Aterra AI

Putting Farmers First:
Building Digital Infrastructure to Transform the UK Food System

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Executive Summary

UK food system is broken. Farmers create enormous value but capture as little as 1% of retail prices.

Purpose and Audience: This paper proposes farmer-owned digital infrastructure as a critical enabler of UK food system transformation. It aims to initiate collaborative proof-of-concept development with farming organisations in 2026-27.

The intended audiences are:

1. Farmers and farming organisations pioneering regenerative agriculture,
2. Policymakers and funders concerned with agricultural transition and food security,
3. Researchers and ethical food system organisations working on nature-friendly innovation.

The Challenge: UK farming is broken. Farmers create enormous value but capture as little as 1% of retail prices in some sectors. Meanwhile, the food system imposes £268 billion in annual diet-related health costs, more than the entire NHS budget, while 11 million people struggle to afford nutritious food. We're losing 3 million tonnes of topsoil yearly and 1,700 farms since 2010. This isn't sustainable economically, environmentally, or socially.

The Root Cause: Fragmented policymaking, digital inequality, and extractive supply chains leave farmers marginalised. Agribusiness giants use advanced digital capabilities to capture profits from farmer data and commodities, while most farmers lack even basic connectivity, only 58% have adequate broadband for business needs.

The Solution: Farmer-owned digital infrastructure that shifts control and value back to producers. This platform would reconnect local supply chains, enable sustainable public procurement, create farmer-controlled data assets that generate new revenue, simplify access to grants and environmental payments, and provide transparent marketplaces that reward quality and welfare standards.

The Impact: With £5 billion in annual public food spending and growing markets for ecosystem services, conditions are right for transformation. What's needed is collaborative investment to scale what pioneering farmers are already proving works: productive, profitable, nature-positive agriculture built on digital infrastructure farmers' control.

11 million

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£268 billion

The food system imposes £268 billion in annual diet-related health costs.

£5 billion

With £5 billion in annual public food spending and growing markets for ecosystem services, conditions are right for transformation.

Table of Contents

1. A Food System at Breaking Point

The UK's food and farming system is facing multiple, interconnected crises. Farmers are struggling to stay financially afloat, nature and soils are being degraded, diets are worsening public health, and millions of farm animals are still raised in systems that compromise their welfare. Market pressures are driving intensification, despite many farmers striving for higher standards. These issues are deeply intertwined, rooted in decades of prioritising cheap food and siloed policymaking at the expense of long-term sustainability. We cannot continue to leave progress on healthy and sustainable food to market forces alone[1].

Understanding these interconnected problems is essential, but solutions exist. This paper examines the systemic failures preventing change (Section 2), then proposes farmer-owned digital infrastructure as a practical path forward, detailing how cooperative digital platforms could address these challenges whilst keeping control and value with farmers (Sections 3-4).

1.1. Economic and Social Crises facing UK Farmers and Local Communities

Farm Income Reduction: UK farmers and rural communities face severe economic pressures. Farm incomes in England fell 19% in 2023, £1.1 billion drop, driven by extreme weather reducing yields and falling commodity prices[2]. Cereal growers saw incomes fall 73% in 2023/24, dairy farmers 68%, mixed farms 67%[3].

Declining farm incomes undermine rural Britain's economic and social infrastructure. Rural residents earn less than urban dwellers while facing higher costs. For example, rural households spend £114 weekly on transport due to poor infrastructure[4]. When farm businesses struggle, these compound existing rural disadvantages: reduced local employment opportunities, diminished tax bases for community services, loss of volunteers for essential community roles, and erosion of the social capital that makes rural communities resilient.

Yet this masks a deeper structural problem. Farmers receive a tiny fraction of what consumers pay for food. In some cases, just 1% of retail value reaches farmers[5]. A loaf of bread sells for £1.20, but the wheat farmer receives perhaps 2 pence. The rest flows to processors, distributors, and retailers who control market access.

Loss of Agricultural Land: This profit extraction is pushing farms out of business. Over 1,700 farms have disappeared since 2010, taking 56,000 hectares of productive farmland with them[6], equal to an area the size of Leeds. Many are highly productive peri-urban farms that produce 20% of the UK's grain, and 13% of milk despite occupying just 11% of farmland[7]. We're losing our most productive land to development while farmers struggle to stay viable.

Meanwhile, 11 million people in the UK live in food poverty, struggling to afford nutritious food[8]. The system fails at both ends. Farmers can't make a living growing food, and consumers can't afford to buy healthy food. Cheap 'junk' food low in nutrition fills supermarket shelves while farmers struggle to stay viable and families rely on food banks. This is not sustainable or fair.

1 Gurgung, I. et al. (2025), 'The State of the Nation's Food Industry 2025', The Food Foundation
2 Horton, H. (2023), 'Floods fuelled 19% drop in income from farming in England in 2023', The Guardian
3 DEFRA farm income statistics 2023/24
4 Gittins, P. (2022). 'The rural cost of living crisis: Exploring the constraints facing hill farmers in England', Leeds University Business School, Centre for Enterprise and Entrepreneurship Studies.
5 'Unpicking food prices: Where does your food pound go, and why do farmers get so little?', Sustain, (2022)
6 'Farming on the edge: new insights into farming in the urban fringe', The Countryside Charity (CPRE), (2025)
7 ibid
8 'Right to Food campaign 2023', Unite the Union

1.2. Environmental Crisis: Soil Degradation, Nature Loss, and Climate Impacts

Soil Degradation: UK intensive agriculture is degrading the natural systems it depends on. Every year, an estimated 3 million tonnes of topsoil erode from UK farmland[9], destroying fertility faster than nature can replace it. This soil degradation already costs £1.2 billion annually in lost productivity and environmental damage[10], with some scientists warning that Britain may have as few as 100 harvests left in its soils[11].

