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Green Gold: Is Hemp the New Oil?

Written by:

Camilla Hayselden-Ashby NSch

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A NUFFIELD FARMING SCHOLARSHIPS REPORT

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Date of report: September 2025

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

Title	Green Gold: Is Hemp the New Oil?
Scholar	Camilla Hayselden-Ashby
Sponsor	NFU Mutual Charitable Trust
Objectives of Study Tour	• Assess the potential for hemp as a cropping option for UK farmers. • Understand what has enabled hemp to scale successfully in other countries. • Identify which end uses hold the strongest promise for demand growth. • Explore models of processing and infrastructure that can overcome barriers to scale. • Examine how policy and collaboration can remove obstacles and accelerate adoption.
Countries Visited	United Kingdom, Jersey, USA, Canada, Zimbabwe, Romania, Netherlands, Czech Republic, Denmark, China.
Messages	• Hemp is a versatile crop with potential in food, textiles, construction and beyond, but most of these markets are still emerging. Scaling depends on developing demand and the processing infrastructure to serve it. • Successful sectors abroad combine farmer-processor partnerships with strong market pull. • Demand is unlocked by products that are demonstrably better than alternatives or economic recognition of environmental impact. • UK progress requires regional processing hubs, adapted varieties, and clear policy support. • Hemp illustrates how the success of novel crops depends on alignment between market demand, infrastructure, and policy. Without this, crops remain niche.

EXECUTIVE SUMMARY

Hemp has a long history in the UK. Once mandated by Henry VIII to supply fibre for rope and sails, it was a staple crop across southern England. Today, just 1,000 or so hectares are licensed. Yet its potential is vast: bast fibres for construction and textiles, protein-rich seed for food and feed, and shiv for biobased building. This offers UK farmers a diversification opportunity at a time when traditional break crops like oilseed rape are in decline.

My Nuffield travels took me to the USA, Canada, China, Zimbabwe, and Europe. I found that hemp's future depends on three interlocking challenges: agronomy, processing, and demand. Modern agronomy is still rebuilding after decades in the shadows. Seed yields are unreliable and while fibre yields are more promising, harvesting and retting introduces risk and complexity. Processors are the next bottleneck: without regional hubs for decortication, straw cannot move beyond the farmgate but most fundamentally, demand is yet to materialise at scale. Farmers are reluctant to grow without buyers, and processors cannot invest without supply - a 'chicken and egg' cycle that has kept the crop niche.

Despite this, I see clear pathways forward. Successful hemp sectors abroad show the need for well-developed end markets and farmer-processor partnerships. What unlocks demand is not simply 'more hemp', but hemp products that do something better than the alternatives: textiles with superior performance, foods with superior health benefits, construction materials which result in more comfortable homes.

The path to success for the UK is threefold:

- **Focus on niches first.** Collaborate with researchers to identify high-value applications that leverage hemp's unique traits, such as in medical aids or performance textiles, where buyers will pay a premium.
- **Invest in agronomy and processing.** Support breeding for early-ripening, shatter-resistant seed varieties, and back grower networks trialling establishment and retting methods for more consistent yields and fibre quality. Invest in regional hubs with modern decortication equipment to give farmers reliable outlets.
- **Build wider markets with policy.** Just as Canada scaled canola with coordinated breeding, processing, and market pull, UK hemp will need policy support. Marketing its environmental benefits and embedding hemp in construction standards or subsidy schemes can drive demand at scale.

Hemp offers a case study in how novel crops can succeed or stall. Taking it from niche to mainstream requires coordinated effort: farmers, processors, researchers, and government acting together. With the right support, hemp could emerge as

a cornerstone of sustainable industry, reducing reliance on petrochemical products and living up to its promise as the '*new oil*'.

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CONTACT DETAILS

Camilla Hayselden-Ashby

Ashford, Kent

chayseldenashby@gmail.com

Instagram: @camillaveronica @ukhemphunter

Nuffield Farming Scholars are available to speak to NFU Branches, agricultural discussion groups and similar organisations.

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email : office@nuffieldscholar.org
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CHAPTER 1 INTRODUCTION

My family runs a mixed sheep and arable farm in Kent, diversified with holiday cottages and an area of solar panels. Since 2006, when my father first moved to direct drilling, we have steadily adapted the system: grazing cover crops with sheep, relying on a high proportion of spring crops to manage blackgrass, and aiming to balance soil health with livestock feed. I split my time between the farm, usually one day a week, and my role as Head of Product at a farming technology start-up.

