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Grass is not a free lunch: what would be needed for outdoor grazing to be viable in UK dairy goat herds?

Written by:

Rachel Yarrow NSch

November 2025

A NUFFIELD FARMING SCHOLARSHIPS REPORT

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Date of report: September 2025

NUFFIELD Farming Scholarships

"Leading positive change in agriculture. Inspiring passion and potential in people."

Title	Grass is not a free lunch: what would be needed for outdoor grazing to be viable in UK dairy goat herds?
Scholar	Rachel Yarrow
Sponsor	Central Region Farmers' Trust
Objectives of Study Tour	1. To understand what models of grazing based dairy goat farming exist in other temperate countries 2. To learn how farmers overcome the challenges associated with grazing dairy goats 3. To understand the principles of successful pasture-based dairy from those farming cows 4. To understand how to successfully implement profound system change on farm
Countries Visited	Brazil, Netherlands, France, Norway, UK and Northern Ireland, Switzerland, Italy, USA
Messages	1. It is possible and viable to keep commercial dairy goats in grazed systems. 2. Grass is not a free lunch: those that get a lot out of pasture-based systems also put a lot in. 3. The most successful systems don't try to shoehorn goats into a system designed for sheep or cows, but lean into the goats' own strengths and preferences. 4. On a dairy farm, if you want to change your system, you need a system for change.

EXECUTIVE SUMMARY

Research finds time and again that British consumers want farm animals to have access to pasture. However, in the UK commercial dairy goat sector, nearly all goats are permanently housed and outdoor grazing is considered at best risky and at worst existentially unviable.

I set out to find out whether, contrary to popular belief, there is a model of pasture-based dairy goat farming that could work in the UK: financially, practically and without compromising animal health and welfare. My study tour took me to meet many farmers of goats in grazed systems. Some chose to graze their goats because of a conviction it was better for the goats; others approached it more pragmatically as a means to an end for obtaining organic certification and a premium milk price. While approaches to grazing differed, the challenges were familiar: how to cultivate a sward a goat finds palatable and nutritious, how to prevent parasitism, how to cope with extremes of weather, how to keep goats fenced in.

This report has four major findings:

1. **Grazing goats in the UK can be viable.**
2. The best grazing systems for goats start with the question, **'what would suit a goat?'**
3. **Grass is not a free lunch**: both cow and goat dairy farmers getting a lot out of pasture are also putting a lot into it.
4. **If you want to change your system, you need a system for change.** Dairy farms can be hard places in which to change things, so change needs to be deliberate and structured.

Farmers *are* grazing commercial dairy goats in climates similar to UK. The most successful systems lean into the natural behaviour and preferences of a goat by grazing them on bespoke mixed swards or putting them in an environment rich in trees and shrubs. However, *all* successful pasture-based dairy – cow or goat - relies on the farmer managing the pasture and grazing rotations with *at least* as much care and attention as the animals themselves.

Yet system change is a hard process on a dairy farm, and to successfully implement a transition to a pasture-based system, farmers will need to take a deliberate and structured approach to the change process. Successful on-farm change results from vision and a commitment to marginal gains. It works best when the farm is surrounded by a supportive peer group, and by a bespoke off-farm team bringing accountability and specialist expertise.

Finishing my travels, I am convinced that UK pasture-based goat dairying has a future, as long as we are not naïve about the work of change needed to get there.

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The opinions expressed in this report are those of the author alone and not necessarily those of the Nuffield Farming Scholarships Trust, of the author's sponsor, or of any other sponsoring body.

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CHAPTER 1: INTRODUCTION

Figure 1: Rachel Yarrow and Fraser Norton at Pencrug (credit: Angus Birditt)

Ten years ago my husband Fraser and I collected our first two dairy goats and set ourselves on a path to building a 300-strong herd and an award-winning artisan cheese business. Like many first-time farmers before us, we were naïve about the challenges ahead, and the decade since has been packed with highs and lows.

I am a new entrant farmer, though technically not first generation. Before I was born, my father farmed sheep, beef, and pigs in Wales and then worked as a commercial bee-keeper before a major career change to join the world of finance and investment. So I did not grow up on a farm, though I have fond childhood memories of farm-sitting for family friends.

I studied English at Cambridge University, then worked my way up the secondary school teaching career ladder. By the time I was thirty, I was Head of Department in a well-known independent school, but in the middle of an interview for the next promotion, I suddenly realised this wasn't the future I wanted. A few weeks later, a chance reading of a magazine article about a cheesemaker with a herd of goats led to a jokey conversation, which somehow turned serious.

A year later, in 2015, we secured our first FBT on farmland owned by Earth Trust in Oxfordshire. We made every mistake in the book, but we are both hard-working people who like a challenge. One of my favourite sayings is 'perservance wins' and through the ups and downs, we developed a successful product and grew our revenue to the point we employed a team of eight.

By 2023, when I was awarded by scholarship, we were at a cross-roads. Our business was outgrowing our tenancy at Earth Trust. We needed more acres, and we needed more secure tenure to justify much-needed investment. But was the type of farming we wanted to do – pasture-based dairy goat farming – even possible in the UK? Should we move farm – if we could ever find a suitable farm to move to - or just call it quits?

Without wanting to give away the ending, I am writing this report from the Carmarthenshire kitchen table of our own 120 acre grassland farm, where we relocated our entire family, goat herd and business in early 2025. It is perhaps

classic ‘Nuffield timing’ that this monumental upheaval coincided with trying to complete my Scholarship travels. It has certainly been complicated juggling it all but I see the two coming together as a ‘best of times, worst of times’: of all the times to step away from the farm, this has been the hardest, but the move and task of establishing a new farming system here has also turbo-charged the urgency of my Nuffield project and I’m hugely grateful for the opportunities it has opened at a time when they have been much needed.

CHAPTER 2: BACKGROUND TO MY STUDY SUBJECT

When we first acquired goats in early 2016, we were advised by other goat farmers and our farm vets that it would be at best futile and worst fatal to try keeping dairy goats in pasture-based system in the UK. We were allocated an acre of paddock by our landlord for 'exercising' the goats, but for the first year and a half, we 'followed the herd' and all our goats stayed inside.