Nature Loss: Nature is collapsing alongside soil health. Farmland bird populations have fallen 60% since 1970[12], skylarks, grey partridges, and yellowhammers vanishing from landscapes where they once thrived. Plant and insect diversity have declined in parallel, undermining the pollination and natural pest control that farming depends on.

Climate impacts: Agriculture contributes nearly 10% of UK emissions through livestock methane, fertiliser nitrous oxide, and carbon loss from soils[13]. Yet farming also suffers climate impacts directly. England experienced its wettest 18-month period on record in 2023, with flooding making harvest impossible on many farms, contributing directly to that year's 19% income crash[14]. Degraded soils can't absorb water, while landscape modifications like straightened rivers accelerate runoff, worsening floods in a vicious cycle.

These environmental challenges impose £120 billion in hidden costs on UK society each year, matching what consumers spend on food[15]. We pay twice: once at the checkout, and again through taxes for water treatment to remove fertiliser and pesticide runoff, through NHS costs for diet-related disease, and through the unquantifiable loss of natural beauty and biodiversity. As Patrick Holden of the Sustainable Food Trust observes, "Unsustainable farming may lower the price of food at the till, but it drives huge costs elsewhere, costs we all end up paying."[16]

9 Perry, M. (2018), 'The hidden cost of UK food: Soil Degradation', Sustainable Food Trust
10 'The State of the Environment: Soil', Environment Agency (2019)
11 'The Hidden Cost of Food', Sustainable Food Trust (2019)
12 Bartlett-Cross, C. (2023), 'Wild Bird Populations Statistics Update', Songbird Survival
13 'Written evidence submitted by DEFRA (ASE0038)' (2019)
14 Horton, H. (2023), 'Floods fuelled 19% drop in income from farming in England in 2023', The Guardian
15 'The Hidden Cost of Food', Sustainable Food Trust (2019)
16 ibid

85% of UK

livestock are raised in intensive indoor systems

60,000

healthy pigs were killed and most of the meat wasted due to labour shortages in 2021

1.3. Public Health and Animal Welfare Crises

Public Health: Our food system is now our health system's biggest problem. Unhealthy diets cost the UK an estimated £268 billion per year[17], more than the entire NHS budget. This includes £67.5 billion in direct healthcare costs treating conditions like type 2 diabetes, heart disease, and diet-related cancers, plus £176 billion in lost productivity and reduced quality of life[18]. Diet-related disease now causes roughly one in seven deaths in the UK[19]. The figure £268 billion is a "a very, very conservative estimate"[20].

This health crisis intersects with food poverty. Lower-income families suffer the highest rates of diet-related illness because unhealthy processed foods are cheapest. In June 2024, an estimated 7.2 million adults and 2.7 million children in the UK experienced food insecurity[21], families skipping meals or relying on food banks in one of the world's richest countries. Public health experts now recognise that "far from keeping us well, our current food system is making us sick"[22].

Farm Animal Welfare: Animal welfare suffers from the same economic pressures. While the UK prides itself on high welfare standards, approximately 85% of livestock are raised in intensive indoor systems[23] where animals live permanently in crowded conditions with little enrichment. This happens not because farmers don't care, most would prefer higher welfare approaches, but because razor-thin profit margins force intensification. When profit per animal is measured in pence, natural pasture-based systems become financially impossible.

The 2021 pig crisis exemplified how fragile food systems compromise both livelihoods and animal welfare. Labour shortages in abattoirs created a processing bottleneck, leaving pigs backed up on farms with nowhere to go. Farmers faced a devastating choice: cull healthy animals or watch them suffer from overcrowding. By July 2023, an estimated 60,000 healthy pigs had been killed and most of the meat wasted. The sector lost over £750 million, 40 farms closed, and the national breeding herd contracted 10%[24]. No farmer wants to destroy healthy animals, yet our disconnected supply chains sometimes force exactly that.

These economic, environmental, health, and welfare crises aren't separate problems. They're symptoms of the same broken system: one that prioritises cheapness over sustainability, extraction over resilience, and short-term profit over long-term viability.

2. Why These Crises Persist: Three Systemic Failures

The interconnected crises in UK food and farming aren't accidents. Three systemic failures drive them: fragmented government policymaking that treats connected problems in isolation, digital infrastructure that serves corporations rather than farmers, and global supply chains designed to extract value from producers and rural communities.

17 'The False Economy of Cheap Food', Food, Farming and Countryside Commission (2024)
18 ibid
19 Afshin, Ashkan et al., (2017) 'Health effects of dietary risks in 195 countries', The Lancet
20 Campbell, D. (2024), 'UK's unhealthy food habits cost £268bn a year', The Guardian
21 'Latest food insecurity tracker', The Food Foundation (2024)
22 'The False Economy of Cheap Food', FFCC (2024)
23 'Factory farms: could new net zero advice lead to their expansion?', Sustain (2025)
24 'NPA response to EFRA Select Committee', National Pig Association (2023)

2.1. Disconnected Policies Create Contradictory Incentives

The UK, like many countries including the European Union (EU), historically manages food, farming, environment, health, and rural affairs in separate policy silos- isolated departments pursuing different, sometimes conflicting, objectives with no overarching strategy to align them toward common goals. As IPES-Food observed, "various sectoral policies are not as mutually supportive as they could be, and at worst, they cancel each other out"[25].

