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Grazing as a service: hooves, habitats and hard economics

Written by

Alexander Crawley NSch

June 2026

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Date of report: June 2026

NUFFIELD Farming Scholarships

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

Title	Grazing as a service: hooves, habitats and hard economics
Scholar	Alexander Crawley
Sponsor	McDonald's UK and Ireland
Objectives of Study Tour	• Explore new models for extensive livestock farming • Explore alternatives to public subsidy for the long-term viability of extensive grazing in the UK • Explore technological innovation, new business models and partnership models to support this
Countries Visited	Kenya, Australia, New Zealand, France, Netherlands, UK, USA
Messages	**For land managers and policymakers** • Grazing is worth paying for where it solves a costed problem. Identify who ends up paying the costs of fire, flood or vegetation management, and how much it costs them. Then pay for a specified grazing outcome against that cost rather than expecting 'free grazing' to solve the issue. • **Develop outcome-based grazing contracts that pay for measurable results** – fuel-load reduction, floodplain condition, heritage and habitat condition – and hold graziers to account for delivery. **For farmers and graziers** • **Focus on professional service delivery – a mindset shift from pure production.** Price against the client's alternative, and be clear where you offer a niche capability that others cannot. • Collaborate through brokers, cooperatives and shared training standards, so that clients get a single, insured, skilled point of contact.

EXECUTIVE SUMMARY

Across the UK, the costs of wildfire and flooding are rising for households, businesses and the public purse. Vegetation-management costs on solar farms, infrastructure corridors and scheduled monuments are mounting, and developers now carry new costs for Biodiversity Net Gain (BNG). At the same time, extensive grazing – the activity that shaped many of these landscapes – is becoming uneconomic, and livestock are leaving the places that arguably need them most.

This report examines Grazing as a Service (GaaS): livestock deployed because they deliver a defined land-management outcome whose value can be measured and paid for, rather than solely because they produce meat or fibre. GaaS is not an argument that grazing is inherently good; its value depends on where, when and how animals are managed. Travelling through the United States, France, the Netherlands, Kenya, Australia and New Zealand, I repeatedly found livestock being brought back, under contract, to reduce wildfire fuel loads, keep floodplains open, manage vegetation on solar farms and vineyards, and protect monuments.

The central finding is that Grazing as a Service can unlock large returns if it is focused on professionally solving expensive problems

Three pricing models recurred: avoided cost (priced against the client's alternative, such as mowing or spraying), avoided loss (priced against damage prevented) and cost-plus. The strongest commercial case was US solar grazing, where an identifiable customer with an existing vegetation-management bill buys a recurring, measurable service. Where the benefit was private, commercial contracts followed; where it was public, payment depended on public budgets and was more fragile, as France's shrinking firebreak budgets show.

The UK has the problems, the livestock and the skills, but differs in important ways: fragmented land ownership, plentiful sheep, little culture of paying for grazing, and limited evidence of the benefits of targeted grazing for fire and flood prevention in the UK. The report recommends standard outcome-based GaaS contracts, demonstration programmes, agreed outcome metrics, professional standards and training for graziers, and mechanisms that allow the parties who carry a risk to pay for its reduction.

TABLE OF CONTENTS

Executive summary ii

Chapter 1: Introduction 1

Chapter 2: Background – why Grazing as a Service matters 2

2.1 An income problem meeting a cost problem 2

2.2 Grazing versus the mechanical alternative 6

Chapter 3: How Grazing as a Service works – who pays, and for what? 8

3.1 The proposition 8

3.2 Three ways to price a grazing service 8

3.3 Valuing avoided loss 9

3.4 Who pays, and for what 10

3.5 From problem cost to a realistic market 10

3.6 How evidence is presented in this report ..... **Error! Bookmark not defined.**

Chapter 4: My study tour 12

Chapter 5: Fire – grazing as wildfire mitigation 13

5.1 California – a functioning market for fuel-load reduction 14

5.2 France – the limits of a subsidy-led model 17

5.3 The UK – not just the fire 21

Chapter 6: Flood and water – keeping the landscape open 22

6.1 The Netherlands – Room for the River 23

6.2 The UK – the Evenlode catchment 27

6.3 Kenya – water security through managed grazing 29

Chapter 7: Solar grazing in the United States – a functioning commercial market 31

Chapter 8: Commercial land management – vineyards and monuments 35

8.1 Vineyards 35

8.2 Scheduled ancient monuments 38

Chapter 9: Biodiversity and carbon 41

9.1 Kenya – restoring rangelands and earning a social licence 41

9.2 Australia – carbon and biodiversity markets 43

Chapter 10: What makes Grazing as a Service viable? 47

10.1 Common characteristics of viable models 47

10.2 Private benefit and public good 48

10.3 The trade-off between productivity and service 48

10.4 Barriers and the professional premium 49

Chapter 11: The UK – what is different, and where are the opportunities? 50
11.1 Why the UK is different 51
11.2 Change on both sides of the contract 51
11.3 UK opportunities compared 52
Chapter 12: Risks and limitations 53
Chapter 13: Recommendations 55
Chapter 14: Conclusions 57
Chapter 15: After the study 58
APPENDIX 59
References 61
Acknowledgements 64

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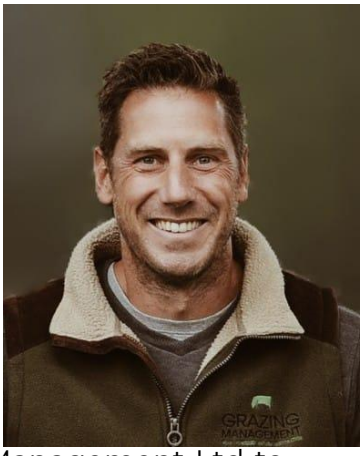
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CHAPTER 1: INTRODUCTION



Before farming, I was a soldier and then a diplomat. Institutional and public sector roles, but both taught me how to manage high-risk situations, how to think strategically and tactically at the same time, and how to build teams and coalitions to tackle big, difficult problems – lessons I have tried to bring to my Nuffield Farming Scholarship.

When I returned from the Middle East, I was determined to move away from conflict zones. As a young family we had no farm and no farming background, but we were determined to farm. It was a steep learning curve, with plenty of errors along the way. In 2021 with my wife, Emily, I set up Grazing Management Ltd to help solve ecological land-management problems for landowners across the UK: a contract-grazing business built on finding solutions (without BPS or SFI), often in unconventional ways – virtual-fenced goats on an industrial port, or geofenced cattle on a peat bog. It has not always been smooth; assumptions have been challenged and experience earned the hard way. We now work for a range of public and private sector clients across many habitats.

Our clients valued what our animals did, but the conventional economics of livestock – kilos of meat and support payments per hectare – did not capture that value

My scholarship set out to look at innovation in extensive grazing, initially focused on technology. Internationally, however, the innovation I kept finding was commercial: animals reintroduced, under contract, to solve large and expensive problems that mechanical and chemical approaches could not solve affordably. Graziers were being paid for an outcome – a reduced fire risk, an open floodplain, a maintained monument, a compliant solar site.

This report calls that model 'Grazing as a Service' (GaaS): grazing contracted in the same way a land manager might contract a flail mower, an ecological engineer or a landscape-maintenance crew. It is built around three questions:

1. What management services can grazing genuinely provide, and where are its limits?
2. Under what economic models do those services become commercially viable for both parties?
3. What prevents wider adoption in UK land management?

The short answer is that GaaS can deliver substantial savings and environmental services, but only where the value is clearly articulated and somebody is willing to pay for the outcome. To test this, I looked in detail at the contracts and financials of the graziers I met, who were remarkably generous with their time and candour.

CHAPTER 2: BACKGROUND – WHY GRAZING AS A SERVICE MATTERS FOR UK FARMERS

2.1 An income problem meeting a cost problem

Three assumptions frame this report:

1. The average English lowland grazing livestock farm has consistently lost money on its agricultural output and has been profitable only because of direct payments, agri-environment payments and diversification. Lowland grazing livestock farms currently receive an estimated £26,000 a year in subsidy which makes up roughly 63% of their average income, with farming making a loss or breaking even most years based on DEFRA figures. (Figure 1).

2. That support is being eroded. The Defra farming budget has stayed broadly flat in cash terms for a decade, while inflation has removed roughly a third of its real value (Figure 2). In England, payments have also shifted to an income-forgone basis, which by design compensates costs rather than generating profit. There is concern that subsidy support may shrink further as government looks to private finance to fill the gap, as the Farming Roadmap proposes.

3. Public finances are stretched, with debt at its highest share of GDP in a generation (Office for Budget Responsibility, 2026a; House of Commons Library, 2026) (Figure 3). With so many competing priorities, this report assumes there is little prospect of government materially increasing support rates for individual farm businesses.