The main reasons for given for why dairy goats and outdoor grazing are incompatible are as follows:[1]

- Goats are browsers rather than grazers and don't readily eat grass.
- Goats are more susceptible to parasitism at pasture than sheep.
- Lack or absence of wormers licensed in the UK for use in goats makes it difficult to treat parasites.
- Goats have poor tolerance for cold and rain..
- Goats often escape.
- Dairy goats are often kept in herds hundreds or thousands, and such large numbers are difficult to manage at grass.

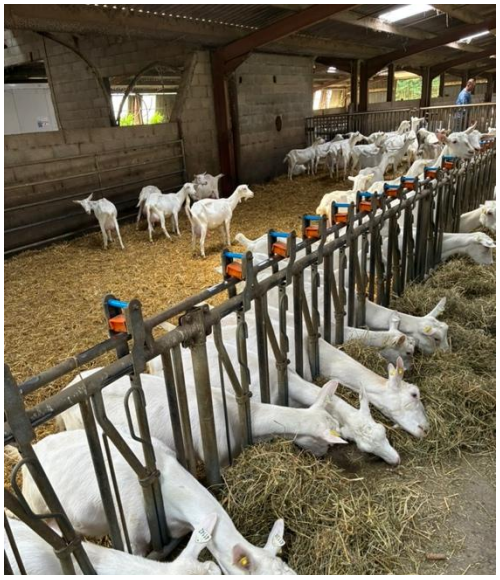

Figure 2: A permanently housed goat herd in France (credit: Rachel Yarrow)

However while the reasons for keeping goats inside were persuasive, having a fully housed herd was not a comfortable place for us to be. Customers like ours who are paying high prices for a quality artisan cheese have certain expectations. The word 'free range' is increasingly used to describe the practice of allowing dairy animals to access pasture; by analogy, those animals – be they cows or goats - which are not kept on pasture are the equivalent of battery hens. Research consistently shows that consumers associate access to pasture with high welfare.[2] A buyer at a top artisan cheesemonger I spoke to told me that customers would 'recoil with shock

[1] Anzuino, K., Knowles, T. G., Lee, M. R. F., & Grogono-Thomas, R. (2019). Survey of husbandry and health on UK commercial dairy goat farms. *Veterinary Record, 185*(9), 267. doi:https://doi.org/10.1136/vr.105274

[2] Schuppli, C. A., von Keyserlingk, M. A. G., & Weary, D. M. (2014). Access to pasture for dairy cows: Responses from an online engagement. *Journal of Animal Science, 92*(11), 5185-5192. doi:https://doi.org/10.2527/jas.2014-7725

and horror' if they knew the animals producing the milk for the cheese on their counter were not allowed to graze outside. In truth, I also liked the idea of the goats going outside – it 'felt right', and I couldn't help thinking that fresh air and sunshine must be good for them.

So with great trepidation, we started to experiment with grazing the goats: a few hours after milking, or a small youngstock group we could afford to make mistakes with. Even these small forays were scary, especially because I could find so little information or research into how to graze goats. We didn't run into disaster, but we certainly had our fair share of issues with goat escapes, rain and worms.

In 2020, I therefore set about studying for a part-time, distance learning Masters in Sustainable Agriculture at Aberystwyth. Coming from a non-farming education and career, I needed a better grounding in the theory of farming ruminants on grass: if there was any research into goats specifically, I would find it.

Studying at Aberystwyth confirmed that there is much less research into grazing goats than there is for sheep or cows, but brought me to two revelations that then led directly to my Nuffield application.

1. There are many countries where goats are kept in much larger numbers than in the UK, and in **many of these goats are kept in extensive and outdoor systems**.[3]

2. In UK dairy cows, pasture-based systems are often pursued for economic rather than purely welfare reasons, because **grazed grass is the cheapest source of feed**.[4]

As the daughter of a financial adviser, I was bewitched by the simplicity and efficiency of this business model. What perfect sense: the animal harvests its own feed, when the food is at its most nutritious, and in so doing provides its own entertainment and exercise. It also saves you the trouble and cost of harvesting, storing and feeding grass as hay or silage, while also saving you on housing and bedding costs.

Had goat farmers in the UK mistaken a threat for an opportunity when it came to the idea of grazing their goats? Why was nobody in the UK trying to make this economic case for grazing dairy goats which, after all, are ruminants too?

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[3] Escareño, L., Salinas-Gonzalez, H., Wurzinger, M., Iñiguez, L., Sölkner, J., & Meza-Herrera, C. (2012). Dairy goat production systems. *Tropical Animal Health and Production, 45*(1), 17-34. doi:https://doi.org/10.1007/s11250-012-0246-6

[4] AHDB. (2021). *The Forage First Guide*. Kenilworth: AHDB Dairy.

CHAPTER 3: MY STUDY TOUR

During my study tour, I visited nine countries and made over 70 visits (see figure 3).

Primarily, I focused on countries with similar climates to the UK, but with larger or more traditional dairy goat sectors. I also wanted to visit countries with a significant proportion of their goats in organic production, as I see this as a growth opportunity in the UK. Lastly, I wanted to learn lessons from pasture-based cow dairy farms.