I first became interested in hemp during the CBD boom of 2018-19, when oils and capsules seemed to appear in every Holland & Barrett and even in lattes. The idea that such a fashionable product might come from a crop grown in the UK caught my attention. But I quickly learned that the UK licensing regime prevents farmers from processing the flowers and leaves (the parts of the plant CBD is extracted from). My interest shifted from CBD to the crop itself.

Hemp was described as easy to grow, shading weeds and requiring minimal inputs. On our farm, the prospect of suppressing blackgrass was particularly appealing. Add to that the wide range of potential uses - textiles, construction materials, food, plastics alternatives, even high-tech applications like graphene - and I wondered why so little was grown in the UK when countries such as Canada, France, and China had far more established industries.

Growing hemp on our farm proved far from straightforward. Agronomy guidance was scarce, licensing was complex, and seed had to be imported. With encouragement from early contacts, I eventually secured a licence and planted a trial field. Over three seasons, alongside my Nuffield research, we expanded the area and tested dual-use, seed, and fibre varieties (see Appendix D for more detail).

My Nuffield journey set out to understand whether hemp could become a new break crop for UK farmers, filling the gap left by oilseed rape in many rotations, and, if so, what uses we should focus on. This report asks whether hemp can become 'green gold' for UK farms, and what must change for that to be true.



Figure 1.1 The author at ZIHT, Harare



CHAPTER 2 BACKGROUND TO MY STUDY SUBJECT

Hemp is *Cannabis sativa* with a very low percentage of THC, the psychoactive compound. My focus throughout this study has been industrial hemp and its applications in food, textiles, construction, and biocomposites. See Appendix A for a glossary of hemp terminology used in this report.

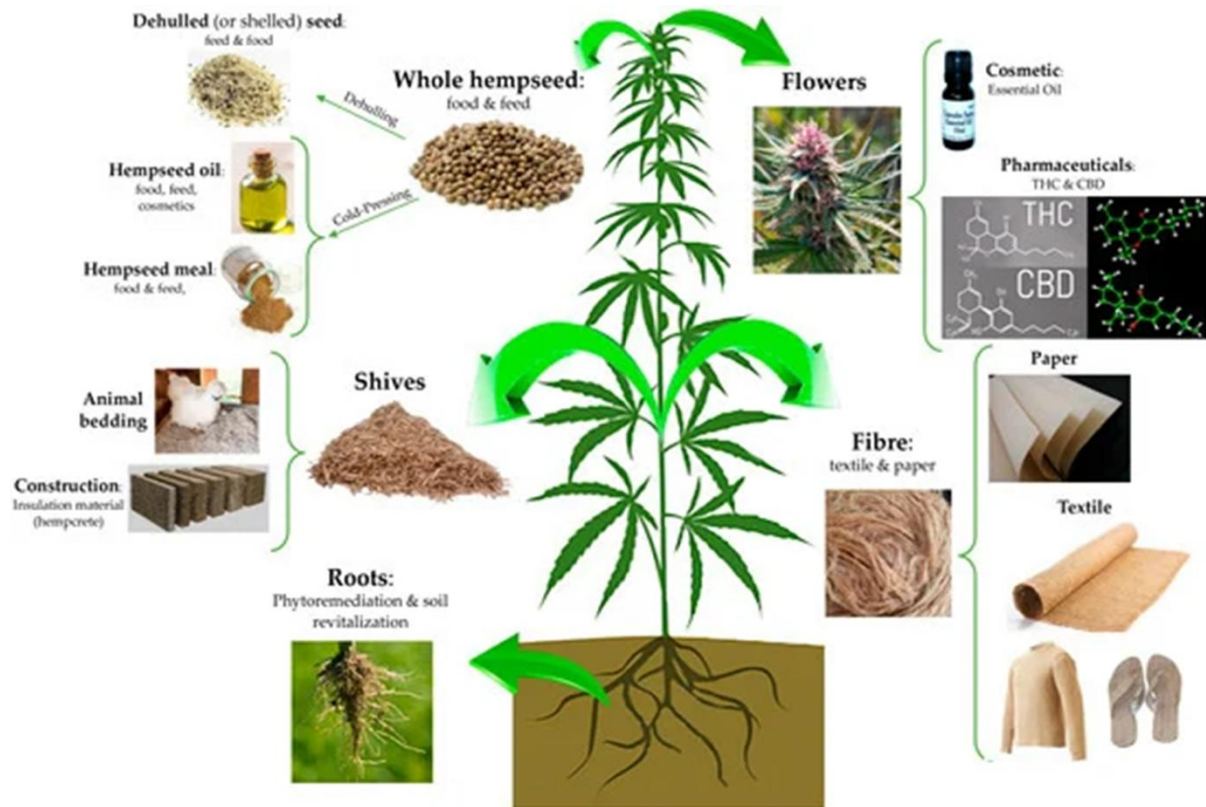


Figure 2.1 Diagram showing key uses for the parts of the hemp plant (Farinon et al. 2020)