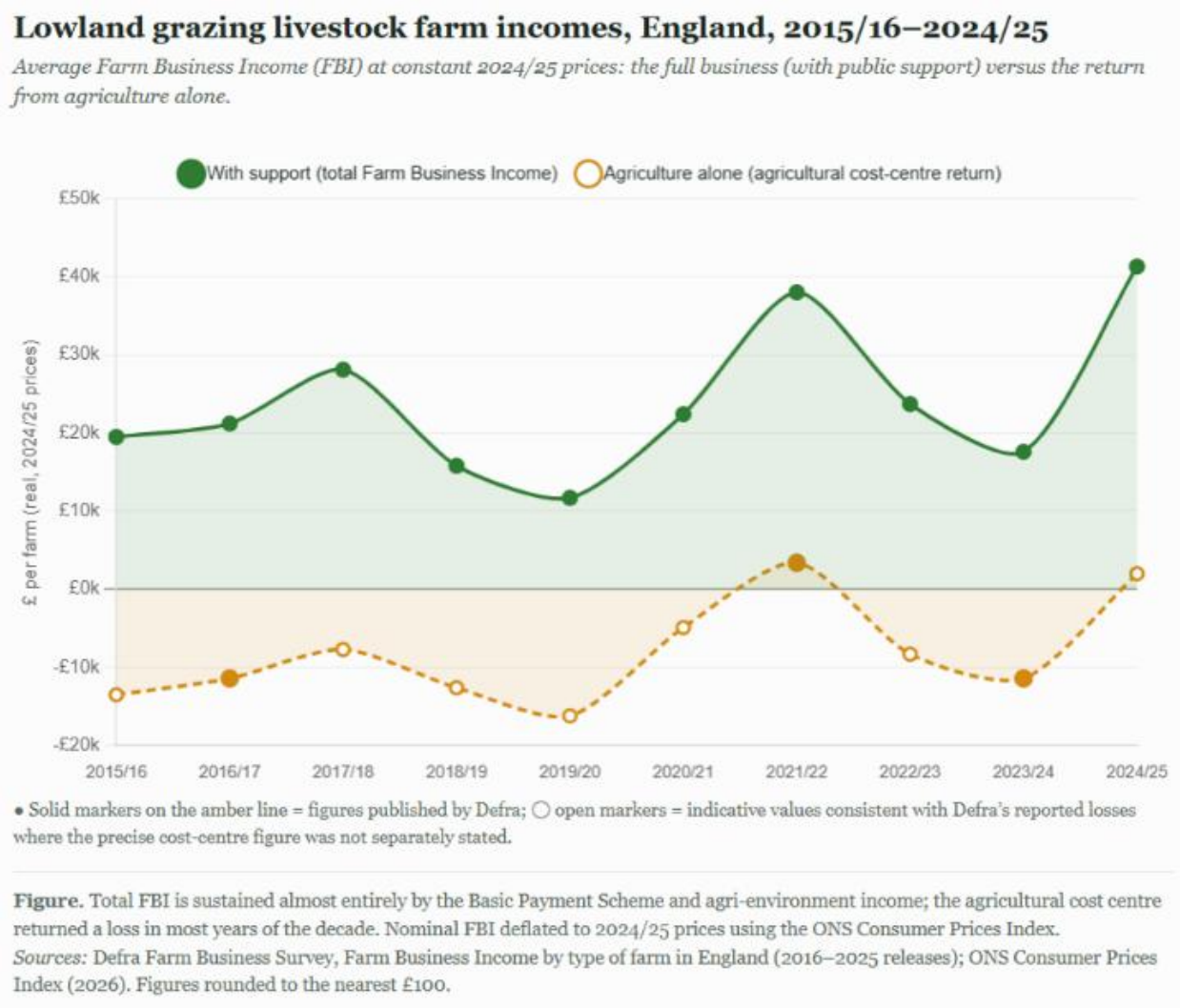


Figure 1. Lowland grazing livestock farm incomes England 2015-2025

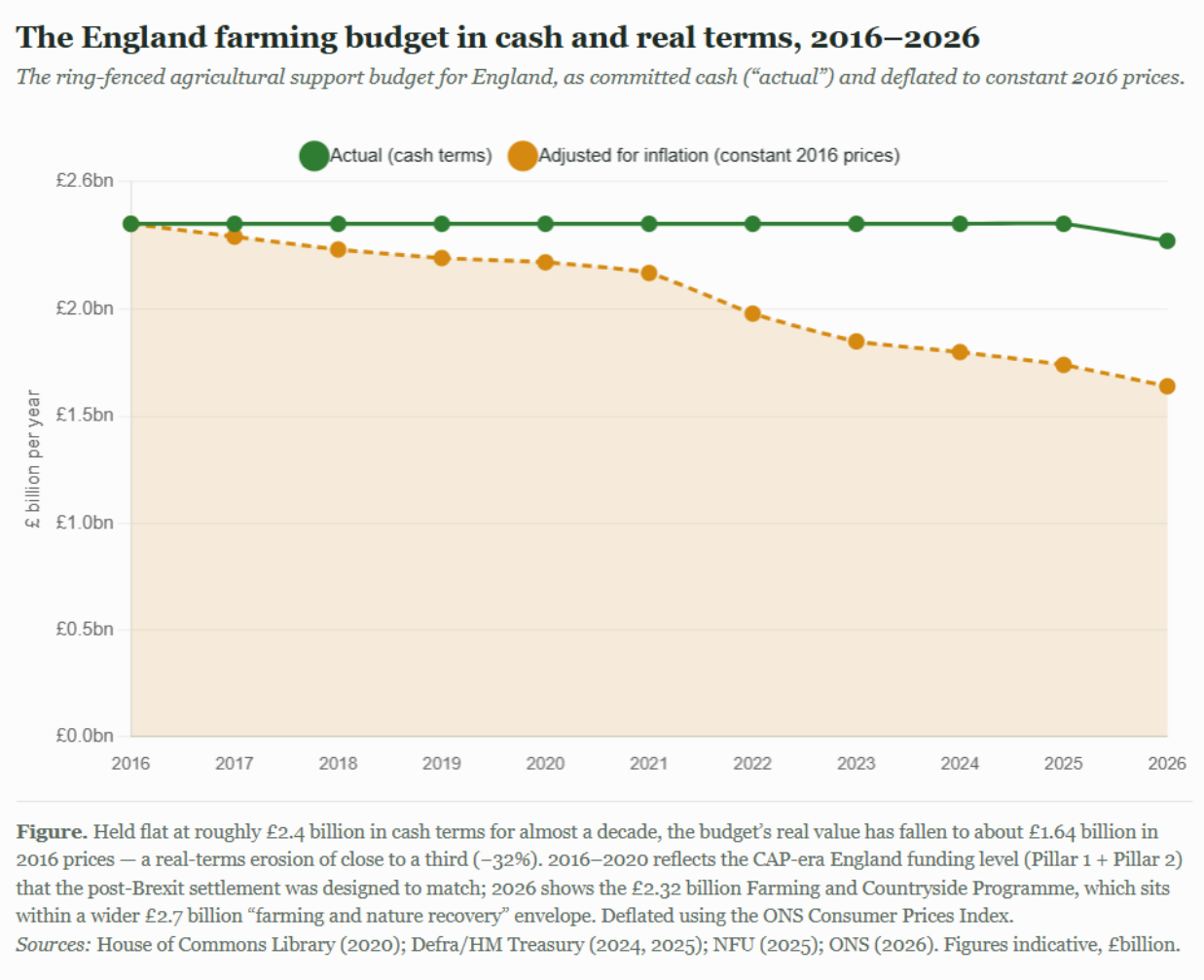


Figure 2. The DEFRA farming budget in cash terms and real terms 2016-2026



Figure 3. The UK debt to GDP ratio 1991-2025

For a sector that has relied on subsidy to keep extensive grazing viable, this is likely to mean more animals leaving the landscape and more under-grazing in upland and marginal areas. The trend is already visible: UK sheep and beef suckler numbers have fallen by around 30% since 2000.

At the same time, the public and private sectors face a growing list of expensive land-management problems (Figure 4).

Issue	Cost in 2025	Future potential cost	Reference
Wildfire	£450 m	£1 bn	In 2025 the UK recorded its first 10,000-hectare 'megafire' (Moorland Association, 2025; UKCEH, 2022).
Flood	£2.4 bn	£3.6 bn	Environment Agency, 2024; Jongman et al., 2014, although to note, this includes sea flooding as well as river flooding.
Solar vegetation management	£8-21 m	£26-69 m	Ground-mounted solar covered roughly 52,000 acres by late 2024 and could reach close to 173,000 acres by the mid-2030s (House of Commons Library, 2025; Carbon Brief, 2022), each acre needing vegetation management costing potentially between £150-£400.
Scheduled Ancient Monuments (SAM)	£18m–£44m (88,000 ha × £200–500/ha indicative conservation-management rate)	£25m–£60m (labour- and H&S-driven cost inflation; more at-risk sites brought	~20,001 monuments in England; ~88,000 ha of monument/heritage grassland under active management; ~330,000 ha of heritage sites in agri-environment schemes; ~40% (four in ten) SAMs managed via agri-environment funding. Historic England (2025); Natural England / Historic England

		into active management)	agri-environment data (2016). £/ha is indicative — no published national SAM management-cost rate.
Utility & transport corridors	£50m–£70m — anchored on Network Rail's documented ~£40m/yr vegetation spend, plus National Highways soft-estate management	£70m–£100m (grid, rail and road expansion + cost inflation)	60,000 ha of managed vegetation: Network Rail ~30,000 ha lineside (within a ~52,000 ha estate) + National Highways ~30,000 ha soft estate. Network Rail (2020); ORR/Arup (2022); National Highways (2024); Network Rail land area (Parliamentary answer, 2025). Highways per-ha cost not published — indicative.

Figure 4. Estimated annual cost of selected UK land-management problems. These are total problem costs, not the market available to grazing (see section 3.5).

To these can be added the costs of carbon offsetting and of Biodiversity Net Gain (see Appendix). Grazing can address only part of each problem, in only some places, and in competition with other solutions; Chapter 3 sets out how to move from total problem cost to a realistic market. Even so, capturing a small share of these costs would be significant relative to current support for extensive grazing, estimated at £330m a year or around 13% of Defra's farm support budget if we extrapolate from DEFRA figures

2.2 Grazing versus the mechanical alternative

Livestock influence vegetation structure, hydrology, nutrient cycling, fire fuel loads, soil biology and species diversity. Whether the outcome is good or bad depends on timing, stocking density, species, terrain and the management objective. This is not an argument that 'grazing is good', but that managed grazing, in the right place, can out-compete the alternatives: the important issue is not livestock per se but how, where and when they are managed. Against mowing, spraying, excavation and controlled burning, grazing can offer lower fossil-fuel use, access to terrain that machinery cannot safely reach, selective vegetation control and on-site nutrient cycling. Its drawbacks – fencing, water, labour, animal welfare and less predictable outputs – are also real and recur in every chapter.

The thread linking every case study is economic. Environmental grazing typically produces benefits for others but imposes costs on the grazier. Where that gap is closed – by a water authority, a utility, a solar operator, a fire service or a conservation body paying for the outcome – grazing persists. Where it is not, the

animals tend to leave. This is the ‘hard economics’ of the title, and the question a UK land manager must answer before a single animal arrives on site: who pays, and for what measurable result? Chapter 3 sets out a framework for answering it.

CHAPTER 3: HOW GRAZING AS A SERVICE WORKS – WHO PAYS, AND FOR WHAT?

3.1 The proposition

Grazing as a Service is not an argument that livestock are inherently good for landscapes. It is a commercial model in which livestock are deployed because they provide a defined land-management outcome whose value can be measured and paid for. It turns grazing from a question of whether animals 'belong' in a landscape into four practical questions: who has a problem; what does that problem cost; can grazing change the outcome; and is the value created greater than the cost of delivering the service?

GaaS becomes commercially viable when the value of the problem it solves is greater than the cost of delivering the grazing service – and the person who bears that problem can be connected to the person capable of solving it.

This matters because, in conventional livestock economics, the person receiving the environmental benefit is usually not the person paying for livestock production. A grazier selling lambs is paid for meat; the railway, water company or village that benefits from an open floodplain or a reduced fuel load pays nothing. GaaS resolves that misalignment by selling the outcome to the party that values it.

3.2 Three ways to price a grazing service

Throughout the study tour I found grazing priced in three ways (Figure 5).

Pricing models for GaaS		
Mechanism	**Explanation**	**Example**
Avoided Loss	Value kept by preventing something from being lost or destroyed. The baseline is a predicted loss; the benefit is the reduction in that expected loss.	A rail operator faces expected flood losses of £10m a year from a 3,000 ha catchment. A package of measures reduces expected losses by £5m – an avoided loss of around £1,670/ha/year. This is the ceiling on what the whole package is worth, not the value of grazing alone.
Avoided Cost	Money you don't have to spend because an alternate action removed the need for it.	The rail company has to pay £400/acre for mechanical vegetation maintenance on flood infrastructure (the anchor cost). An alternative option (grazing) costs £350/acre.
Cost plus	The actual cost of delivery plus an agreed margin.	A grazier helps deliver the natural flood management soft infrastructure maintenance service, charging actual costs plus a margin, so £250/acre.

