: There are many different methods to accommodate groups of student workers. When done well, 'working to learn' has a profound impact on students.

- I was blown away by the student workers I met throughout the trip. It can be a big step to give students true responsibility on farm, but I saw countless cases where it paid off tremendously. It was inspiring to hear from the staff who led the student workforces.
- Hopefully the information in this report may be useful to someone considering increasing the involvement of student workers on their farm.

Theme 5: It is possible for commercial farms to create successful and independent educational projects. External bodies, including veterinary practices and universities, can help in supporting these projects.

- Polyface farms have made an excellent training scheme on their farm that helps their wider community. Their programme has been planned out thoughtfully and developed over many years.
- I believe there are opportunities for farms to create similar projects in the UK.
- Curriculum design, admissions processes and quality assurance are all difficult to do. Universities and veterinary surgeons would be well placed to help commercial farms in these areas.

I hope that readers may have reached some of their own conclusions as well. If you would like to discuss this project further, please feel free to get in touch by email at guscassie05@gmail.com .

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Further Resources:

Erdy McHenry Architecture Firm Website: https://em-arc.com/MONOGRAPH-2020

Hokie Harvest Sale 2025 Sale Book: https://sas.vt.edu/content/dam/sas_vt_edu/documents/hokie-harvest/2025/2025%20Hokie%20Harvest%20Sale%20Book.pdf

Polyface Apprenticeship website: https://polyfacefarm.com/apprenticeship

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