The consequences are everywhere. One government department encourages maximum agricultural output to keep food prices low, while the NHS spends £67.5 billion annually treating diet-related diseases caused by abundant processed food. Planning policy prioritises housing development, whilst 56,000 hectares of prime farmland has been lost since 2010[26], and food security strategies simultaneously worry about import dependence. Farm support rewards environmental improvements, but procurement buys the cheapest food regardless of how it was produced.

This fragmentation wastes taxpayers' money and creates the wrong incentives. The solution isn't more policies; the CPRE recently urged the UK government to "urgently join up its policies on land use, food security and agricultural support" instead of treating them separately[27].

We can't solve food poverty in one silo, climate emissions in another, and obesity separately, because each solution affects the others.

2.2. The Digital Divide: Global Corporations Capture Profits from Farmers Data

The digital and data infrastructure underpinning UK food and farming is fragmented. Farmers, processors, retailers, restaurants, and government regulators each use incompatible systems, or sometimes no digital systems at all, with little interoperability or real-time data sharing[28]. Supply and demand signals don't align, creating waste, shortages, and lost opportunities.

This fragmentation isn't neutral; it systematically advantages large corporations while marginalising small, local food producers and businesses.

Agribusiness giants deploy sophisticated AI, IoT sensors, and cloud-based data platforms to optimise operations and maximise margins[29]. They collect and monetise vast datasets from farmers, financial markets, and consumers while returning minimal revenue to food producers. The global agricultural data market is projected to grow from $1.4 billion in 2023 to $2.5 billion by 2028[30], revenue farmers will never see despite generating the underlying data.

25 De Schutter, O. et al., 'Towards a Common Food Policy for the European Union', IPES-Food (2019)
26 'Farming on the edge', CPRE (2025)
27 ibid
28 'NPA response to EFRA Select Committee', National Pig Association (2023)
29 Too Big to Feed', IPES-Food (2017)
30 Markets and Markets (2023), 'Agriculture Analytics Market - Global Forecast to 2028'

Meanwhile, most UK farmers lack even basic digital infrastructure. Only 58% have broadband adequate for business needs, and just 24% can get mobile signal across their whole farm[31]. Less than a third use the internet for business purposes[32], limiting access to online marketplaces, precision agriculture tools, and funding applications.

The 2021 pig crisis exemplifies both the welfare costs of broken supply chains and the failure of digital infrastructure. When processing capacity collapsed, producers, processors, and government struggled to coordinate because information couldn't flow between disconnected systems. Sixty thousand healthy pigs were culled while food banks went empty.

2.3. Global Supply Chains Extract Value from Farmers

UK farmers operate within global supply chains increasingly dominated by companies that control every step in the supply chain from farm to fork, seeds, animal feed, logistics, processing, and distribution.

Four companies, Archer Daniels Midland, Bunge, Cargill, and Louis Dreyfus (the "ABCD" traders), control between 70% and 90% of global grain trade[33]. They use cutting-edge digital tools to maximise margins, while returning minimal value to UK farmers.

Similar concentration exists throughout the supply chain: six firms control 78% of agrochemicals, six control 58% of seeds, and ten retailers control 34% of food sales globally[34].

58% of farmers

Only 58% have broadband adequate for business needs

70-90%

of the global grain trade controlled by 4 companies

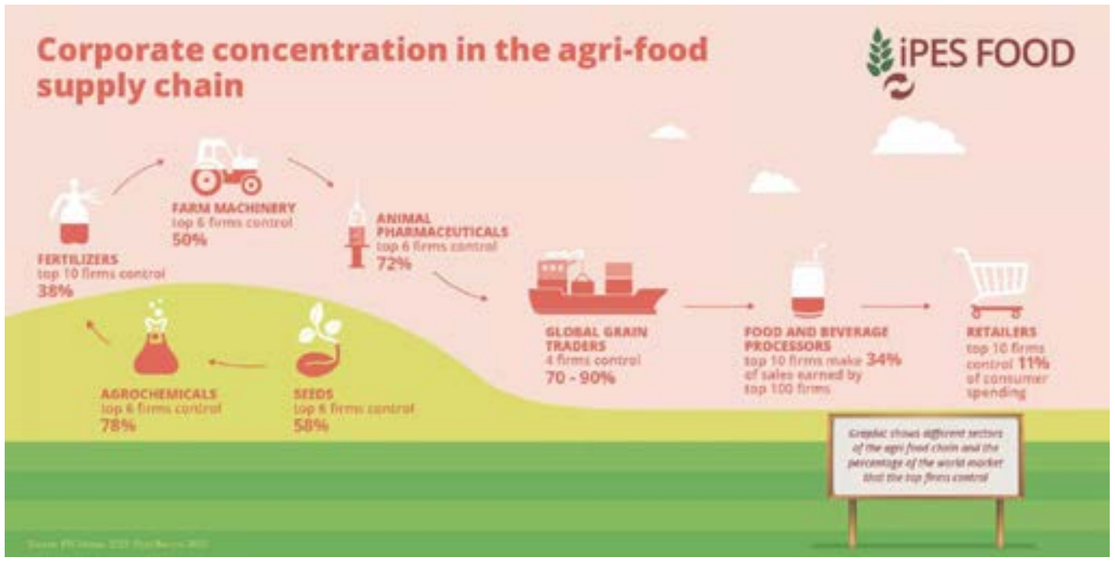


Diagram 1: showing the agri-food chain and the percentage of the world market that the top firms control. Courtesy of IPES FOOD "Who's Tipping the Scale", 2023.