Category	Country	Summary
Countries with a tradition of farming goats in extensive systems for cheese-making	Norway	Norway has a long tradition of goat farming and a well-organised dairy goat and cheese-making sector. According to EU statistics, in 2022 Norway had 35, 472 dairy goats, of which 9.6% were farmed organically.
	France	France has one of the largest and most productive dairy goat populations of Europe, with about a million in the national milking herd. According to EU stats, in 2022 there were just over 200,000 organic certified goats, about 15.6% of the total goat population. They are also the most technologically advanced country in the world with regards to dairy goats and have a diverse sector ranging from large, intensive herds to low-input, extensive ones. There is a big focus on cheese-making throughout the sector.
	Italy	Italy has over half a million dairy goats and about 100,000 certified in organic production. Most of these are in very extensive, low-output systems in the south and islands (especially Sardinia). I chose to visit northern Italy where production levels and climate are more similar to the UK.
	Switzerland	Switzerland has many native goat breeds and about 35,000 dairy goats in production. The most productive dairy goat breeds, Saanan and Toggenburg, originate here.
Countries with dairy goat sectors developed in the 20th century	Netherlands	The Netherlands has a big, mostly intensive dairy goat sector and was the model used by many UK dairy goat farmers when establishing herds in the 1980s and 1990s. There are over half a million goat in the Netherlands, and about 10% are farmed organically.
	USA (New England)	Vermont has a tradition of dairy farming and in recent decades has developed a strong reputation for artisan cheese-making to add value on smaller farms which would otherwise struggle to compete, co-ordinated by the Vermont Cheese Council who produce a Cheese Trail Map. There are over 10,000 dairy goats in Vermont (human population 643,077).
Pasture-based cow dairy farming	UK and Northern Ireland	I visited twelve pasture-based cow dairy farms across England, Wales and Northern Ireland, and interviewed several more farming in these systems.
	Netherlands	I visited two pasture-based cow dairy farms in the Netherlands, a country with a large and productive intensive cow dairy sector but where there is also a lot of public pressure around the issue of grazing and animal welfare.
	Brazil	I visited two pasture-based micro-dairy herds, both in the low-input, low-output model, and both processing their milk on farm. I also met and later interviewed Simon Wallace, a New Zealander who farms in the state of Bahia, adapting the New Zealand grass-based dairy model to the Brazilian climate where it is very uncommon.
	USA (New England)	I visited herds in Vermont and Rhode Island, both focused on pasture-based production for cheese-making.
British pasture-based goat farms	Dairy goats Meat goats	The UK goat sector is small, with less than 100,000 in commercial production, of which about 45,000 are commercial dairy goats, nearly all permanently housed. In 2019, there was less than 1000 certified organic goats in the UK. However there is an increasing interest in pasture-based systems, especially with meat goats.

Figure 3: Summary of my study tour

CHAPTER 4: FARMING GOATS IN GRAZED SYSTEMS

I primarily focused on goat herds in commercial settings: these ranged from herds of 12 to herds of over 1500, but most were between 80 and 250 head. The majority of herds visited were owned by farmers making artisan cheese; some sold bottled milk or another dairy product, and some larger herds produced for a milk contract.

4.1 Why graze goats?

The most common reasons for farms grazing their goats were are follows:

4.1.1 **The farmers' belief system.** The most common reason I heard was that farmers grazed their goats because they believed in it. For some it was as simple as enjoyment of seeing the animals outside; others believed it was better for the goats' health and welfare; others that is is more natural.

4.1.2 **Organic status or product premium.** This was the second most common reason. As permament housing is not allowed under organic certification, a number of farmers provided access to grazing primarily to fulfil this. Higher organic milk prices or subsidy for organic conversion were often the motivations for organic certification. In Switzerland, there is a specific premium paid to dairy producers for allowing cows or goats outdoor access.

4.1.3 **Free-up forage for winter feeding.** In Norway and Switzerland, the purpose of moving the goats to a mountain farm to graze during the summer was to leave the land at the main farm ungrazed for several months so it could be conserved for winter forage.

4.1.4 **Conservation**. In the south of France, herds of Rove goats were kept partly in order to browse the garrigue – an arid limestone scrubland – and in so doing to maintain its open spaces and protect it from wild fire. In Switzerland, a herd of goats was reintroduced to an Alp to help combat the dominance of juniper bushes.

4.1.5 **Tradition, tourism or public access.** In Norway and the Swiss Alps, these systems are traditional. Many businesses relied on direct sales from an on-farm shop or cafe, and in some cases on income from tasting experiences or farm tours. In Saas Fee (Switzerland), the alpine goat herd is a tourist attraction and the basis of an annual goat festival.

4.2 Meeting the challenges of grazing goats

As referenced in section 2, there are a range of challenges identified as barriers to grazing goats in the UK context. It was therefore interesting to hear how far farmers using pasture-based systems with their goats in the farms I visited identified the same, and whether they had found ways to overcome them.

4.2.1 Goats are browsers rather than grazers

There is an element of myth in the idea that goats don't eat grass.[5] During my travels, I saw goats in the act of grazing on grass swards on numerous farms, for example at The Gourmet Goat Farmer in Wiltshire, UK, or on farms in France, Vermont, Norway and the Netherlands.

Figure 4: French Alpine goats grazing grass (credit: Rachel Yarrow)

However many farmers acknowledged that not all grass swards are optimal for dairy goat production and some are more palatable to goats than others.

Other approaches included use of:

- Mixed swards
  - Ryegrass, clover and chicory (Netherlands)
  - Lucerne, ryegrass and clover (Italy – on an acid soil)
  - Lucerne, sainfoin and white clover (Loire Valley)
  - Lucerne, white clover and red clover (Lyon)
- Shrubs
  - Norway: salix glauca (a willow-like species),
  - Switzerland: juniper
  - USA: cup-plant
- Trees
  - Evergreens
  - Deciduous

See Appendix 3 for further details and photos of swards and shrubs used on dairy goat farms.

[5] Bonanno, A., Fedele, V., & Di Grigoli, A. (2008). *Grazing management of dairy goats on Mediterranean herbaceous pastures*: CAB International Wallingford, UK.

Figure 5: Grazing systems in use with dairy goats (photo credits: Rachel Yarrow)

4.2.1 Parasitism

This the number one reason given why dairy goats in the UK cannot be grazed:[6] a lack of the age-acquired immunity to gastro-intestinal nematodes found in sheep and cows, together with an absence of wormers with a license for use in goats.[7]

It was therefore surprising that only one of the many goat farms visited found parasites presenting a significant issue. Most other farms I visited either reported never worming goats, or worming them once a year, often in the dry period where more treatment options were available.

4.2.1.1 **Short grazing or exercise yards.** Parasites were limited, presumably by time and the fact the bulk of the diet was not grazed grass.