Figure 5. Pricing models for GaaS (illustrative figures)

Avoided cost is the most practical starting point. A traditional contractor prices cost-plus: inputs plus a margin. Many of the graziers I met instead priced against the client's alternative. As an example from interviews, on a US solar site, a 1,000-acre array might cost an operator around US$300,000 a year to mow knowing that 'anchor price', a grazier can quote competitively below it and still earn far more than lamb sales alone would yield. The client saves money, the grazier captures a fair share of the value, and income becomes less dependent on meat markets and subsidy.

Avoided-cost pricing will not necessarily last. Where margins are attractive, new entrants will compete, and prices will tend to fall towards the cost of delivery plus a normal margin. Graziers told me this had not yet happened in their markets, but it is the likely long-run direction where livestock and labour are plentiful – an important point for the UK (Chapter 11). Durable premiums depend on scarce capability: skills, certification, reliability and scale that competitors cannot easily copy.

3.3 Valuing avoided loss

Avoided loss is the most powerful but most demanding model. A very large potential loss does not, by itself, establish a large value for grazing. The value that can be attributed to a grazing service is better expressed as:

Net value of grazing = (baseline expected loss – residual expected loss with grazing) – (grazing + monitoring + infrastructure + transaction costs)

Expected loss is the probability of an event multiplied by its cost, for example a 1 in 10 year flood costing £10m. The difficult term is the residual loss, can changes lead to a 1 in 10 year flood costing £1m or making it a 1 in 100 year flood event?

Often, it is the use of natural infrastructure (floodplain, firebreak etc) that makes this key change. Grazing is often the crucial maintenance.

So, how much does grazing actually change the probability or severity of a fire or flood, alone or as part of a wider package of measures? This report does not claim a particular percentage reduction. Establishing one would require a defined baseline, a credible counterfactual (what would have happened without grazing), monitoring of the vegetation or hydrological indicators that drive risk, and enough sites and years to separate the effect of grazing from weather and other interventions.

Until that evidence exists, avoided loss is best used to identify who should care, and avoided cost to set the price for grazing as maintenance.

3.4 Who pays, and for what

Across my travels, the same payment models recurred, each with a different customer and a different reason to pay (Figure 6).

Payment model	Who pays / example
Corporate infrastructure contract	Solar developers and utilities buying reliable, low-risk vegetation management (USA)
Insurance- and lender-driven	Insurers, banks and infrastructure owners paying for fire and flood risk reduction (California; potentially Evenlode, UK)
Water authority / NFM contract	Public water bodies keeping floodplains open and functioning (Netherlands)
Fire-prevention contract	Public fire budgets and Homeowners Associations/communes paying for strategic firebreak grazing (USA/France)
Private land contract	Vineyards and estates buying weed control and fertility (USA, France)
Conservation / NGO agreement	Conservation bodies paying for habitat, monuments and biodiversity (Kenya, Australia, Netherlands, UK heritage sites)
Public subsidy / stewardship	Government agri-environment payments - the legacy model now under fiscal pressure (UK, France)

Figure 6. Payment models for grazing services

The payment mechanism follows the beneficiary. Where the benefit is a private avoided cost, such as a solar operator's mowing bill or an insurance premium requirement, a commercial contract can follow. Where the benefit is a public avoided loss, such as protecting a village from fire, payment usually requires public procurement. Where the benefit is unpriced, such as habitat or landscape character, a subsidy, regulatory obligation or philanthropic mechanism is usually needed. Identifying which of these applies is the first commercial question for any GaaS proposal.

3.5 From problem cost to a realistic market

The costs in Figure 4 and the Appendix are opportunity estimates, not a GaaS market. It helps to distinguish four levels:

- **Total problem cost** – the full annual cost of a problem, such as flood damage across England.
- **Addressable spend** – the part of that cost spent, or plausibly spent, on vegetation or land management that grazing could replace or support.
- **Serviceable market** – the part of addressable spend on land where grazing is practical (access, water, fencing, welfare, safety, terrain) and where a payer exists.
- **Obtainable market** – the share that grazing businesses could realistically win, given competition, livestock supply, skills and client willingness.

Each level is substantially smaller than the last. The UK figures in this report sit mostly at the first two levels and should be read in that light.

CHAPTER 4: MY STUDY TOUR



I organised my travel around themes rather than countries, initially looking at technological innovation. Wherever I went, however, I kept finding grazing being paid for, or considered, as a service worth more than the meat it produced. It was important to interrogate the contracts and the numbers, not just the ecology and ideology: did the approach actually stack up?

In southern France, I went to see extensive livestock in a climate 2°C warmer than ours, and ended up with farmers, officials and the regional Chamber of Agriculture working on pastoral firebreaks in the Pyrenees. In the Netherlands, I planned to look at rewilding-style grazing and found paid-for floodplain grazing under the 'Room for the River' programme, and farmers managing scheduled monuments. In Kenya, I went to look at high-tech tracking and low-tech cattle handling, and ended up examining rangeland restoration, coexistence between livestock and wildlife, and the role of cattle in water management.

In Australia and New Zealand, I looked at how agri-tech could support livestock systems and tested carbon claims. In the Eastern United States, I spent time with the American Solar Grazing Association (ASGA) and numerous contract graziers. In California I found myself on a Malibu beach looking at the charred remains of multi-million-dollar houses where grazing was being introduced to save lives and property. Throughout, I interviewed graziers, conservation bodies, solar developers and policymakers, always returning to the same questions: what is the problem? What is the cost? Can grazing help manage the problem in a financially viable way? Is there a repeatable, scalable model to deliver value?

CHAPTER 5: FIRE – GRAZING AS WILDFIRE MITIGATION



Once fully costed, the January 2025 Los Angeles fires are on track to be among the most expensive natural disasters in history. When I talked to communities in California, they seemed scared and scarred, knowing it was only a matter of time before the fires returned. Credit: (AP

Wildfire offers the clearest illustration of avoided loss because the potential losses are enormous and increasingly fall on private balance sheets. The January 2025 Palisades and Eaton fires around Los Angeles together destroyed over 16,000 structures, killed at least 29 people and forced around 200,000 evacuations; estimates for the combined event put insured losses at roughly US$40 billion and total economic losses above US$140 billion (CalFire, 2025; Jones et al., 2026; Swiss Re, 2026) . As properties become harder to insure, risk passes to the lenders who hold mortgages against them and to the public bodies left managing burnt land. Across Europe, forest fires cost around €2 billion a year (Cross Dependency Initiative, 2025).

5.1 California – a functioning market for fuel-load reduction



I travelled the length and breadth of California looking at wildfires, including the charred remains of the Malibu beachfront mansions. Vegetation clearance here was not a 'nice to have' but often a legal requirement, and grazing was one way of meeting it to protect assets and lives. Map credit: Google

California does not try to remove fuel everywhere. It concentrates fuel-load reduction at the wildland–urban interface, supported by law: in designated fire-hazard areas, property owners must maintain up to 100 feet of defensible space around buildings (California Public Resources Code §4291). Separately, insurers increasingly take wildfire risk and mitigation into account when deciding whether to offer or renew cover. A land manager there has five main options:

- Mechanical clearance
- Manual brush-cutting
- Chemical treatment
- Controlled burns
- Grazing

On difficult or sensitive terrain, graziers reported that grazing is increasingly the most cost-effective and ecologically acceptable option. Crews typically deployed up to 250 sheep and goats from a single trailer, clearing about an acre a day and charging roughly £750 per acre – similar to brush-cutting – with minimum-job and move-on fees waived on larger sites. Operators running five or six teams could turn over around £4,000 a day through a four-month fire season. For one operator, around 40% of work came from public bodies (fire services, schools, hospitals), 40% from homeowner associations and 20% from private individuals. This was not subsidy, but specific contracts.



California wildfires sounded terrifying. People described walls of flame 30ft high advancing at 80mph with the wind, and talked about how many years until the next wildfire: not if, but when – 3, 5 or 10 years? (own photo).



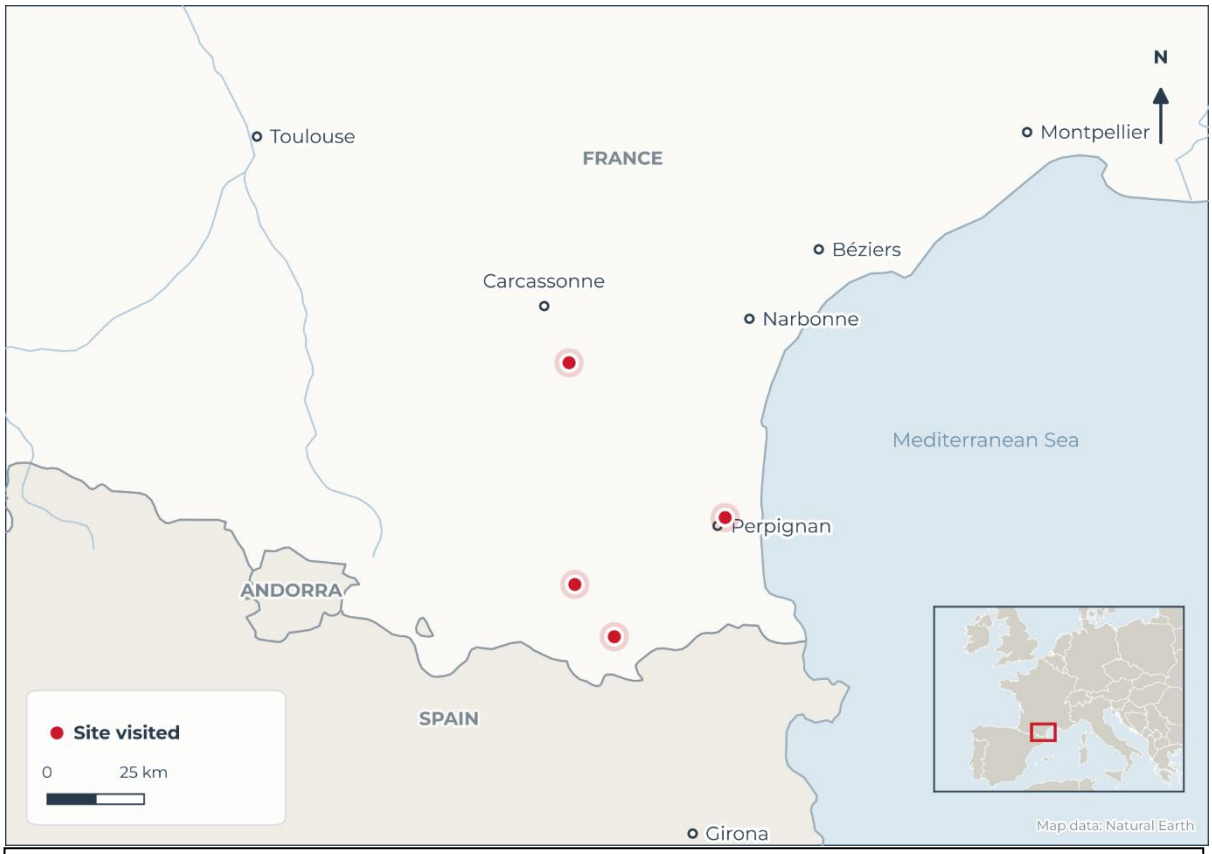
New entrants were able to build thriving businesses, employing multiple people, growing hugely in a short space of time. It was incredibly encouraging to see agriculture thriving and delivering services that people really cared about and benefited wider society. Napa Pasture Protein Inc managed vineyards and wildfire grazing as well as producing lots of protein (own photo).