This market structure determines who captures profit from the system. Farmers sit at the narrow end of an hourglass, competing to sell to a handful of powerful buyers (see diagram 1). Between the farm gate and the consumer sits a concentration of processors, traders, and retailers wielding disproportionate bargaining power. The result: farmers become "price takers" receiving whatever buyers offer, while profits accumulate to those further up the food supply chain.

31 'Poor connectivity holding back farm businesses', NFU (2025)
32 University of Plymouth digital agriculture research
33 'Monopoly Agriculture Case Study', Global Justice Now (2024)
34 Too Big to Feed', IPES-Food (2017)

Technology accelerates this imbalance. As IPES-Food observed, "information technology comes out as the newest and most powerful driver behind agrifood sector consolidation. Big Data connects inputs, such as seeds, fertilisers, and chemicals, to farm equipment, retailers and consumers in unprecedented ways"[35]. Corporate platforms like John Deere's 'Operations Center' demonstrate how agricultural technology companies can capture significant value from farmer-generated data through proprietary systems and recurring revenue models, while farmers receive limited compensation for the data they contribute[36].

This inequality will deepen as technology advances. Public procurement illustrates the problem. Despite government ambitions for 50% of public food spend to be local or sustainably produced, farmers face systematic exclusion from school food contracts through complex tender requirements, preference for established large-scale suppliers, and lack of accessible digital procurement platforms[37]. An independent review found that barriers to SME participation require "mechanisms to enable smaller producers to access tender processes, such as dynamic procurement platforms", which currently remain underdeveloped.

Digital technology is already transforming UK agriculture.
The question is, who will control agricultural digital infrastructure, and who will benefit from the revenue it creates?

3. A Change Enabler: UK Farmer-Owned Digital Infrastructure

3.1. A Vision for Change: Putting Farmers in Control

UK farming faces challenges that are complex and interconnected. Tackling these requires joined-up thinking and a national food strategy treating these issues together rather than in silos, prioritising public spending on healthy locally grown food that returns profit to the farm gate and strengthens the livelihoods of rural communities.

Policy reform takes time, but digital innovation can enable change now. This paper proposes farmer-owned, open digital infrastructure as a critical enabler of systemic transformation. Before detailing how this would work, it's worth understanding how digital ecosystems have transformed other industries, and why the ownership structure is critical to determining who benefits.

35 Too Big to Feed', IPES-Food (2017)
36 Wolfert, S. et al. (2017), 'Big Data in Smart Farming', Agricultural Systems, 153
37 Quince, W. (2024). 'Independent Review of Public Food Procurement', as reported in Sustain (30 May 2024), 'Defra review highlights 'huge' opportunity to improve public food procurement'

Examples from other industries show that who owns digital infrastructure determines who benefits.

3.2. Learning from Existing Digital Platform Ecosystem Models

Examples from other industries show that who owns digital infrastructure determines who benefits. Over the past decade, digital platforms have transformed industries from retail to mobility to agriculture. These platforms create networks where different players share data, collaborate, and compete, generating new revenue opportunities. By pooling data in ways no single organisation could achieve alone[38], these ecosystems help participants grow faster, share strengths, and become more resilient.

Table 1 illustrates six models showing how global companies use digital platforms to create and capture profit. While these platforms initially deliver value to participants and customers, their extractive ownership often leads to monopolistic control, reducing choice and concentrating profits with platform owners.

Company	Ecosystem Model	How Profit is Created	How Profit is Captured
Uber	Digital platform connecting riders, drivers, couriers	Provides efficient on-demand mobility for customers; enables flexible earning for drivers; builds data-rich logistics network	Takes commission on transactions; monetises data insights; expands into adjacent markets
Samsung	Open innovation ecosystem across devices, IoT, partners	Creates interoperable devices linked through SmartThings; fosters developer ecosystem, collaborates with Google	Captures value via hardware sales, proprietary platforms, developer partnerships
Alibaba	Digital trade ecosystem spanning commerce, logistics, payments, cloud	Enables SMEs and consumers to transact easily; integrates logistics, payments, digital services	Captures transaction fees, cloud revenue, advertising, financial services
Tesla	Data-driven mobility and energy ecosystem	Provides EVs connected to charging, software, energy storage; over-the-air updates	Hardware sales, recurring software subscriptions, energy services, ecosystem lock-in
Apple	Curated digital ecosystem (App Store, iOS, devices, services)	Empowers developers to create apps; delivers seamless user experience; builds consumer loyalty through quality products, services and security.	App Store commissions, subscription services, premium device margins
John Deere	Farmer-centric digital ecosystem (JDLink, Operations Center)	Integrates machinery, agronomic data, third-party apps; improves farm productivity	Equipment sales, digital service subscriptions, data-driven advisory, partner integrations

Table 1: Digital Ecosystem Models - Adapted from Parker et al. (2016), Wolfert et al. (2017)

38 Pidun, U., Reeves, M. & Schüssler, M. (2019). Do you need a business ecosystem? BCG

3.3. Two Models, Two Outcomes

These examples reveal how digital ecosystems can reshape profit creation and capture. Apple's App Store enabled millions of software developers to create products while Apple secures a share of revenue through commissions and subscriptions[39]. John Deere's "Operations Center" connects machinery, farm data, and applications, providing productivity tools while generating recurring digital revenue for Deere[40]. Uber's taxi-hailing service exploited inefficiencies in the taxi industry, linking drivers (supply) and passengers (demand) through its digital 'marketplace' platform, enabling an efficient logistics network while controlling the algorithm determining driver earnings and ride pricing.