4.2.1.2 **Rotational patterns**. These varied, but most involved a combination of:

1. ***Frequent moves***. Some moved twice daily (a French farm), others moved goats on after 1 to 3 days, some after a week. A professor of parasitology, farming goats in Switzerland, suggested 3 weeks should be the absolute maximum, but preferred 2 weeks.
2. ***Long rest periods***. The most common rest period was 90 days, often with a forage cut taken during the rest period.
3. ***Seasonal pasture blocks***. Some farms had seasonal blocks i.e. a spring block, a summer block and an autumn block. Each would be grazed by the goats for one block only, and then cut or used for a different livestock type (not sheep due to their shared parasites) in the other seasons.
4. ***Use of other animals within the rotation***. The use of cows and horses or donkeys in a grazing rotation with goats was a strategy seen in France and the USA, thought to be beneficial both because of the different 'bite styles' and different parasite types.

4.2.1.3 **Anthelmintic plants.** Chicory, a known anthelmintic, was one of the most commonly used bioactive forages, either in a mixed sward (Netherlands, USA, France) or as a pure stand in a dedicated plot, which goats could be 'run over' at intervals (Netherlands). Other herbal approaches were also mentioned, particularly by organic farmers, including cow dairies where garlic and seaweed were common supplements.

4.2.1.4 **Transhumance**. The practice of moving animals to a mountain farm, in order to conserve forage at the home farm during the summer

[6] Harwood, D. (2019). *The Veterinary Guide to Goat Health and Welfare: Revised Edition*. Wiltshire: The Crowood Press.

[7] Taylor, M. (2002). Parasites of goats: a guide to diagnosis and control. *In Practice, 24*(2), 76-89. doi:https://doi.org/10.1136/inpract.24.2.76

months, also create the same kind of long rest period – and an intermediate forage cut - that rotational systems imitate.

4.2.1.5 **Shrub and tree forage**. Goats kept in systems where they grazed shrubs and trees rather than grass have limited contacted with worm larvae. Examples of these were the Rove goats in the garigue, and Norwegian and Swiss goats on the mountain above 1000M.

The farm with the parasite problem was an organic farm in northern Italy, milking about one hundred French Alpine goats. The system they had used involved grazing a 4 hectare block between April and the start of August; the goats were allocated a daily portion of pasture and typically would pass over each three times during the season. However at the time of my visit, in August 2025, the goats were all housed because the parasite load had become unsustainable. However, they had taken professional advice and were in the process of cleaning the pasture through rest and re-seeding, and planned to use seasonal grazing blocks in future seasons with increased fecal monitoring.

4.2.2 Poor tolerance for cold and rain

I deliberately chose to visit countries with seasonal climates, including cold and rain, as this is such a common objection to keeping dairy goats outdoors in the UK.

4.2.2.1 **Breeding and breeds.** Some farmers chose to keep known hardier breeds – for example the Rove goats in the south of France or the Pfauenziege in Switzerland. One UK meat goat farmer had created her own on-farm selection process, where she chose future breeding bucks based on their ability to thrive living outside throughout a British winter.

Figure 6: Rove goats in the south of France (credit: Rachel Yarrow)

4.2.2.2 **Provision of shelter.** On some farms, this comprised overnight housing (especially where nights could be very cold, for example on the Swiss Alps) or seasonal housing e.g. during snowfall in Norway or Vermont. Grazing was sometimes arranged so that goats always had access back to shelter. However this often seemed to constrain which parts of the grazing platform could be used. Additionally, a Dutch genetic advisor warned this could lead to a learned behaviour of 'shelter

seeking' where goats then expend unnecessary energy walking back to their barn and interupt their grazing for longer than needed.

4.2.2.3 **Training**. The Dutch advisor recommend a structured approach with youngstock, where they are first trained on electric fence, then taught to graze, and lastly left outside long enough to develop tolerance of weather – all before they started grazing as a first time milker.

Figure 7: Alpine goats in Vermont grazed in silvopasture (credit: Rachel Yarrow)

4.2.2.4 **Trees**. In systems where lots of tree cover was provided, goats were reported to be less bothered by rain – partly because of the shelter, but also, a Vermont farmer told me, because they find the tree and shrub fodder so palatable that they are more motivated to tolerate the rain to eat it.

4.2.2.5 **Tolerance of lower yields**. Milk yields were reported to drop due to cold weather, for example in Switzerland. Farmers accepted this as part of their system and planned accordingly.

Interestingly heat was cited as a barrier to grazing as often as cold or rain, with goats sometimes housed by day instead of by night to protect them from this.

4.2.3 Fencing and escape

Electric fencing was by far the most common type of fencing used to contain dairy goats in every country visited. Most commonly this was electric netting or a single strand of electric wire/ polyrope, in both cases with plenty of 'heat'. Much emphasis was placed – especially in France and the Netherlands – on training goats to the fencing when they are kids, with a solid barrier behind the electric to prevent them learning to jump forward when they are shocked.

No-fence collars were also used successfully in Norway (where they were invented), Vermont and the UK, in groups of up to 40 goats. Goats learnt how to use these quickly and farmers liked how they allowed them to graze areas such as forest and steep mountain where fencing would otherwise be nearly impossible. The price of these is still considered prohibitive and the farmers I saw had all had received funding for these.

Figure 8: young goats in Norway wearing No-Fence collars (credit: Rachel Yarrow)

See Appendix 2 for more details and photos of fences used with dairy goats.

4.2.4 Large herd sizes

The largest herd I saw had 1500 goats (the Netherlands); these goats had optional access to pasture from their housing, where a TMR was provided and grazed grass was expected to make up about 10% of their ration during the grazing season.

I saw herds of 100-700 grazing in France without access back to their shelter; grazed grass was intended to be their main source of forage. French research was said to show that dairy goats could be at pasture for up to 8 hours without access to water without an impact on milk yield. Border collies were used on several farms to help move larger herds back and forth from pasture.

4.3 Breeds and breeding

At the heart of this is a question: what makes a good goat for milking from grazed forage? I discussed this with a Dutch goat geneticist who proposed that whatever the breed, the key attributes are as follows:

- Components (milk solids) over high yield
- Persistent lactation: a lactation which recovers well from knocks such as heat and cold
- A deep torso: proxy for large rumen capacity
- Udder conformation
- Sound hips and legs
- Tending to a smaller size to expend less energy in walking

Capgenes, the French goat genetics powerhouse added in 2025 an offer of 'grazing' semen, from bucks who had undergone controlled infection with nematode larvae and found to have better resilience/ resistance.