Grazing is often chosen because it does things machinery cannot. Animals reach steep and rocky ground safely; they can retain a low scrub windbreak against wind-blown embers while removing the dry, fine grasses that carry fire, rather than scalping a site bare; they leave roots in the ground, reducing erosion after clearance; and they do not leave cut, flammable material lying on the surface. The approach is slower and more selective than cutting, which gives

wildlife time to move ahead of it. Graziers were candid that firebreak grazing is the hardest service to deliver: low-quality forage depresses animal growth and breeding rates, which is exactly why it must be paid for properly. The strongest operators, such as Ventura Brush Goats, had trained in property protection and wildfire behaviour so they could offer a packaged fire-protection service with grazing as one element. Fire services and fire safety councils often had preferred graziers and sought to place multiple sites with a single provider.

Case summary: California fire grazing	
The problem	Wildfire risk to life, property and infrastructure at the wildland–urban interface.
Existing solution	Mechanical and manual clearance, herbicides and controlled burns; statutory defensible-space duties on property owners.
What grazing changes	Reduces fine fuel on steep or sensitive ground while retaining roots and selected vegetation.
The economics	Public bodies, homeowner associations and individuals pay around £750/acre, priced against brush-cutting (avoided cost).
The evidence	Prices and client mix ; site conditions . The reduction in fire risk on grazed sites was not measured.
The constraint	Low-quality forage, labour, predators and logistics; seasonal demand.

5.2 France – the limits of a subsidy-led model



In France, I met with local officials and farmers. I planned to join the 'descendu' as cattle were brought back from mountain grazing at the end of the summer. However an outbreak of 'lumpy skin disease' stopped this. Another example of a changing climate bringing new difficulties for farmers, making standard farming even harder and more marginal. Map credit: Google maps



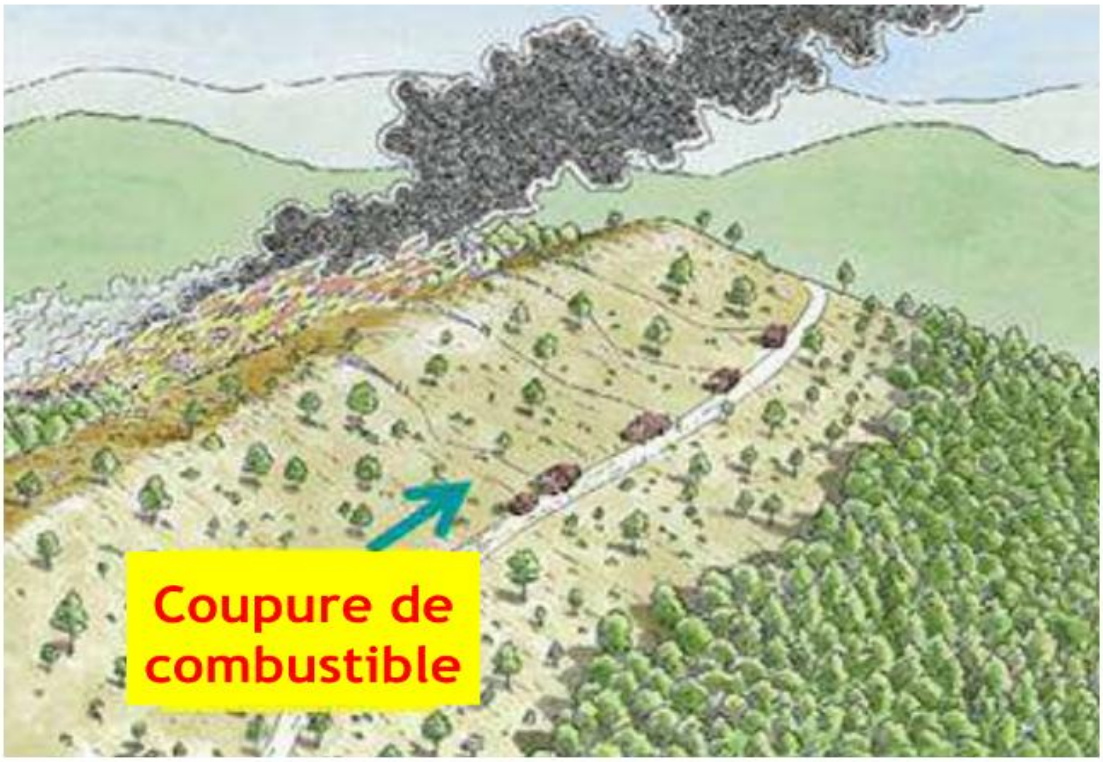
The scale of devastation from the wildfires in the South of France was huge and was getting steadily worse as the grazing response dwindled. As I drove through the winding Pyrenees roads I imagined with a shudder the terrifying moment a wildfire swept down the valley cutting off communities and evacuation routes. Photo credit Abdul Saboor / Reuters.

In August 2025, France suffered its largest wildfire in over 75 years near Ribaute in the Aude, burning some 17,000 hectares - an area larger than Paris - and at its peak consuming around 1,000 hectares per hour (France 24, 2025; BBC News, 2025).

As the climate has warmed and hill livestock have become less economically viable, hillsides that were traditionally grazed have scrubbed over and fuel has built up. For years the French state has paid graziers to keep vegetation down in specific zones – evacuation routes, safe areas around villages and working space for firefighters – through agri-environment payments, welcomed by the fire service. In the Pyrénées-Orientales, pastoral firebreaks have been maintained for over 30 years. A similar philosophy is captured in the French slogan 'des moutons plutôt que des Canadairs' ('sheep rather than Canadairs', the firefighting aircraft), although the phrase has a wider French history than this programme itself.



The landscape is managed for wildfire in partnership between farmers and firefighters. A shrinking public subsidy pays the bill. Credit : Société d'élevage des Pyrénées Orientales Chambres d'agriculture Occitanie et Pyrénées Orientales



French fire-mitigation grazing strategy was well developed over decades, with plans that integrated the fire service, farmers and policymakers. What appeared to be lacking was funding. Farming in these areas was hard and unprofitable on production alone, but potentially worth millions in costs avoided. 'Coupure de combustible' means firebreak. Image taken from: Integration of Pastoralism in Fire Risk Management, situation in southern France, by Carole Duperron, Raphaële Charmetant and Anne Rouquette, produced by the Société d'Élevage des Pyrénées-Orientales / Chambres d'agriculture Occitanie et Pyrénées-Orientales

Yet the model is straining because it depends on a static public budget. Firebreak-grazing support across France is capped at around €4 million within a €100 million agri-environment envelope, with individual payments limited (for example €200/ha to graze and cut a ridgeline safe zone and €150/ha for adjacent fuel reduction) and per-farmer ceilings near €14,000 . In the Pyrénées-Orientales, the area under contract fell from about 1,000 hectares across 59 contracts in 2014 to roughly 250 hectares across 20 contracts in 2025 as budgets were squeezed. Repeated droughts reduced water and fodder and forced herds to downsize, and the farmers I spoke to said the next generation did not want to take on farming. The need for grazing is rising just as grazing becomes harder and more expensive and public support shrinks. This is the limitation of relying on a fixed public budget to pay for a public avoided loss.



The tiny commune of Calce showed real agency in developing their own solution to the potential existential risk to their village. A pragmatic blend of private and public money created a new opportunity for a farmer and protected their homes. Image: The Municipal Sheepfold (Bergerie Communale), Calce, France. (Source: Calce Eco-Pastoralism and Solar Initiative documentation).

The instructive exception was the small commune of Calce, which combined public and private money to build a house and barn and to assemble a contiguous 400-hectare grazing block from many fragmented landholdings. The commune lets it at a markedly below market rent to a shepherd whose 200 sheep graze down the fuel load around the village, while they also draw standard farm payments. It still relies partly on subsidy, but it blends public and private finance and points towards the service-based models discussed in Chapter 10.

Case summary: French pastoral firebreaks	
The problem	Scrub encroachment and fuel build-up on abandoned hill grazing; wildfire risk to villages and to firefighting access.
Existing solution	State-funded firebreak-grazing contracts alongside aerial and ground firefighting.
What grazing changes	Keeps defined strategic zones open: evacuation routes, safe areas and firefighting space.
The economics	Public agri-environment payments (around €150–200/ha, capped per farmer). At Calce, the commune adds land, housing and low rent.
The evidence	Budget and contract figures . The fire service values the firebreaks , but the risk reduction was not quantified here.
The constraint	Fixed public budget, drought, succession and fragmented land ownership.

5.3 The UK – not just the fire

On returning to the UK, I expected wildfire to become a serious issue within five to ten years. Three months later, the Prime Minister issued a nationwide wildfire emergency alert to every citizen in England and Wales. Conversations with national wildfire specialists in the Fire and Rescue Service showed me that the consequences go well beyond the fire itself. Deep summer burns on peat release fine particulate matter in smoke that can drift into cities. Summer fires leave no vegetation cover in winter. Heavy metals from the industrial era, accumulated in peat over centuries, can then be washed into drinking-water reservoirs. Valley-side coal tips stripped of vegetation become less stable, raising the spectre of disasters such as Aberfan. Carbon is released as the peat itself burns. These interactions warrant a separate study; working with policymakers, the fire service and land managers on them is now an ongoing focus for me (Chapter 15).

CHAPTER 6: FLOOD AND WATER

Flooding is the second major risk where grazing can play a role, with wider implications for water management. The proposed mechanism is straightforward: many natural flood-management features, such as wet grasslands and multifunctional floodplains, are designed to remain open. Left unmanaged, they can scrub over, which may reduce both their hydraulic function and their habitat value . Where land is too marginal for ordinary farming and machinery cannot easily or affordably operate, grazing is often the practical tool for keeping it open.

6.1 The Netherlands – Room for the River



I initially visited the Netherlands to see rewilding as the opposite of the 40,000 head feedlot in Australia. What I found was not ideology but financial pragmatism. Grazing animals were used as infrastructure maintenance for Natural Flood Management to help solve a £3 billion problem. Map credit: Google maps

The Dutch floods of 1993 and 1995 caused damage worth roughly £3 billion in today's money and triggered the 'Room for the River' approach (Chan et al., 2022). Realistically the Netherlands couldn't build dykes ever higher. Instead, the Netherlands created floodplains designed to take water. On the Meuse floodplain, just upstream of Maastricht for example, the state bought farmland (in some cases compulsorily), private companies extracted the gravel beneath it to form flood basins, and levees were deliberately breached so that river surges spill into the floodplain and dissipate and not into the cities. That land must stay open grassland rather than woodland so water can flow and, being too marginal to farm, it is kept open through extensive, rewilding-style grazing.