Uber exemplifies this trajectory: initially beneficial for customers and drivers, its dominance eventually reduced choice and driver power as the platform captured increasing value from both groups. This is why cooperative ownership is critical for UK agriculture, to prevent digital infrastructure from following the same extractive path that has already marginalised farmers in global supply chains.

The common thread: digital platform owners control the infrastructure and capture disproportionate value from participants' contributions. This extractive model has disrupted industries and revolutionised our everyday lives, including how we shop (Amazon) and how we order taxis (Uber). This approach works well for companies and their shareholders, but poorly for participants whose data and effort power these platforms and services. Left unchecked through regulation and governance, this model can lead to the creation of corporate 'monopolies' dominating industries and controlling pricing leading to poor outcomes for society.

3.4. The Critical Distinction: Digital Platform Ownership Structure

The examples above show how platform economics work, but who owns the platform determines who benefits. Corporate platforms extract value from participants. Cooperative platforms, owned by members with democratic control, return value to those who create it.

For UK agriculture, this distinction is critical. Extending corporate extraction models would deepen existing inequalities. But farmer-owned cooperative infrastructure shifts power from extraction to empowerment, ensuring farmers control and benefit from their collective data assets[41]. Section 4.9 details how this governance would work in practice.

4. How Farmer-Owned Infrastructure Would Work: Eight Key Benefits

A farmer-owned platform could knit together today's fragmented food system through the better use of data and reporting standards. It would shine a light on unfair trading terms, help farmers use AI practically (not just to intensify), and reduce reliance on supply chain 'middlemen' so more profit stays with the people and communities who produce our food. Crucially, this would be built around farmers' needs as primary food producers and land stewards, while also serving consumers, businesses, innovators and policymakers.

The following eight benefits show how cooperative digital infrastructure can enable positive systemic transformation.

4.1. Benefit 1: Re-Localise Supply Chains and Strengthen Food Security

What it does: Connects local producers directly with local buyers while building resilience against global supply shocks.

The platform would create regional digital marketplaces where farmers list available produce and forecast upcoming harvests, visible to restaurants, retailers, and institutions. Local buyers, a school catering manager, a hospital procurement officer, a restaurant owner, could post tenders or specific needs, allowing producers to respond individually or collectively.

By making local supply and demand visible, the system reduces reliance on fragile global chains. For example: a Somerset vegetable cooperative could supply all secondary schools in the county, where before none could meet

39 Parker, G., Van Alstyne, M., & Choudary, S. (2016). Platform Revolution: How Networked Markets Are Transforming the Economy. W.W. Norton & Company
40 Wolfert, S., Ge, L., Verdouw, C., & Bogaardt, M.-J. (2017). Big Data in Smart Farming – A review. Agricultural Systems, 153, 69–80
41 Scholz, T. (2016). Platform Cooperativism: Challenging the Corporate Sharing Economy. Rosa Luxemburg Stiftung

the volume alone. During disruptions, whether pandemics, trade disputes, or transport strikes, these networks could flexibly redirect supplies to areas in the UK where it's needed most. Evidence shows every £1 spent on local food by public institutions generates multiple pounds in local jobs and business growth[42], so this would deliver significant and measurable benefits to UK communities.

Shorter supply chains mean lower transport emissions, fresher food, fewer "food miles" and therefore carbon emissions, and shorter journeys for livestock to slaughter. As local food networks strengthen, demand could support reopening regional processing facilities and abattoirs that closed during centralisation, creating rural jobs while improving animal welfare through reduced transport stress.

Money circulates locally rather than leaking to distant corporations and their shareholders. Food hubs, cooperatives, and existing nature-friendly online businesses could all plug in, creating a web of regional food economies that collectively strengthen national food security.

Potential Impact: Resilient local food networks that reduce vulnerability to global supply chain shocks while keeping profits and benefits in rural communities.

4.2. Benefit 2: Improve Farm Profitability Through Market and Contract Transparency

What it does: Gives farmers pricing power and fairer share of retail value through transparent marketplaces and contract benchmarking.

Given that farmers currently capture as little as 1% in some sectors (as discussed in Section 1.1), transparent digital marketplaces would let farmers compare prices, benchmark contract terms against anonymised peers, and identify buyers willing to pay fairly for quality and provenance. Collective selling tools would allow groups of small farms to negotiate as one entity with purchasing power comparable to large estates.

A dairy farmer earning £0.28 per litre when supermarkets retail milk at £1.20 could see what neighbours receive, identify direct customers (cafés, schools, local retailers) willing to pay £0.45, and coordinate with fellow farmers to meet volume requirements. More stable demand and fairer prices enable reinvestment, keeping cows on pasture longer, improving facilities, or reducing herd size to prioritise welfare over volume.

The platform highlights provenance and production standards, connecting welfare-conscious farmers with customers willing to pay for it. As consumer demand for ethical and nutritious food rises, digital tools ensure good sustainable and ethical practices command premium prices rather than being undercut by cheaper imports.