4.3.1 **Rare and native breeds**. One of the breeds I was keenest to see when I started Nuffield was the Rove goat. Known for its hardiness and ability to milk from forage, I thought I might end my Nuffield with a Rove goat import business. While I was impressed by their beauty and hardiness, the reality was that the two Rove goat farmers I visited were achieving 0.5L/ head/ day in early August 2024, and were feeding 450g/ head/ day of barley on top of forage to achieve that. Poitivine goats are another French rare breed and are again beautiful, but they did not appear to be outperforming the more commercial breeds in the pasture setting.

4.3.2 **Commercial breeds.** Sanaan goats – the most high yielding of the breeds – were seen grazed in a handful of farms, though generally alongside considereable supplementation. French Alpine goats were ubiquitous on French grazing farms, where they consistently achieved lactations of 700-800L per year on a ration of 600g-1kg of grain supplementation alongside forage. Toggenburg goats were common in the grazing farms in the Netherlands, and also seen in their native Switzerland.

4.3.3 **Norwegian Dairy Goat.** In Norway, I was impressed by the Norwegian Dairy Goat, a composite breed formed from various native breeds combined with French genetics in an organised breeding programme with the aim of producing a goat balancing production and hardiness.

Figure 9: Norwegian Dairy Goats near Aurland, Norway (credit: Rachel Yarrow)

4.4Additional challenges

It is sometimes easy to focus on the ways in which it might be easier to farm a certain system in other countries. However while travelling, I was often struck by challenges other farmers faced which we are spared in the UK.

4.4.1 **Snow.** In Norway, Vermont and Switzerland, farmers could expect snow to be lying on the ground for months of the year. Norwegian farmers often kidded in January in unheated barns at -20C. Vermont farmers did not expect grass to start growing until May.

4.4.2 **Predation.** Wolves (France, Switzerland, Italy) and bears (New England) were given as very real reasons why goats could not be grazed outside overnight in those countries, even during summer.

4.4.3 **Regulation**. It is currently against the law to start a new goat farm in the Netherlands, due to a recent Q Fever outbreak. A Norwegian farmer who was trying to start a cheese-making business wasn't allowed to employ anyone because businesses are only allowed to take on staff if the local authority grant them permission.

CHAPTER 5: LESSONS IN PASTURE-BASED DAIRY

As a would-be pasture based dairy farmer, I felt it was imperative to meet farmers who were making these systems work with cows. There are obvious differences between cows and goats, but there are also many similarities; they are both ruminants after all, and goats are often known as 'the poor man's cow'.

Though pasture-based cow dairying is now very well-established in the UK, as recently as the 1990s this was not the case. Dairy farmers have been on a long journey too with pasture-based farming, and I heard from early adoptors such as Nuffield Scholar Roly Tavenor and organic farmer Johnny Ryder about the resistance they met back then. The pasture-based dairy sector still has its pioneers and outliers to this day: the mobile milking parlour and out-wintering systems used at Kingsclere or the milking herd of 1500 at the Sansaw Estate show how our understanding of what a UK pasture based dairy herd can be is still evolving; those pushing the boundaries still cause controversy.

Figure 10: A mobile milking parlour at Kingsclere, UK (credit: Rachel Yarrow)

5.1 Grass is not a free lunch

AHDB describes grazed grass as the cheapest source of food for a dairy cow, but it is absolutely not a 'free lunch'. Farmers who are getting a lot out of grazed grass are putting a lot in: time, thought, constant attention and investment in infrastructure. Using grazed grass as the engine of the ration shields you from fluctuations in the grain market, but it exposes you to the British weather and its increasingly unpredictable seasons, a point which was painfully clear when talking to farmers at the end of the spring/ summer drought of 2025.

5.2 Farm the grass not the animal

Successful pasture-based dairy farmers undergo a profound mindset shift. A Carmarthenshire dairy farmer described himself as 'a grass farmer with livestock'. Another dairy farmer told his children that 'the platemeter is the most important tool on the farm'. Most dairy farms I visited in the UK were measuring their grass every week, using software, and planning each week's grazing meticulously.

While no-one was suggesting animal welfare should be neglected, the mindset change required seeing the animals differently. A Shropshire dairy farmer told me 'the herd is one cow', as a reminder that it is dangerous to spend too much time

trying to 'fix' that handful of cows who present issues, rather than the silent majority of the herd who are thriving in your system.

5.2.1 Prioritise infrastructure that gets the animal to the grass. A logical extension of this mindset is that successful pasture-based dairy farms have invested heavily in infrastructure that makes the whole grazing platform as accessible as possible throughout the whole year: tracks, fencing and water. Many farms did not even have housing capacity for all their milking herd, deeming this unnecessary and a poor return on investment compared with grazing focused infrastructure. The importance of tracks came up again and again, not just in terms of the surface itself, but in their role in enabling efficient flow around the farm. 'Tracks are like water pipes', one farmer told me, and another that moving his milking groups around the farm 'was like a traffic management problem'.

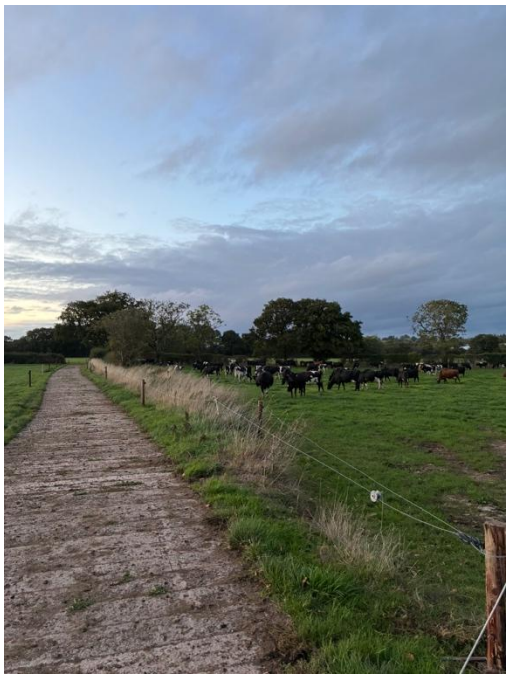

Figure 11: typical railway sleeper cow tracks in Shropshire, UK (credit: Rachel Yarrow)

5.3 Simplicity and efficiency

Many of the farmers I spoke to were drawn to the simplicity of the pasture-based system, and the quality of lifestyle they felt it offered. A short, intense calving block but then a 'simple, easy' system which created time for people to pursue off-farm interests or wider industry roles. One farmer contrasted it with traditional systems where 'people just get tired'.