Galloway cattle near Maastricht, managed as an all-natural herd with multiple bulls, grazed the floodways as hundreds of cyclists and walkers passed by. They were mixed with Konik ponies on this site and on others with bison and water buffalo. Key was keeping the floodplains open for next time a city risked being inundated (own photo).



This was a different model, with an NGO funded by the state to deliver the wider public good of flood alleviation. Dutch water management treats floodplains as public flood infrastructure, with a budget to maintain them (Photo: FREE Nature).

The grazing is contracted to the NGO FREE Nature for roughly €60,000–€100,000 a year per site, on a cost-plus basis . FREE Nature now manages 40 reserves – many, but not all, Room for the River sites – with 1,800 animals and 16 staff. The organisation reports that the grazing has created outstanding habitat and generated jobs and tourism alongside its flood function . This is a public-procurement model: the state pays, and an NGO delivers across multiple sites as a professional single point of contact, bringing niche livestock and ecological skills rather than a focus on liveweight gain. What made it work was institutional: Dutch water management treats floodplains as part of national flood infrastructure, with a public body responsible for maintaining them and a budget to do so

.

Case summary: Dutch floodplain grazing	
The problem	River flood risk in a low-lying, densely populated country.
Existing solution	Dykes; under Room for the River, floodplains designed to take water, which must be kept open.
What grazing changes	Keeps floodplain vegetation open and low where mowing is impractical and farming financially unviable, while creating habitat.
The economics	The state pays an NGO around €60,000–100,000 per site per year on a cost-plus basis (public procurement).
The evidence	Contract values ; habitat outcomes . The hydraulic contribution of grazing specifically was not quantified.
The constraint	Depends on public budgets and on floodplains being recognised and funded as infrastructure.

6.2 The UK – the Evenlode catchment



Although only 90 minutes from home, the project demonstrated how sophisticated financial modelling can connect flood-risk reduction with investment. It uses an avoided-loss model, allowing farmers to deliver private and public benefits with an income stream from both sectors that is less tied to commodity markets. Map credit: Google maps

The most striking UK example I studied was the Evenlode catchment in Oxfordshire, where natural flood management is being financed partly by organisations that bear flood risk. For example, Network Rail has 27 bridges that cross the river on the main line to London. Each flood event that closes the railway leads to fines in the hundreds of thousands of pounds. Each flood event leads to inspection costs and potential repair costs on the bridges. This is expensive.

The project spans some 50 farms across 3,000 hectares, with £100 million of Landscape Recovery payment from DEFRA and ambitions for a further £150–250 million from private investors . Early investors had skin in the game: a county council with a statutory duty to demonstrate flood mitigation, an electricity network operator protecting its assets, and Network Rail. The underlying logic is financial: as flood risk rises, assets become harder to insure and lenders and owners face higher costs, which makes insurers, lenders and infrastructure owners natural customers for flood mitigation . Grazing sits within this as one means of managing vegetation on restored floodplains and on Biodiversity Net Gain (BNG) sites. The hydrological benefits are hard to quantify and the evidence

base is still emerging. Funding for the Evenlode projects relies on a blend of anticipated BNG and carbon payments, public finance and the emerging avoided loss payments. The Evenlode is therefore best seen as an emerging evidence case: it demonstrates a potential financing and governance model for natural flood management based on avoided loss, rather than proof of a specific hydrological value attributable to grazing. It also currently relies mainly on a single large public subsidy as a flagship project, which may not be replicable at scale across the UK - £500m has been earmarked over 20 years for the 52 applicant projects, £100m of this has gone to the Evenlode project alone. The large scale anticipated private finance is still in development.

This is also at the stage of land owners earning the money for Nature Based Solutions as opposed to the grazier be that the land owner or a third party being specifically paid to manage vegetation through grazing, yet.

Case summary: Evenlode catchment, Oxfordshire	
The problem	Flood risk to communities, rail and electricity infrastructure.
Existing solution	Hard defences, asset protection and insurance.
What grazing changes	Helps keep restored floodplain and wetland features open and functioning.
The economics	Blended public and private finance from parties that carry flood risk (avoided loss), plus carbon and BNG payments.
The evidence	Financing structure . The hydrological benefit of grazing is not yet proven
The constraint	Attribution of avoided loss, long timescales and complex multi-party governance.

6.3 Kenya – water security through managed grazing



For this section, I visited the 14,000 Ha Kakuzi farm. A highly productive blueberry, avocado and macadamia nut farm, with a sideline in 4000 head of cattle. When I initially planned to visit Kakuzi I had no idea of the vital role the cattle played. Map credit: Google maps.

Kenya was different, with a level of political and social complexity this report cannot do justice to. At Kakuzi, a horticultural business worth around $70m a year relied on careful water harvesting in its reservoirs and on its social licence to operate with the local community . Some 4,000 cattle (which Kakuzi viewed as a surprisingly minor part of their business) grazed the scrubby water catchment around the reservoirs. In pure economics, most years the cattle broke even or lost money. It was the service they provided that delivered the real value - managers explained that land seen as unused risked being claimed by government - keeping the land in recognised agricultural use stopped this. The politics of land ownership was also deeply divisive and the cattle employed hundreds of local people.

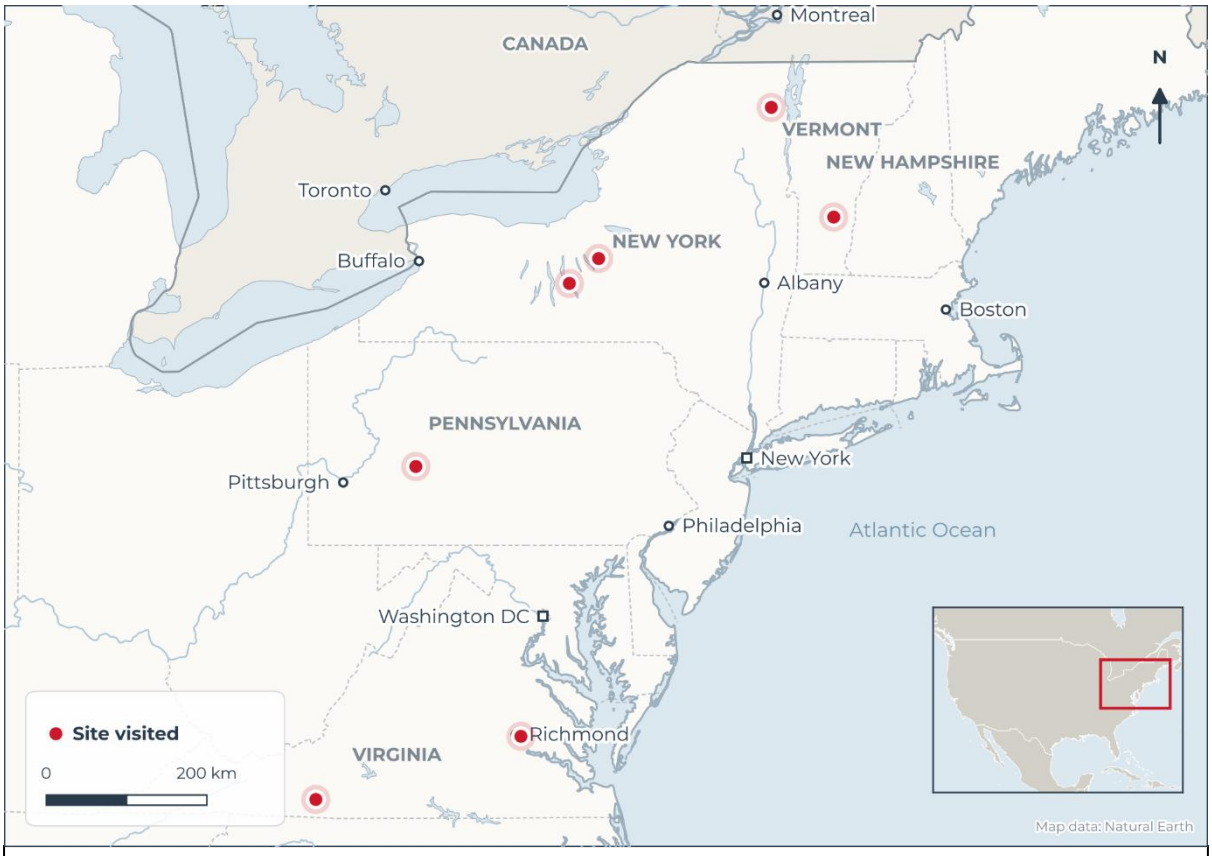


Kakuzi was impressive but had attracted controversy as an internationally owned large landowner. The politics ran deep and the farm faced challenges rarely considered in the UK. Yet managers saw cattle grazing as playing a strategic role well beyond the break-even business of beef production (own photo).

Managers regarded grazing as economically unimportant but strategically vital: it protected the catchment and thus the reservoirs that underpin a business employing around 3,000 people. Without a counterfactual, it is not possible to say what would have happened without the cattle, but the case shows a business valuing livestock for a strategic role rather than for direct profit.

Case summary: Kakuzi, Kenya	
The problem	Securing the water catchment, land tenure and social licence for a large horticultural business.
Existing solution	Reservoirs, water harvesting and community relations.
What grazing changes	Keeps catchment land in active agricultural use and provides local employment.
The economics	Cattle roughly break even; their value is internal and strategic, supported by the horticultural business.
The evidence	Strategic role and financials . The causal effect on water security has not been established.
The constraint	A highly specific political and land-tenure context.

CHAPTER 7: SOLAR GRAZING IN THE UNITED STATES – A FUNCTIONING COMMERCIAL MARKET



On the east coast USA, I visited numerous ASGA graziers and attended a 2 day solar energy summit with a number of policy makers, looking at the whole industry and then where GaaS fits in. Map credit: Google maps

The strongest commercial demonstration I found was where grazing aligns with a commercial owner's own incentives. Here grazing is bought not as a public good but as a cheaper, better way to run an already profitable asset.



Sheep were relatively productive on solar, but the really impressive element was the opportunities vegetation management payments provided for new entrants and where it helped save multi-generational traditional farms from going broke. For those who were flexible and hungry enough, there were incredible opportunities (own photo).