What it does

Gives farmers pricing power and fairer share of retail value through transparent marketplaces and contract benchmarking.

Potential Impact: Farmers capture 20-30% more value on average, making quality-focused and welfare-friendly farming economically viable.

42 'Why Public Sector Food Procurement Matters More Than You Think', Food Chain Framework (2025)

4.3. Benefit 3: Create Farmer-Owned Data Assets That Generate Extra Revenue

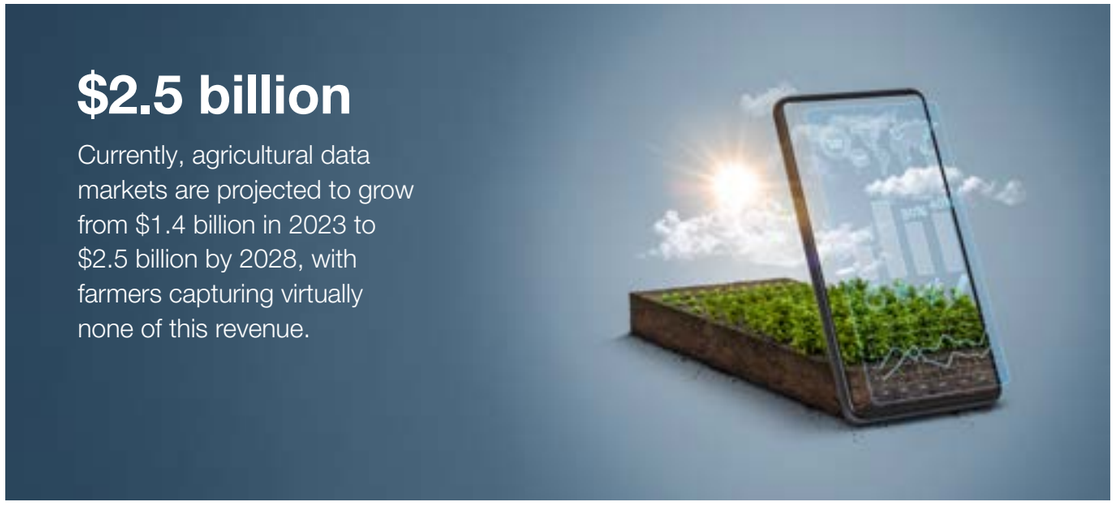
What it does: Transforms farmer data from something corporations extract into a collective asset that generates income and insights for UK farmers.

Currently, agricultural data markets are projected to grow from $1.4 billion in 2023 to $2.5 billion by 2028[43], with farmers capturing virtually none of this revenue. Agricultural technology firms, supermarkets, and commodity traders all monetise farmer-generated data while returning almost nothing to the producers who created it.

A farmer-owned data commons would invert this extractive model. Participating farmers contribute anonymised, pooled farm data that farmers own together, soil health metrics from regenerative practices, biodiversity indicators, climate adaptation strategies, reduced-input system performance. This data is valuable to researchers, policymakers, carbon credit verifiers, start-ups and agricultural technology developers.

A farmer-controlled governance board would approve data access requests, set pricing, and establish ethical guidelines. The data commons would operate as a not-for-profit cooperative, with revenue surplus returned to member farmers rather than extracted by external shareholders. Critically, farmers retain sovereignty over their data.

The revenue mechanism naturally rewards nature-friendly farming as the most commercially valuable data comes from farmers improving soil health, enhancing biodiversity, reducing chemical inputs, and building climate resilience.



Potential Impact: New income streams rewarding agricultural innovation, with farmers compensated for knowledge generation and data capture the sector needs.

4.4. Benefit 4: Enable Sustainable Public Procurement at Scale

What it does: Acts as the interface between public buyers and local producer networks, making sustainable procurement practical.

The UK public sector spends around £5 billion annually on food[44], a powerful lever currently underutilised. Schools, hospitals, care homes, and prisons typically buy from large distributors, often importing from abroad because no single local farm can meet volume requirements.

The platform aggregates local supply, standardises quality assurance, and coordinates logistics so groups of smaller farms can collectively fulfil institutional contracts. A county's school meal contract requiring 5,000 kg of potatoes weekly could be met by ten farms each supplying 500 kg, coordinated through the platform. This delivers fresher, more nutritious food for pupils and patients, secure markets and fairer prices for farmers, and public money reinvested in local economies.

43 Markets and Markets (2023), 'Agriculture Analytics Market'
44 'Defra review highlights opportunity to improve public food procurement', Sustain (2024)

The UK government has signalled interest in requiring at least 50% of public food spend to be local or high standard[45]. This platform makes that ambition practical, efficient, and transparent while rebuilding trust between producers and the people they feed.

Potential Impact: £2.5 billion+ of public procurement redirected to local, sustainable producers within five years, creating thousands of rural jobs.

4.5. Benefit 5: Unlock Access to Grants and Ecosystem Service Markets

What it does: Simplifies access to environmental payments, grants, and nature markets through AI-powered tools.

Farmers increasingly must deliver environmental benefits, carbon reduction, tree planting, soil improvement, water quality, biodiversity enhancement, alongside food production. Markets and government schemes to pay for these "ecosystem services" are emerging but navigating them is complex and time-consuming.

The platform acts as a one-stop hub where farmers access grants, subsidies, and nature markets through simple digital tools. Farmers are automatically notified when they qualify for schemes (hedgerow grants, agroforestry payments, carbon markets), applications are prefilled with existing farm data and compliance verified through satellite imagery and data from sensors.