All parts of the plant can be used (see Figure 2.1), but the most versatile are the seed and the stem. The seeds are rich in protein and omega-3 fatty acids. They can be pressed for oil, processed into protein powders, or sold dehulled as 'hemp hearts'. Research is also investigating further uses such as paints, varnishes, and even biodiesel.



Figure 2.2 Hemp hearts, powder, oil and milk



The stem has a woody core, or shiv, surrounded by strong bast fibres. The fibres can be spun into textiles or used in composites, while the shiv can be mixed with lime to form 'hemcrete', a breathable, fire-resistant building material with insulation qualities. Fibre can also be processed into mats or panels for insulation, and biocomposites already feature in the automotive industry in dashboards and interior panels. To get to these usable components, hemp straw must be separated via decortication.

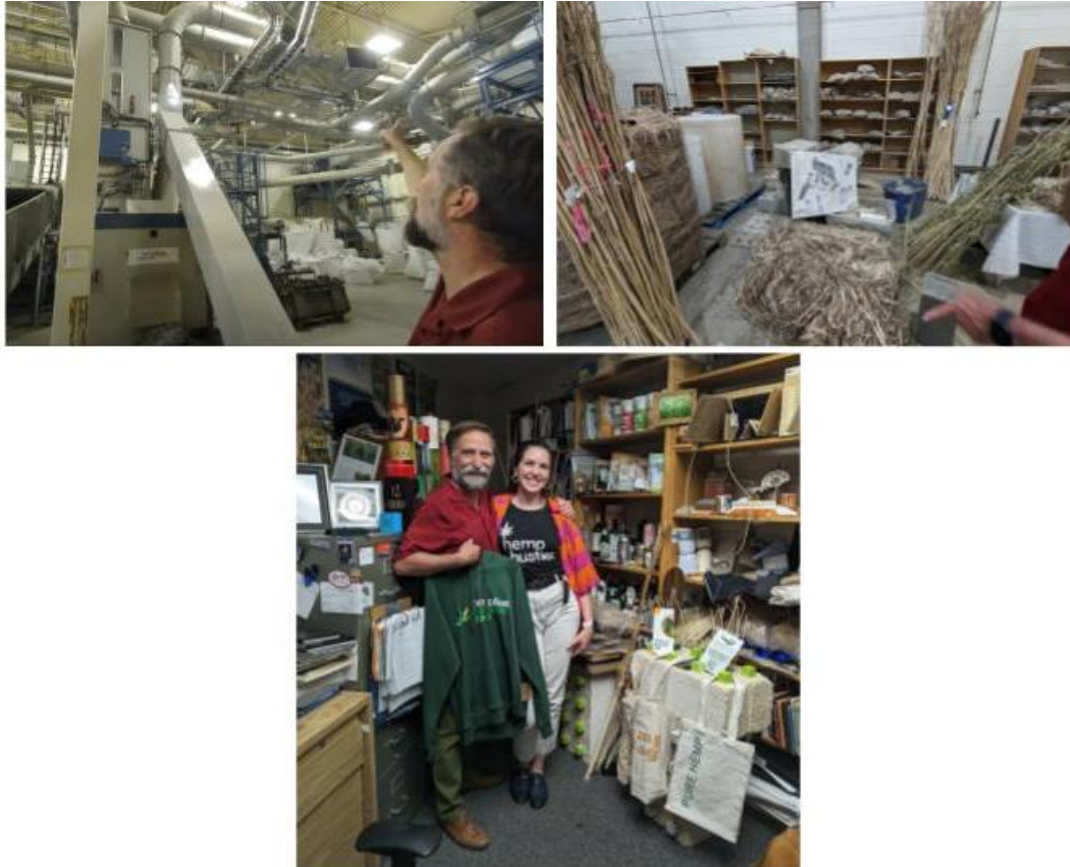


Figure 2.3 L-R Jan Slaski explains the decortication line at Innotech Alberta, Hemp samples from around the world for processing and analysis, Jan with the author in his office with a huge selection of hemp products

While historically important (see Appendix B), by the mid-twentieth century hemp had all but disappeared from UK fields. As a result, UK farmers today approach hemp almost as a 'new crop'. There is little institutional memory and no body of recent research to fall back on. When I began growing hemp on our farm, the information I could find was either outdated, adapted from other countries, or hidden in scattered reports from the last brief UK boom around 2006. There was no recommended list of varieties, limited trial data for UK conditions, and few routes to market.