US solar occupies roughly one million acres today and could reach ten million by 2050, each acre needing repeated vegetation management. Mechanical mowing or spraying on these awkward, cable-and-strut-filled sites runs at roughly US$150–480 per acre for two cuts or sprays a year. Sheep often offer a better solution, but the US is short of sheep: meeting demand across proposed solar sites could require the national flock to grow from the current 5 million to 30 million head just to manage solar sites. That supply-demand gap has built real businesses. One grazier earned around US$300,000 a year in management fees from 200 ewes, plus lamb sales. Another went from 25 ewes on 25 acres in 2022 to 1,500 ewes across 4,000 acres, turning over US$100,000 in lamb sales but US$1million in vegetation-management payments. The largest players, such as United Agri-Voltaics and Agri-Voltaics Solutions LLC, acted as brokers as well as graziers: a single point of contact for solar operators, sub-contracting sites to trusted farmers and providing contacts and insurance – a scalable model that avoided undercutting. Here, avoided-cost pricing was far more profitable than conventional sheep farming.



This was not normal farming and required a mindset shift. The huge 'utility' scale solar farms brought a different level of risk and opportunity compared to the smaller 'community' solar projects (own photo)

Solar operators often prefer sheep to machinery for reasons beyond price . The best graziers matched the mechanical price and added value on top. The American Solar Graziers Association (ASGA) trains and certifies graziers to understand solar infrastructure, work safely, and report maintenance and safety issues – broken fences, damaged panels, drainage problems. That on-site presence matters most where flood or compliance failures could expose the operator to large penalties: a shepherd who raises the alarm on a blocked attenuation pond can save far more than the grazing costs. Certified graziers also contribute at the planning and design stage, helping to ensure schemes are workable agrivoltaics rather than box-ticking. Sheep cause less infrastructure damage than mowers – notably the 'panel strike' caused by thrown stones – and, if well managed, reduce fire risk, may improve soils and support biodiversity.

For the operator, vegetation management is a small fraction of site revenue, so paying a professional for reliability and lower risk is an easy commercial decision. Again, institutions wanted a single point of contact for multiple sites: reliable, professional, insured and skilled providers mattered more than the cheapest option. This was private-to-private contracting, although the growth of solar has itself been supported by public policy. If that support were reduced, graziers would be exposed too – a reminder not to swap one form of subsidy reliance for another.



ASGA showed how GaaS could be professionalised and supported, allowing it to expand rapidly. Training such as the Level 1 Solar Grazing Management Certification gave institutions the confidence to have graziers working on high voltage electrical sites (Photo: ASGA).

This is the clearest demonstration of GaaS as a business model. It has an identifiable customer, a pre-existing vegetation-management cost, a service that competes directly with an alternative, recurring demand, measurable delivery, and growing professionalisation through training, certification and brokers.

Case summary: US solar grazing	
The problem	Recurring vegetation control on large, infrastructure-dense sites.
Existing solution	Mowing, strimming and spraying at around US$150–480/acre/year.
What grazing changes	Vegetation control with less panel damage, plus on-site inspection and reporting.
The economics	Operators pay management fees at or below the mechanical price (avoided cost); brokers aggregate supply and carry insurance.
The evidence	Prices, fees and business growth; service delivery on site.
The constraint	Supply of sheep and shepherds, logistics, and dependence on the continued growth of solar.

CHAPTER 8: COMMERCIAL LAND MANAGEMENT – VINEYARDS AND MONUMENTS



In California, I visited multiple graziers who included vineyards in their rotations of paid grazing. Napa in particular was quite progressive with its sheep grazing programmes and celebrated the lamb produced at these boutique vineyards. Map credit: Google maps

8.1 Vineyards

In California, vineyards used grazing as part of a premium commercial system. They knew their per-acre costs for vegetation management – a clear anchor price (Figure 7). Winter and dormant-season grazing controlled weeds, cycled fertility and reduced herbicide use, all of which could save money. The constraints were timing and in some instances the need to change the infrastructure to 'high wire vines': animals in at the wrong moment can damage the crop, so a specialist grazier who understood the service was worth paying for; a cheap option could cost far more in damaged vines. The same flocks that graze fire zones or solar sites in one season can move to vines in another, smoothing a grazier's income across the year and sparing vineyards the cost of keeping an in-house flock they need for only a few months. Again, the vineyards' aim was one contractor they could rely on.

Process	Cost/acre in USD	If sheep could replace all of these operations (which often requires high-wire trellising), the anchor price they compete against is around US$260/acre, before any value for reduced herbicide use, soil or ecological benefits. In practice, sheep cannot always replace every operation and can damage the crop.
Mowing	50	
Discing	25	
Suckering	35	
Summer and winter weed spraying	150	
Total	**260**	

Figure 7. Vineyard vegetation-management costs that sheep could partly replace (US$/acre).



In California, vineyards were experimenting with 'high-wire' grapes to make sheep grazing an easier and more viable option for more of the year (own photo).

Case summary: California vineyards	
The problem	Weed and vegetation control between vines.
Existing solution	Mowing, discing, suckering and spraying (around US$260/acre/year).
What grazing changes	Dormant-season weed control and fertility cycling, with reduced herbicide use.
The economics	Vineyards pay a specialist grazier against their known costs (avoided cost).
The evidence	Cost breakdown ; practice on site .
The constraint	Timing, breed choice and crop-damage risk; seasonal demand.

8.2 Scheduled ancient monuments



In the Netherlands I visited three SAM that the state paid to have managed, often pragmatically using a mix of cutting and grazing, contracted to the same farmer who then sub-contracted out various operations. Map credit: Google maps

In the Netherlands, scheduled monument management was a small but distinctive market that plays to grazing's strengths. Animals can reach the steep, uneven and sensitive ground around earthworks and ruins where machinery is difficult or damaging. The animals graze back the scrub and tree growth that would otherwise disturb the archaeology. The animals add interest for visitors, and shepherds are another set of eyes and ears on sites officials may rarely visit. As elsewhere, grazing was valued against mechanical options as well as for its heritage and biodiversity benefits. Knowing the anchor cost of mowing gave the farmer a clear value proposition to deliver against; equally important was the farmer knowing their own labour and livestock fixed costs, rather than treating the work as 'free grazing'.



In the Netherlands, the state paid graziers well to maintain scheduled monuments such as the fort at Werk aan de Waalse Wetering near Utrecht. The grazier suffered with bluetongue but was still able to be profitable. Photo credit: Aerial view of Werk aan de Waalse Wetering/ Shutterstock

Case summary: Dutch scheduled monuments	
The problem	Scrub and root damage to archaeology on ground that is difficult for machinery.
Existing solution	Mechanical mowing and scrub clearance.
What grazing changes	Sensitive vegetation control on steep or fragile ground, plus informal site surveillance.
The economics	The state or heritage bodies pay graziers against the cost of mowing (avoided cost).
The evidence	Practice and pricing basis .
The constraint	Small scale per site, specialist specifications, travel and logistics.

CHAPTER 9: BIODIVERSITY AND CARBON

Biodiversity and carbon markets are two growing financial areas with potential to deliver but also to over promise and under deliver. This report acknowledges the complexity of these two areas and the ongoing work by other Nuffield Scholars to do them justice.

Grasslands evolved with herbivory, and removing grazing can reduce diversity just as overgrazing can; the potential prize is the disturbance mosaic that managed livestock create. Livestock can help build soil carbon, and they can also degrade and erode soils. Again, the important issue is not livestock per se but how, where and when they are managed.

9.1 Kenya – restoring rangelands and earning a social licence



In Kenya, I visited numerous conservancies, farms and research centres integrating cattle to help wildlife, be this through direct ecology or through a social licence to use large areas of land for wildlife alongside food production. The politics of land and cattle in Kenya was acute. Map credit: Google maps



TrueRange were developing techniques to mob graze cattle to improve pastures for wildlife whilst also producing food: 1500 head on 2 acres for 2 hours, moved regularly. This was a mix of beef income, social licence through employment and sharing grazing and improving conditions for wildlife which helped tourist revenues (own photo).

In Kenya, I met Maasai herdsmen and TrueRange, who were trialling new grazing techniques. Instead of removing livestock, cattle were used deliberately to restore degraded rangelands by mimicking the large herbivore migrations that historically shaped them. Repeated droughts had decimated wild herds, which were increasingly constrained by fencing. Domestic cattle were bunched tightly, moved on to graze and then kept off recovering ground. Managed this way, they ate down rough vegetation, and managers reported that wildlife followed behind on the improved grazing. Just as important was the social dimension: the grazing created local employment and



Ol Pejeta is a 50,000-acre wildlife conservancy where Maasai herdsmen integrate 6,000 cattle into the ecological work of restoring rangelands. The cattle play an important part in its 'social license', supporting local communities with premiums for buying local cattle (Photo credit: Justin Heath CEO, Ol Pejeta).

demonstrated that food production and wildlife can share the same land, earning a social licence to operate. Here, wildlife recovery appeared to depend on maintaining a working grazing system rather than excluding livestock – a counter to the assumption that conservation means removing animals. Wildlife brought tourism, and tourism made the economics viable.

Case summary: Kenyan rangelands	
The problem	Degraded rangeland, drought and pressure on wildlife.
Existing solution	Livestock exclusion, or unplanned grazing.
What grazing changes	Planned, tightly bunched cattle grazing to restore vegetation for wildlife.
The economics	A combination of beef income, tourism and conservation funding, underpinned by a social licence.
The evidence	Practice ; wildlife response . Outcomes were not independently measured here.
The constraint	Reliance on tourism and philanthropy; complex land and community context.

9.2 Australia – carbon and biodiversity markets



Sites visited in Australia included a flagship progressive farm for McDonald's storing carbon, the methane supressing DIT Agri system for extensive grazing and the Queensland Trust for Nature, grazing for fire suppression for wildlife. I also visited a number of other agri-tech companies, university research centres and a 40,000 head feedlot. Map credit: Google maps.

Australia offered an insight into emerging carbon markets. In Victoria's beef systems, long-term soil-carbon sequestration under improved grazing has been estimated at roughly 0.4 to 2 tonnes CO_2e per hectare per year, worth perhaps £10–45 per hectare at recent carbon prices before project costs (Agriculture Victoria, 2026; Lawrie, 2024) . These figures should be treated with caution. Soil carbon varies widely with soil, climate, management and measurement method, and it is reversible: Victoria's worst drought in 80 years showed how quickly gains can be lost, even on the farm of one of the most progressive and engaged farmers I met. Carbon is therefore best treated as a potential additional revenue stream rather than the foundation of a GaaS business, unless permanence, additionality and verification can be demonstrated. Other innovations for extensive grazing promised methane reductions through water supplements that could earn Australian Carbon Credit Units (ACCUs), issued by the Clean Energy Regulator. The more immediate value, however, seemed to be market access: helping retailers show reductions in their scope 3 emissions. The question is how long that will earn a premium before it simply becomes a requirement to sell.



Drought in Victoria let to many dried up reservoirs, as I saw at Boorook Farm. Severe droughts can quickly reverse soil-carbon gains (Photo: ABC News).

Queensland has a levy on developers to fund biodiversity offsets, but QTFN described it as underfunded and ineffective in general. However, the Queensland Trust for Nature's (QTFN) use of cattle at Aroona Station to improve habitat for species such as koalas illustrates the case for grazing to support biodiversity (Queensland Trust for Nature, 2026).