5.3.1 Efficiency. When asked what were the keys to successful pasture-based dairy farming, several farmers first answer was efficiency, and in particular, an efficient and fast milking parlour. Efficiency often looked like an improved shedding or handling system, and cutting down time spent separating or treating cows. Preventative measures like installing footbaths on the way into the parlour improved animal health and welfare but also reduced time spent dealing with lameness.

5.3.2 Simplicity. Mat Boley describes his once-a-day, PFLA accredited pasture-based dairy farm as 'the simplest dairy farm in the world'. Others were a little less ambitious, but simplicity came up again and again, for example in Dorset organic dairy farmers Tom and Sophie Gregory's mission statement: 'To produce milk from grass, simply.' It's worth noting that simple and efficient are not always one and the same though. A Dutch dairy farmer I visited had recently

reintroduced a small amount of grain, fed in parlour: he loved the simplicity of a grass-only diet, but a modest 1.5kg of grain per cow per day gave disproportionate improvements in parlour-flow and milk quality, so was more efficient.

5.3.3 When is the perfect the enemy of the good? I heard several farmers caution against 'system creep', where initially small modifications to improve cow milk yields risk undermining the grass-focus and simplicity of the intended system. This seemed wise, but needs to be balanced against another imperative I heard again and again, which was the need to be flexible when running a system like this. In the early autumn of 2025, when I did my last visits to pasture-based dairy farmers, the drought had left nearly everyone short of grass. One farm was using palm kernel expeller, unusual for them, and feeding 3 to 4 times as much grain as usual. Having a 'good' system is better than having a 'perfect' system, and balance is always key.

5.3.4 Efficient enough or high value enough? As a counterpoint, Simon Wallace, dairy farming a 'Kiwi style' grass-based system in Brazil, reflected that as pioneer farmers running a novel system in the Brazilian context, he couldn't yet achieve New Zealand levels of efficiency. However, having created a high value brand ('Leitissimo'), they didn't actually rely on strict efficiency for the farm to be profitable.

Naturally, he still strived for it, but he accepted that it was harder to achieve when farming outside the New Zealand context, where so much else was in place to make that farming model a finely-tuned machine. This made me reflect that for pioneers and early adoptors – like UK pasture-based goat farmers – having a high value brand and product are important until the system becomes more established and embedded.

5.4 Right animal for the system

No one I visited had successfully transitioned from an intensive to a pasture-based dairy system without a fundamental change in herd genetics. There was almost universal agreement that the most important KPIs were fertility and the ability to produce milk from grazed grass.

Figure 12: hybrid dairy cows in Cumbria, UK (credit: Rachel Yarrow)

Most farmers had a very pragmatic approach to breed selection; like with goats, there are several native rare breed dairy cows, but very few commercially successful farms are milking Northern Dairy Shorthorns. Two and three way hybrid crosses were popular, often based on Jersey or

Friesian. Farms such as Torpenhow or Kingsclere sold their herds and then re-stocked with New-Zealand or Irish type genetics, but early adoptor Roly Tavenor did not have such stock available in the early 1990s. His approach was to buy a Jersey bull to put across his existing Holstein cows.

5.5 The value of 'enough' over 'more'

Milk yields in low-input, pasture-based systems are always going to be lower than in intensive systems. The farms I visited reported yields ranging from 3000L to 8000L per year, with the lower end of the spectrum being once-a-day milking and 100% pasture. Most were in the 4000-5000L range. This reminded me of the difference between the expected yield of an intensively farmed dairy goat, which might be 1500L per year, and the commonly reported lactations of 600-800L in grazed farms in France.

Yet, as often in life, less is sometimes more. For dairy farmers, lower yields mean greater longevity, improved immunity, better fertility, and of course less money spent on bought in feed. As chasing ever more yield brings more cost and more issues, the key is to find the sweet spot of 'enough' milk.

5.6 Goats vs cows – is the grass greener?

Before Nuffield, my belief was that farmers of pasture-based dairy cows have it easier than farmers of goats. Undeniably farming cows does bring certain advantages: better access to genetics, a much larger peer group, established discussion groups, a properly developed supply chain.

However there are also advantages to goats which dairy cow farmers would envy, for example:

- Faster breeding cycle: the progeny of an AI mating can be in the parlour 18 months later.
- More prolific: dairy goats typically have litters of 2, 3 or even 4 kids, creating a larger pool of potential replacements.
- Lighter animal: at 60-75kg, an adult dairy goat can fare better and do less damage on wet ground.
- Long lactation: dairy goats can milk for many years (2-4 year lactations are common), reducing the labour associated with kidding and kid rearing.

These don't solve all the problems associated with farming goats in pasture-based systems, but it certainly makes quick genetic progress and flexibility theoretically more possible.

In a similar conclusion to chapter 4, it is worth remembering that the grass is sometimes greener on your own side of the fence.

CHAPTER 6: LESSONS IN ON-FARM SYSTEM CHANGE

On a cold dark night in November 2024, I was driving around the empty M25 on my way home from the Nuffield conference in Belfast. A presentation by a scholar about how he had automated his parsnip packing line had not seemed close to my interests, but the similarity that struck me was that we were both trying to do system change. For the parsnip scholar though, it now seemed to be a case of 'job done', whereas I felt I was caught in a frustrating cycle of taking a step forward only to be met by a new set-back.

Was there something about a dairy farm that made it a harder place than a parsnip packing line in which to bring about change?

I started to think about why dairy farms might resist change:

- High volume of routine daily workload: little time and mental energy left.
- The state of emergency that arises whenever milking machinery breaks down: high adrenaline; fire-fighting mindset.
- A human and animal team that thrive on routine and repetition.
- High stakes: high output and high revenue make change feel risky.
- High performance animals: the lactating dairy animal is under metabolic pressure and changes to the system create health risks.
- Capital intensive: money tied up in parlours and housing create a 'sunk cost' and high monthly debt repayments to be met.