A tenant farmer could be notified they qualify for a hedge-planting grant worth £8,000, have the application 80% pre-filled from existing records, and complete it in 20 minutes instead of six hours of paperwork. A small mixed farm could enter carbon markets previously accessible only to large estates, earning from carbon payments, biodiversity credits, and premium prices for regenerative produce simultaneously, "income stacking" that makes sustainable farming by default.

Potential Impact: Grant uptake increases 40%, small farms access £15-25k annually in payments, and sustainable practices become economically rewarded.

4.6. Benefit 6: Improve Animal Welfare Standards

What it does: Enables farmers to access transparent markets that reward higher-welfare practices, reducing economic pressure to intensify.

While most UK livestock live in intensive systems (Section 1.3)[46], this reflects economic pressure rather than farmer preference. The platform enables farmers and buyers willing to pay premium prices for pasture-fed beef, truly free-range eggs, and high-welfare pork. Digital traceability lets farmers showcase welfare credentials transparently, days on pasture, stocking densities, enrichment provided, building trust with consumers and premium buyers.

Better logistics and demand forecasting reduce situations where farmers must cull animals due to processing bottlenecks or sudden order cancellations. Real-time visibility of processing capacity across regional abattoirs would allow farmers to adjust schedules, preventing the kind of crisis that led to mass culls in 2021.

Potential Impact: Livestock shift to higher-welfare systems faster as economic viability improves, increasing farmer income from welfare premiums per animal.

45 'Debate on supporting local food infrastructure', House of Commons Library (2022)
46 'Factory farms: could new net zero advice lead to their expansion?', Sustain (2025)

4.7. Benefit 7: Close the Digital Divide

What it does: Provides inclusive, user-friendly tools designed with farmers, building upon existing peer networks and offering training and support to ensure no one is left behind.

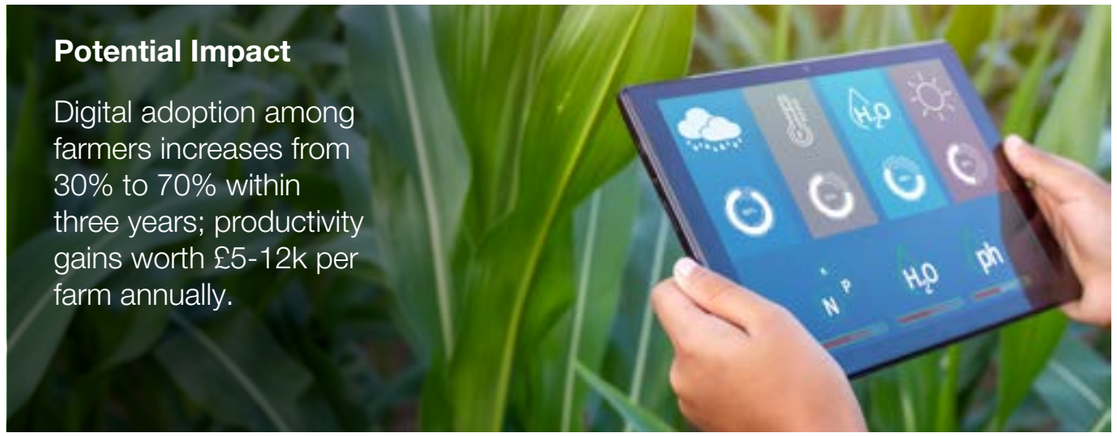
Despite widespread connectivity challenges (Section 2.2), the platform must work for every farmer through offline functionality and accessible design. Co-design with farmers ensures digital applications meet real needs rather than imposing 'big tech' assumptions onto agricultural reality.

For example, a simple mobile app covers day-to-day operational tasks with voice-activated features for those preferring speaking to typing, and offline functionality that syncs when connectivity is available, acknowledging that many rural areas still lack reliable broadband. Integration with popular communication channels like WhatsApp keeps barriers low.

The platform would complement and integrate with existing online farmer peer networks rather than replacing them. Additional peer support through online forums and farmer-to-farmer mentoring would foster digital confidence across communities. Local "digital support agents", perhaps through agricultural colleges or cooperatives, provide hands-on help to get farmers connected.

The platform operates as open infrastructure with robust data privacy protections, allowing farmers to benefit from insights like regional crop trends or anonymised benchmarking while retaining full control over sensitive business data.

Potential Impact: Digital adoption among farmers increases from 30% to 70% within three years; productivity gains worth £5-12k per farm annually.



4.8. Benefit 8: Integrate Policy Goals Around Health, Nature, and Climate

What it does: Provides the digital backbone that finally joins up fragmented food policy goals through shared data infrastructure.

Because the platform captures data from farm to fork, what's produced, how it's produced, where it's sold, what environmental benefits are delivered, it provides policymakers with a holistic picture currently impossible. Aggregated, anonymised data informs smarter regulations and incentives.

If a region's school procurement policy leads to higher local vegetable sales and measurable improvements in children's nutrition, that success can be scaled elsewhere. Dashboards track progress on reducing farm emissions, improving diets, or expanding land under regenerative management. Local councils, health authorities, environment agencies, and agriculture departments coordinate more effectively through shared visibility.

For farmers, abstract policy goals become tangible nudges: "Planting cover crops this month could earn you a £500 soil health bonus from your council." Over time, this evidence-driven alignment hard-wires continuous improvement into the food system.