At Aroona, grazing was largely for wildfire mitigation to protect habitat – a fire–wildlife crossover. However, its financial value was harder to prove. Biodiversity outcomes are easy to claim but have proved hard to fund without philanthropy or government levies. In the UK, BNG is an emerging market in which legislation requires developers to create habitat and maintain it for 30 years. This could generate GaaS maintenance contracts where the land is uneconomic for conventional farming, however the market is still relatively small and subject to legislative changes. Varying reports suggest a market between £40-100m a year, which is far from the £2.4bn farming budget that is meant to be largely replaced by private markets according to the Farming Roadmap.

Case summary: Australian carbon and biodiversity	
The problem	Funding soil-carbon and habitat outcomes on grazed land.
Existing solution	Carbon credits, philanthropy and government offset schemes.
What grazing changes	Potential soil-carbon gains; fuel reduction that protects wildlife habitat.
The economics	Potentially £10–45/ha from carbon before project costs; biodiversity work largely philanthropically funded.
The evidence	Sequestration ranges ; reversal in drought ; offset funding .
The constraint	Permanence, additionality and verification costs; underfunded biodiversity markets.

CHAPTER 10: WHAT MAKES GRAZING AS A SERVICE VIABLE?

Land is rarely the constraint; the economics are. Clients often ask 'why should I pay a grazier? They're getting free grass!' rather than 'why am I paying for spraying and cutting but refusing to pay for grazing?' Comparing the case studies shows what separated the models that worked commercially from those that struggled.

10.1 Common characteristics of viable models

The strongest cases shared six characteristics:

- **An identifiable payer** who carries the cost of the problem – a solar operator, a vineyard, a fire service, an insurer, a utility, a bank.
- **An expensive alternative** with a known anchor price – mowing, brush-cutting or spraying.
- **A measurable outcome** that the client can check – both modelled risk reduction and specific vegetation height, area cleared, site condition.
- **Recurring demand**, so the service is bought every year rather than once.
- **Professional delivery capacity** – trained, insured and reliable operators, often organised through a broker or single point of contact.
- **A scarce capability** that protects the price from a race to the bottom.

Figure 8 compares the case studies against these characteristics.

Case	Who pays	Pricing model	Benefit	Strength of evidence
US solar	Solar operator	Avoided cost	Private	Strong commercial track record
California fire	Public bodies, homeowner associations, individuals	Avoided cost	Mixed	Commercial; fire-risk effect not measured
California vineyards	Vineyard	Avoided cost	Private	Commercial practice
Dutch floodplains	State	Cost-plus	Public	Established contracts; hydraulic effect not isolated
Dutch monuments	State / heritage bodies	Avoided cost	Public	Established practice
French firebreaks	State (subsidy)	Fixed payment	Public	Declining budget; effect not quantified
Evenlode, UK	Councils, infrastructure owners, investors	Avoided loss	Mixed	Emerging
Kakuzi, Kenya	The business itself	Strategic (internal)	Private	Reported; no counterfactual
Kenyan rangelands	Tourism, conservation funders	Mixed	Mixed	Reported
Australia carbon / biodiversity	Carbon market, levies on builders	Credits / grants	Mixed	Uncertain; reversible

Figure 8. Comparison of case studies by payer, pricing model and evidence

10.2 Private benefit and public good

The pattern is revealing. The most robust, best-paid grazing was bought by private and quasi-private customers – solar operators, vineyards and infrastructure owners – who face a hard, quantifiable cost or liability and treat the payment as risk management rather than charity. The most fragile grazing depended on flat or shrinking public budgets, as France's declining firebreak contracts show. Public models can work well where the benefit is recognised as infrastructure, as in the Netherlands, but they are only as secure as the budget behind them. For UK graziers, the implication is to seek customers with a statutory obligation or a real, costed problem – a flood duty, an insurance threshold, a planning condition, a maintenance bill – because that is where willingness to pay is highest and most durable.

10.3 The trade-off between productivity and service

The figure below shows how the trade-offs often appeared to graziers: the harder the service and the lower the livestock productivity, the higher the price needed. Several graziers expected competition to push prices towards cost-plus over time, but said this was not yet happening .

Service	Cost of the alternative Client's anchor price per acre	Service payment Fee paid to the grazier	Livestock productivity Growth and breeding on site	Delivery difficulty Skills, risk and logistics	What it means for the grazier
Vineyards Dormant-season weed control	Low ●○○	Low ●○○	High ●●●	Medium ●●○	Modest fee, but good forage supports animal performance
Solar Vegetation under panels	Medium ●●○	Medium ●●○	Medium ●●○	Medium ●●○	Balanced, recurring income that scales across many sites
Firebreaks Fuel-load reduction	High ●●●	High ●●●	Low ●○○	High ●●●	Highest fee, compensating for poor forage and the hardest delivery

Effect on the grazier: Favourable · Neutral · Unfavourable — Dots show level: low · medium · high

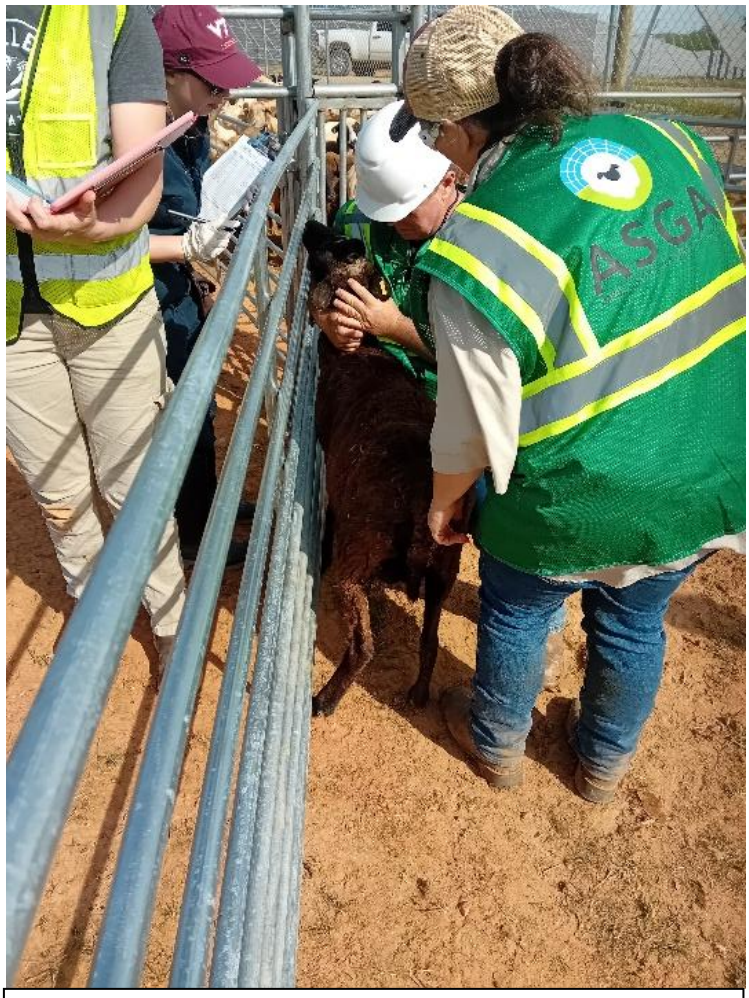
How profitability and productivity intersect. Does this undermine the avoided cost argument or is it a coincidence? (Own graphic).

10.4 Barriers and the professional premium

The barriers were consistent: transaction costs, fragmented land ownership, fencing and water infrastructure, seasonal labour, liability and insurance, and the difficulty of proving outcomes. These are precisely the problems a professional grazing service exists to solve. The people I met told me repeatedly that clients valued a single, reliable point of contact who could translate between the worlds of 'corporate' and 'agriculture', carry insurance and certification, guarantee that the animals turn up and the work is done, and report credibly on outcomes . That professionalism – trained and certified stockpeople with knowledge of the client's sector, proper monitoring and dependable logistics – is what justifies paying a grazier a proper price rather than buying the cheapest grazing, spraying or cutting. The operators whose business models most clearly demonstrated GaaS were service contractors first and livestock producers second, and they were paid accordingly.

CHAPTER 11: THE UK – WHAT IS DIFFERENT, AND WHERE ARE THE OPPORTUNITIES?

The UK has many of the problems that GaaS addresses and many of the assets needed to deliver it, though not always in the same landscapes. Floodplains, solar farms, nature-recovery projects, commons, wildfire-prone uplands, infrastructure corridors and heritage sites all need what managed grazing provides, and the UK still has the livestock and stockperson skills – for now. With sheep and suckler numbers falling, the risk of under-grazing is rising. However, overseas models cannot simply be copied. In the US, solar grazing is lucrative because sheep and shepherds are scarce while demand grows fast. The UK has around six times as many sheep as the US, with only around 5% the USA's solar acreage. However the underlying principles are still valid and UK graziers should look at the underlying value delivered and at where capability is genuinely scarce in other sectors



Graziers needed to adjust their mindsets and often their sense of their own identity to take full advantage of the available opportunities, even if this meant 5-point PPE to check sheep.

11.1 Why the UK is different

Several features of the UK make GaaS harder to establish than in the places I visited :

- **Fragmented land ownership** – firebreaks and floodplains cross many holdings, raising transaction costs. Where the State owned large tracts it was easier.
- **Plentiful livestock** – abundant sheep mean grazing is often offered cheaply or free, which weakens the anchor price.
- **Commons –** Much of the UK's upland where flooding and fire risk sits with undergrazing as an issue is held as common land making co-ordination challenging
- **Peat** – UK uplands where grazing for fire and flood infrastructure maintenance is key has delicate peat that burns and erodes unlike the landscapes visited elsewhere
- **Regulation and procurement** – public bodies tend to buy by activity or lowest price, and grazing rarely fits standard procurement categories.
- **Governance and evidence** – few UK studies attribute fire or flood outcomes to grazing, which makes avoided-loss arguments hard to evidence.
- **Catastrophic events** – Noticeably, repeated huge fires and huge floods triggered changes of mind set. Has the UK experienced enough catastrophe to materially lead to change?

11.2 Change on both sides of the contract

The opportunity requires change on both sides of the contract.

On the supply side, graziers need to focus on professional, reliable service delivery and understand their clients' needs – to understand 'corporate'. That may mean wearing five-point PPE, including hard hat and hi-vis, and signing in with a control room just to check sheep. It also means moving away from prioritising daily liveweight gain towards a rigorous focus on delivering specific outcomes for the client.

On the demand side, clients need to recognise that they are buying a professional service with real costs. It is not 'free grazing', but often a better and more efficient alternative to mechanical or chemical options. If clients pay properly, they can hold graziers properly to account. Incentives then align, rather than diverging as one party seeks kilos of meat and the other a land-management outcome.

Pressure on UK land also means more graziers competing for work and undercutting each other. The lesson from the US is not to copy its sheep-grazing model, but to identify where the supply–demand gap lies in the UK and to compete on capability rather than price.