Nuffield Scholar Michael Blanche, who has studied and podcasted about farm system change, agreed with me that the 'relentlessness' of dairy farm life makes change hard, though he also observed that where farmers genuinely wanted to change, they were usually able to.

On farm visits in the second half of my Nuffield travels then, my question to everyone was 'what has allowed you to make change successfully on your farm?' However I also went beyond visits, interviewing leaders in the school system, where I used to work, and reading books and listening to podcasts related to change management both on and beyond the farm.

See Appendix 1 for some of the books and podcasts which most influenced me.

6.1 If you want to change your system, you need a system for change

Change is hard. The idea of 'worse before better' is well-known in system change theory. Even changes that ultimately succeed are first likely be time-consuming, tiring, messy, and met with resistance. For every success, there are often a dozen

more failures, for want of a better word, and even very good ideas rarely translate into practice without a great deal of trial and error.

To make change happen, therefore, requires long-term thinking and a system of ideas and resources together with professional and peer support. However, it also requires you to let go of the idea that your farm is a production line over which you have perfect control. Farms are not like factories, and change will never be a linear process.

6.2 Clear vision

Why is the change important? The most inspiring farmers I spoke to knew exactly what was important to them both in their life and on their farm. When there are deep emotional reasons driving someone's behaviour, they become a powerful force.

I met farmers whose driving motivation was being able to spend time with their young families, or to transform the natural landscape on their farm. For some it was about being able to afford to retire at some point, for others to improve the public's understanding of farming.

This vision can be expressed in different ways. Some people had a statement which they'd developed on a Holistic Management course, some were influenced by an inspirational parent. Nuffield Scholar Claire Whittle has literally drawn her vision of the farm of her future.

A clear vision motivates whoever is leading the change on farm, but it also makes it much easier to share with farm team so they too can understand it. Nuffield Scholar Tim Downes spoke of the need for a farm manager who 'lives and breathes the system'; Nuffield Scholar Sophie Gregory of the value of 'staff who understand exactly what you need to achieve'.

It can also be a useful day to day decision making tool. Chip and Dan Heath speak about the importance of 'scripting critical moves': change often stalls simply because it is unclear whether to choose x or y option when a decision point arises. Having a clear vision can help to unstick these decisions: asking which of the option take you closer to the vision may be enough to make the path clear.

6.3 Re-imagining yourself as a resource for change

Your attention and focus as a leader is arguably the most precious resource needed for change, but it is also fragile and easily diverted by pressing and urgent farm-work. People who were successfully driving changes on their farm were taking steps to conserve themselves as a resource, giving themselves time for things that needed their attention and being forgiving of themselves when things weren't perfect or were taking longer than they wanted. Practically, this

Figure 13: setting farmwork alongside creative interests can help with building a resilient mindset (credit: Rachel Yarrow)

boiled down to things to like not over-committing themselves on the milking rota, taking themselves off-farm on a regular basis and maintaining active or creative hobbies and family life.

Both Claire Whittle and headteacher Tina Farr emphasised how importance observation is during the process of change: seeing what is there, noticing the patterns and things you might not have expected.

6.4 The value of small change

I visited a few farms where a major step-change had taken place: a farm relocation or new acquisition; selling and re-buying a whole herd to change genetics; moving from a fixed to a mobile milking parlour.

However a focus on small changes is arguably the most powerful tool for system transformation. Even those who had changed something major on their farm had a host of small changes and continued trial and error alongside that; change is rarely 'one and done'.

Dan and Chip Heath urge would-be system transformers to 'shrink the change'. They argue that the thought of large-scale change often overwhelms people to the point of paralysis. Hence, in system change it is usually trumped in effectiveness by a small, actionable change. Hannah at Blue Ledge Farm in Vermont told me, 'the best system is the one that is possible'; likewise, the best next step for change is the one that is possible, within the time and resources actually available.

Others talked about the value of trying change on a (small) scale that you can afford to have fail – again, necessarily a small change, and one you can retreat from if needed. The term 'marginal gains' also came up often, drawing on sports science and the work of UK Cycling to recognise how many small improvements aggregate to create a big impact.

6.5 Team around the farm

Though no-one used these exact words, on farm after farm I noticed that those who were successful at change often mentioned the influence of someone off-farm – a farm advisor who believed in the project, a switched-on accountant or shrewd business partner, a 'think outside the box' farm vet. Yet we rarely talk about what the ideal team of professional support *around* our farms might look like, or how we might think about putting it into place.

External support was reported to bring many benefits, for example:

- Accountability over targets and KPIs
- An outsider perspective
- Local expertise, or livestock species specific expertise
- Coaching and encouragement
- A reason to make time to reflect outside the hustle and bustle of farm life

There won't be a recipe for what such a 'team around the farm' should look like, but perhaps having two or three individuals who are external to the farm would be ideal. Whether they bring expertise in finance, business planning, livestock, grassland management or a more general coaching perspective would depend on the individual farm. What seems most important is that they regularly meet you to talk about your progress and are not afraid to ask you challenging questions.

6.6 Peer group

Early adoptors of pasture-based dairy in the UK nearly all spoke of their involvement in well-facilitated discussion groups. On the other hand, pasture-based goat farmers in the UK spoke time and again of how hard it was to farm in what could feel like a vacuum, with no one else understanding what you were going through.

The value of a discussion group is partly in sharing success and good practice, and allowing farms to benchmark data with the goal of improving performance. However it also exposes you to a peer group which normalises the type of farming you are engaged in at a time when it is not widely practised.

Furthermore, discussion groups are likely to be populated by farmers with a reflective and progressive mindset. Nuffield Scholar Michael Blanch, who had facilitated discussion groups in Scotland, observed that only 3% of all eligible farmers ever engaged in discussion groups; by definition, if you put yourself in a discussion group setting, you are also choosing a peer group outside the farming norm which will put you in the right mindset for a challenging journey.

CHAPTER 7: HOW NUFFIELD HAS CHANGED ME, OR 'A TALE OF TWO NUFFIELD MOMENTS'

Like many a Nuffield Scholar before me, I imagined an epiphany would come at some point in my Nuffield journey – perhaps on a high Alp or lush Provencal meadow. I wasn't wrong, but my Nuffield moments didn't come as I imagined they would – and I was not at all prepared for how much everything about my life and farm would be changed by them.