Potential Impact: Policy effectiveness increases 30-50% through coordinated implementation; £500m-1bn in public spending delivers better outcomes through joined-up approaches

5. Infrastructure Governance: Ensuring Farmers Retain Control

As established in Section 3.4, the ownership structure determines who benefits. Extractive platforms concentrate ownership and capture disproportionate value from participants' contributions, as the US-based Farmers Business Network demonstrated when venture capital transformed it from farmer cooperative to conventional for-profit company[47].

This platform would operate as a not-for-profit cooperative owned by participating farmers, ensuring democratic control and profits returned to members rather than external shareholders.

Critical elements could include:

- **Farmer-majority board representation** ensuring producer interests drive decisions
- **Transparent governance processes** with member accountability
- **Robust data sovereignty protections** allowing farmers to opt out or exit while retaining their data
- **Open-source technology** where feasible, preventing vendor lock-in
- **Separation of ownership from operations,** farmers own the data commons; technical development can be contracted to research institutions or commercial providers

This structure protects against mission drift when commercial pressures override social objectives.

47 Bronson, K., & Knezevic, I. (2016), 'Big Data in food and agriculture', Big Data & Society, 3(1)

6. Conclusion:

Who Will Control the Future of UK Farming?

The UK food system faces interconnected crises that fragmented, siloed approaches have failed to address. Farmers create enormous value yet capture little of it, whilst bearing the costs of a system optimised for cheapness over sustainability. Soil degradation, biodiversity loss, a health crisis imposing costs exceeding the NHS budget, and compromised animal welfare, signal that current approaches are economically, environmentally, and socially unsustainable.

Farmer-owned digital infrastructure offers a critical enabler of systemic transformation. By ensuring farmers retain ownership of their data, control access to their collective knowledge assets, and capture revenue from data they generate, digital platforms can shift from extractive to empowering. Combined with re-localised supply chains, improved market access, simplified environmental scheme participation, and ecosystem service payments, such infrastructure can support the transition to regenerative agriculture whilst improving farm economic viability.

Realising this potential requires acknowledging significant challenges. Agricultural data initiatives have struggled elsewhere when governance structures proved inadequate or commercial pressures overrode cooperative principles. Maintaining competitive technical capability while preserving cooperative values demands robust governance, sustainable revenue models, and strategic partnerships with research institutions, existing mission-aligned businesses, technology companies and government.

Digital infrastructure alone cannot address policy fragmentation, market concentration, or structural inequalities in the UK food system. Technology is an enabler, not a solution. Success depends on genuine farmer leadership in co-design, adequate long-term funding, and integration with broader policy reform.

Nevertheless, the opportunity is substantial. With £5 billion in annual public food procurement, an NHS at breaking point, ever increasing prices exacerbating the cost of living, growing markets for nature services, and increasing consumer demand for transparency and sustainability, conditions exist for farmer-owned infrastructure to succeed where extractive models have failed.

The UK food system faces interconnected crises that fragmented, siloed approaches have failed to address.

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5.1 Next Steps: Co-Design and Collaboration

Across the UK, pioneering farmers and environmental and socially conscious businesses are already demonstrating that productive, profitable, nature-positive farming is achievable. Community Supported Agriculture schemes, regenerative farming networks, and local food partnerships have proven the viability of alternative models. What's missing is the digital infrastructure that joins these initiatives up and makes the approaches scalable and economically sustainable.

The future of UK farming must be designed by farmers, for farmers. This paper offers not a finished solution, but a framework for conversation about how digital infrastructure could support rather than undermine farmer autonomy, economic viability, and environmental stewardship. Every year of delay entrenches existing UK food system power asymmetries further.

The technology, the policy context, and the pioneering farmers already exist. What's missing is the infrastructure investment and collaborative governance to scale what works.

Realising this vision requires addressing fundamental questions about funding. Initial development would likely draw on government agricultural innovation programmes, philanthropic foundations supporting food system transformation, and co-investment from farming organisations and potentially technology companies with social innovation funding offers.

Long-term sustainability could come from modest member fees scaled to farm size, revenue from data licensing under farmer governance, and marketplace transaction fees substantially lower than current intermediaries charge. The specific funding model will be co-designed with farming partners during proof-of-concept development, ensuring financial viability whilst preserving cooperative ownership and affordability for small farms.

The path forward is clear: co-design farmer-owned infrastructure with those already proving nature-positive farming works. The technology exists. The farmers exist. What's needed now is the will to build it.

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About the Author

Dr Sophia Fannon-Howell is the founder of Aterra AI, a company established in 2025 to develop technologies that deliver positive social impact. She has over 20 years' experience in data systems, digital innovation, and artificial intelligence, including senior leadership roles in the energy and commodities sector. Her extensive corporate experience has given her insight into how technology is applied to create and capture value in complex markets, insights that informed her research into UK food system challenges.

Through trustee work in farm animal welfare, she has gained understanding of the economic pressures that drive intensive production systems, often the only viable path to financial sustainability under current market conditions.

This paper synthesises that research into a framework for farmer-owned digital infrastructure that serves producer autonomy rather than corporate extraction.

Aterra AI is seeking partners for proof-of-concept development with nature-friendly farming organisations in 2026-27.

Contact: info@aterra.ai

If you're interested in exploring collaboration, whether as a farming organisation, funder, policymaker, researcher, or technology partner, please get in touch.

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Building Digital Infrastructure to Transform the UK Food System

By Dr Sophia Fannon-Howell
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