11.3 UK opportunities compared

Figure 9 compares the main UK markets by their commercial characteristics.

Market	Likely client	Existing cost or problem	GaaS value	Key constraint
Solar	Developer / operator	Mowing, spraying, vegetation risk	Vegetation management plus site monitoring	Abundant competing graziers; logistics
Wildfire	Landowner / public body / fire service	Fuel reduction; fire risk	Fuel-load reduction on strategic zones	Attribution of avoided loss; who pays
Flood	Public body / infrastructure owner	Flood risk; floodplain maintenance	Keeping floodplain and wetland features open	Hydrological attribution
Heritage	Heritage body / landowner	Mechanical scrub control	Sensitive vegetation management	Small scale; specialist specifications
Infrastructure corridors	Rail, road and utility operators	Lineside and verge vegetation management	Vegetation control on difficult ground	Safety, access and procurement rules
Biodiversity	Developer / landowner	BNG habitat-management obligation	Contracted habitat outcomes over 30 years	Measurement and verification

Figure 9. UK Grazing as a Service opportunities by market

On this comparison, solar, heritage and infrastructure corridors most closely resemble the commercial cases overseas: an identifiable client with an existing maintenance budget, although plentiful UK sheep mean graziers must compete on service rather than scarcity. Wildfire and flood carry the largest potential values but depend on solving attribution and on finding a payer for public avoided loss. Biodiversity depends on BNG creating long-term, verifiable maintenance obligations.

CHAPTER 12: RISKS AND LIMITATIONS

Balanced criticism strengthens the case for GaaS rather than weakening it. The main risks and limitations are:

- **Causality and attribution.** Much of the evidence in this report for grazing's effect on fire and flood outcomes is observational or reported by interviewees. Grazing is usually one measure among many, and weather dominates outcomes in any given year. Avoided-loss claims need baselines, counterfactuals and monitoring before they can support a price.
- **Animal welfare.** Firebreak and scrub grazing often means poor forage, difficult infrastructure and challenging logistics. Service contracts must not push animals beyond what is good for them and farmers must not push productivity; welfare standards belong in the contract.
- **Biodiversity trade-offs.** Grazing at the wrong time or intensity, or with the wrong species, can damage habitats as readily as it restores them, and fuel-reduction and habitat objectives may conflict.
- **Carbon permanence.** Soil carbon is variable, hard to measure and reversible. Unless permanence, additionality and verification are demonstrated, carbon should be treated as an upside rather than the basis of a business case.
- **Measurement and verification.** Outcome-based contracts need agreed, affordable indicators; on small contracts, measurement costs can exceed the value of the service.
- **Greenwashing and 'foodwashing'.** I heard of solar planning conditions requiring specialist pollinator mixes alongside a requirement to graze or mow four times a year – objectives that pull against each other. A related risk is 'foodwashing': presenting land as still productive when the grazing is token and yields a fraction of previous output.
- **Subsidy substitution.** Several markets, including solar and BNG, exist partly because of public policy. GaaS that depends on them may swap one policy dependency for another.
- **Competition.** Where margins are good and livestock plentiful, prices will tend towards cost-plus. Further, according to Farmers Weekly, 86% of beef farmers surveyed didn't know their fixed costs but still planned to expand their operations. The race for extra land without a robust business plan can undermine the whole sector as uncosted businesses deliver poor results.
- **Industry credibility.** GaaS can be seen as a 'rsik' compared to continuing with mechanical means. In a new industry, a few poor performers can undermine the credibility of the whole approach. This is where ASGA style standards become useful.

Grazing is neither inherently regenerative nor inherently destructive; its value depends on context, management and objective. In the UK we should be careful of greenwashing and also of poor grazier standards as this becomes seen as an easy way to access extra land. We should insist on monitoring and verification,

and concentrate effort where the avoided cost is large and demonstrable. Done well, GaaS can give livestock farmers reliable income streams that are less dependent on commodity markets and the taxpayer – while still producing food – and save society money on problems it is currently paying to manage badly.

CHAPTER 13: RECOMMENDATIONS

These recommendations address both the policy and land-management perspective and the on-the-ground delivery perspective. In many cases the same organisation holds both roles, but each requires a different approach.

For land managers, infrastructure owners and policymakers

- **Know the costs.** For each fire, flood, solar, heritage or habitat problem, identify the cost or risk and how land management can reduce that cost or risk– insurers, lenders, infrastructure owners, authorities with statutory duties – and create a mechanism to buy the land management outcome with grazing as an option to maintain it. Find mechanism to share the costs of nature Based Solutions to avoid a 'Tragedy of the Commons' situation
- **Know your anchor price.** Establish what vegetation management currently costs by mechanical or chemical means, so that grazing can be compared like for like, making sure the grazier knows their true overall costs to deliver a quality service
- **Adopt a standard GaaS contract.** Define the outcome, baseline, intervention, measurement, reporting, liability, payment and what happens if the outcome is not met – paying for results rather than for activity, headage or land ownership.
- **Fund a demonstration programme.** Test GaaS in wildfire, flood, solar, heritage and biodiversity settings, with monitoring designed from the outset to build the evidence for avoided loss.
- **Agree outcome metrics.** Use measurable indicators such as fuel height and continuity, vegetation state, scrub and root encroachment, floodplain condition or solar-site maintenance incidents.
- **Stop expecting free grazing.** 'Free grazing' misaligns objectives. Land owners need to pay for the service, and hold graziers to account for delivering it. Graziers need to fully understand their costs before offering to graze for free or cheaply. Badly costed agreements lead to badly delivered services.

For farmers and graziers

- **Sell a service, not a by-product.** Shift from a production mindset to professional service delivery, priced against the client's alternative, and be clear where you offer a niche capability that others cannot.
- **Professionalise.** Hold the insurance, certification, welfare protocols, site-safety competence and reporting systems that clients expect from any contractor.

- **Invest in training and knowledge exchange.** Build and share specialist skills – fire behaviour, solar infrastructure, heritage sensitivity, ecology – through training and peer networks. Shared standards grow the market and raise client confidence; competitive advantage then comes from delivering well rather than from keeping the market small.
- **Collaborate to offer a single point of contact.** Build broker and cooperative networks so corporate and public clients can contract once for multiple sites, with certification, insurance and reporting carried centrally.

CHAPTER 14: CONCLUSIONS

Grazing animals are no longer simply food-producing units. Internationally, they are increasingly paid to maintain the landscapes that reduce wildfire risk, keep floodplains open, protect heritage and manage infrastructure. The benefits are real but conditional, and the binding constraint is economic. The models that worked treated livestock as a means of delivering a defined, measurable outcome, and they lasted where a customer with a genuine, costed problem was willing to pay. Where the benefit was private, a commercial contract followed; where it was public, payment depended on public budgets and was more fragile.

Grazing as a Service is therefore not a claim that livestock belong in every landscape. It is a commercial model built on four questions: who has a problem, what does it cost, can grazing change the outcome, and is the value created greater than the cost of delivery? The UK has these problems in abundance. What it needs now are standard contracts, evidence of outcomes, professional standards, and mechanisms that let those who carry a risk pay for its reduction. The future of extensive livestock may depend less on producing meat and more on solving society's most expensive land-management problems.

CHAPTER 15: AFTER THE STUDY

My Nuffield travels showed that targeted grazing is not a niche idea but a practical tool that the UK has barely begun to use. The challenge now is to turn that into action at home.

Fire mitigation has become an immediate priority. I have initiated practical discussions around the use of grazing animals in fire management strategies with South Wales Fire and Rescue Service, the National Wildfire Resilience lead for the National Fire Chiefs Council, Natural Resources Wales and the National Sheep Association..

I have also started work with Cadw, the Welsh Government's historic environment service, on how livestock can sensitively manage vegetation on scheduled monuments, beginning with a pilot on a UNESCO World Heritage Site.

Separately, we have run pilots on an industrial port site in South Wales, using goats and sheep with virtual fencing to manage the land in ecologically sensitive ways, and we are now trebling our goat numbers and integrating new technology.

The energy sector offers another opportunity. I am talking to solar operators across the UK about grazing beneath panels, and to the American Solar Grazing Association about what training and knowledge can be adapted for a British context. Underpinning all of this, our biodiversity work continues, because healthy, well-managed land is the foundation everything else rests on.

Most importantly, this cannot be the work of one business alone. I am building a network of partnerships with other UK graziers who are beginning to offer Grazing as a Service, sharing what I have learned through workshops and talks so that others can deliver it too. My hope is to help establish GaaS as a recognised, trusted service across the UK. If any of this resonates with you, please get in touch.

APPENDIX

Sector	Current UK area	2035 potential	2050 potential	Indicative mgmt cost	Indicative spend / problem cost (now → 2035) – not GaaS revenue	Source
Solar	52,000 acres	172,000 acres	0.5million acres	£150–400/acre	£8–21m → £26–69m	DESNZ (2024); House of Commons Library (2025)
Wildfire-prone upland	1.3m ha moorland managed 8,300–21,000 ha burn/yr	At-risk area rising with climate	Materially higher	£150–300/ha (strategic zones)	Total cost predicted at £1bn Tens of £m on targeted firebreak zones	International Journal of Wilderness (2023); McMorrow (2011)
Flood / floodplain & washland	1.6m ha floodplain 3,000 ha species-rich grassland actively managed	3000 Ha with Evenlode and similar projects appearing across the UK. SFI/CS payments for species rich floodplain management	unknown	£500-£1100/hectare for natural flood management and species rich floodplain management	Total UK flood cost £2.4bn a year, rising to £3.6bn by 2050 (total problem cost)	Floodplain Meadows Partnership (2024); Environment Agency (2024); GOV.UK (2024)
Scheduled monuments	20,001 monuments in England (2025)	Broadly stable	Broadly stable	£200–500/ha (sensitive sites)	Low £m niche	Historic England (2025)
Utility & transport corridors	>60,000 ha (Network Rail 30,000+ ha lineside/53,000 ha land; National	Growing with grid/rail expansion	Growing	£200–600/ha	Tens of £m	Network Rail (2024); GOV.UK (2021)

Sector	Current UK area	2035 potential	2050 potential	Indicative mgmt cost	Indicative spend / problem cost (now → 2035) – not GaaS revenue	Source
	Highways ~30,000 ha soft estate)					
Combined	>100,000 ha potentially addressable today	—	Plausibly ~2× by 2050	—	Tens of millions annually	—

Cost basis: solar £150–400/acre from sector data; £100–250/ha reflects cut-and-collect benchmarks; firebreak rates align with French strategic-grazing payments (~€150–200/ha). Figures for upland, floodplain, monuments and corridors are indicative – UK per-hectare grazing markets in these sectors are not yet formally published. All figures are opportunity estimates of total problem cost or management spend (see section 3.5), not estimates of the market available to grazing, which would be substantially smaller once practicality, competition and willingness to pay are considered.

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