Figure 14: Rachel Yarrow and Fraser Norton at Pencrug (credit: Angus Birditt)

Sitting in a sweltering cafeteria at my CSC in Brazil, I had my first 'Nuffield moment'. I heard Simon Wallace, a dairy farmer hailing from New Zealand, tell the story of how he bought land in Brazil to start a pasture-based dairy cow herd. Brazil had little history of dairy farming, but the tropical climate struck him as perfect for growing grass and land was affordable – there was no model to follow, but he believed in the idea enough to go for it.

Two days before that talk, my dad texted me to say he'd heard a farm in South Wales he had himself worked on in the 1970s would be coming up for. I mentally dismissed it: nice idea, but impractical to move so far away. But wait, I now thought, was this not MY opportunity? Wales is not Brazil, but it is known as a

fantastic grass growing climate and infinitely more affordable than Oxfordshire. If we really believed pasture-based dairying could work with goats, then what were we waiting for?

Fraser and I visited Pencrug two weeks after I returned from CSC, fell in love with it, and the sale completed 4 months later. Ten months after the CSC, we moved our herd and business there.

My second 'Nuffield moment', which I wrote about in chapter 6, brought me down to earth with a thud. The question I'd been asking – what does a successful pasture-based goat dairy farm look like? – could only take me so far. If I wanted to take our farm through a process of profound change, I needed to create my own system to make sure that change happened.

I've since become a self-taught student in the school of system change theory, and have studiously applied my learnings to what we do on the farm. At a workshop at OFRC in January 2025, just before we moved, I created a vision of my farm of the future. Fraser and I have consciously reduced the amount of rota-ed farm and cheese-making work we do to create space for planning and creating the infrastructure we need to make our new farm work. We have our 'team around the farm' in place, and I have cultivated a peer group by visiting other UK pasture-based goat farmers and starting a WhatsApp group. Fellow 2024 Nuffield Scholar Cormac White and I are in the process of lauching a Grazed Goat discussion group. I believe I am putting in place the structures which make it most likely we will be able to see this change through on our farm.

But looking at the wider sector also makes me hopeful. In fact, I see the change happening already.

This autumn, for the first time, two different farmers approached me and then bought breeding bucks from me, specifically because they wanted pasture-based genetics. There used to be nowhere to go for that.

Last week, I read an interview with a conventional goat farmer who, when asked what excited him about the future of goat farming in the UK, answered 'watching how the move to grazed grass goes'.

A buyer working on behalf of well-known, upmarket high street café chain approached us about supplying them because of the value they put on using free-range milk products and the difficulty they were finding in sourcing this for goats' cheese.

Above all, though, is the confidence that comes from seeing something – in this case dairy goats in grazing systems - done in dozens of different ways on dozens of different farms. They say 'if you see it, you can be it' and I have certainly seen it. I used to hope it would be possible, now I really believe it is possible.

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

Can a pasture-based dairy goat system work at commercial scale in the UK? Absolutely.

Will it be easy for people to start adopting pasture-based systems when there are so few goat-based example to follow in this country? Absolutely not.

There are models of goat dairying where goats have access to grazing in a limited way which would be relatively accessible for existing goat farmers in this country: they wouldn't require profound system change, but neither would they be cost-free or make much difference to cost of production. So whether it becomes worthwhile for more farmers to look at adopting a system like this will depend entirely on the market, the supply chain and the milk price.

If retailers concerned with 'free range milk' want to extend their promises to goats as well as cows milk, they should consider what they could do to ease and incentivise the transition: offering better milk prices, funding bespoke advice on outdoor grazing to farmers, or providing small grants for new infrastructure.

Farmers who want to use grazed herbage in a more fundamental way, as the engine of their goats' ration, can certainly take heart. Grass is not a free lunch, and considerable planning, time and infrastructure will be needed to get the most out of pasture, but successful models and knowledge of how to make it work with dairy goats exist in ways that can translate to the UK context.

Farmers with even more ambition might re-imagine from first principles a pasture-based system for dairy goats, like I saw at Does' Leap Farm in Vermont. A landscape of trees and shrubs integrated as forage, alongside mixed herb and legume swards, leans into the dietary preferences and behaviour of dairy goats, though there is not yet anything like a playbook of how to establish and run such a system at scale.

However all UK dairy goat farmers with an interest in the pasture-based approach would benefit from collaborating through discussion groups and social media, and to develop shared understandings of desireable genetics and grazing management, and to become part of a forward-looking peer group and community for change.

CHAPTER 9: ACKNOWLEDGEMENTS AND THANKS

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APPENDIX 1: BOOKS AND PODCASTS ON THE SUBJECT OF SYSTEM CHANGE

The podcasts and books which had the greatest influence on my were:

Podcasts

- It's About Time: A Pasture-Pod 6-part special series hosted by Michael Blanche
- Lean Made Simple with Ryan Tiernay
- Tina Farr (headteacher) interviewed by Holly Everett on the Triple Well-Being

Books

- *Switch* by Dan Heath and Chip Heath
- *4000 Weeks* by Oliver Burkemann

APPENDIX 2: FENCES AND GOATS

Electric fence training paddocks: hot wire in front of solid fence

Gold standard boundary fencing: solid fence with electric

Electric netting

Single strand electric for dividing paddocks

Two and three strand electric for boundaries

APPENDIX 3: SPECIES OF SHRUB AND HERBAGE

Edible shrubs on the Norwegian mountainside: Salix glauca (gives slight bitter note to cheese), Juniper (roasted flavours in well-matured cheese), blueberry, lingonberry heather, lichen 'Reinlav'

A novel approach to goat silvopasture at Doe's Leap Farm, Vermont. A mixed 'salad bar' including self-sown saplings of maple, white ash and oak, together with a mix of cup-plant, chicory, red clover, plantain, golden rod, ryegrass and other naturally occurring herbs and forbs.

A common Dutch mix of clover, rye-grass and chicory

A grazing mix of lucerne, red and white clover near Lyon, France

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