Figure 2.4 Hemp rope making factory, London, 1880

The barriers are clear: licensing, lack of agronomic knowledge, limited processing capacity, and above all, the absence of developed end markets prepared to pay a fair price. This gap in knowledge and support shaped my study tour.



CHAPTER 3 MY STUDY TOUR

When I applied for my Nuffield Scholarship in 2020, it was in that brief moment when Covid restrictions seemed to be easing. Soon after, borders closed again and travel was delayed far longer than I expected. Over the following three years, I pieced together a journey across Europe, North America, Africa, and Asia, each leg chosen to highlight a different aspect of the hemp story. A pivotal moment came in Canada, outside the crop itself: standing at Fort McMurray's oil refinery amid pipelines and smoke stacks, I was struck by the sheer scale of oil as an industry. That image sharpened the framing of this report: could hemp ever become a comparable 'new oil', fuelling whole value chains, if demand and processing align?

Country & Date	Comments & Takeaways
UK & Jersey (2021 onwards)	Grounding to understand the state of the industry before travelling further. Together, these visits underlined the promise of hemp but also the UK's structural challenges of seed supply, processing, and licensing.
USA - Kansas, Montana, Colorado (Mar 2022)	Hemp cultivation has rapidly expanded in the USA since the 2018 Farm Bill making it a useful case study to see how the crop could develop. The NOCO Hemp Conference showed the direction of travel from CBD to seed and fibre and the many potential uses. Horror stories from the CBD boom and bust highlighted how enthusiasm without assured buyers is dangerous.
Zimbabwe (October 2022)	An opportunity via Nuffield connections too good to pass up which showed a diversity of farming from intensive pigs and crocodiles to conservation. The Zimbabwe Hemp Association showed early energy despite minimal infrastructure and visiting a medical marijuana grower highlighted low labour costs as a competitive advantage.
Canada - Saskatchewan, Alberta (June 2023)	The world's second biggest hemp producer: Canada showed both scale and fragility, as well as a tension between pure commodity production versus added value through integrated supply chains. As well as farm visits, I was fortunate enough to participate in the Commonwealth Scholars Conference which gave access to a wide range of businesses and institutions from hospitals to indigenous reservations.



Romania (May 2024)

A leader in hemp production during the Soviet era, gradually building back its industry by combining heritage and innovation. Visits here solidified the message: start with markets and work backwards.

Netherlands (May 2024)

I was invited to participate in the Interreg Biobased Construction peer review. This highlighted how policy can stimulate markets: using local resources, aligning supply with demand, and supporting growth through procurement tools.

Czech Republic (Jun 2024)

The EIHA conference gave a European overview: farmers, processors, and policymakers debating standards, lobbying, and market-building. A sharp contrast with the UK, where no single body coordinates this role.

China (Feb 2025)

Terraced fields still worked by hand feed into the world's largest hemp textile sector, underpinned by low labour costs and strong state backing. The juxtaposition of manual hemp plots and cutting edge manufacturing emphasised the importance of cost of production and connected infrastructure.



Figure 3.1 Yunnan, China showed contrasts of small-scale field production against rapid modernisation of infrastructure.



CHAPTER 4 GROWING HEMP: AGRONOMY & VARIETIES

Across my travels, farmers echoed the same message: hemp is not yet a 'plug-and-play' crop. Despite its long history, decades in the shadows mean modern agronomy is still being rebuilt, with growers and researchers experimenting to fill gaps in knowledge.



Figure 4.1 The UK Hemp Growing Season, images from author's farm

4.1 Establishment and nutrition

Hemp can be grown with relatively low inputs, but optimum yields require good nitrogen (N) availability. Trials in Canada suggest 60-150 kg N/ha may be optimal depending on end use and environment (Van der Werf, 1994; Struik et al., 2000). Seedbed quality matters just as much: uniform emergence under good moisture gave the best stands, while drought stressed crops severely. This tallied with the vulnerability to water stress reported by farmers in Canada and the US.



Figure 4.2 Bart de Vries with an emerging hemp crop at HempFlax, Romania where they have been experimenting with no till establishment and cover cropping before hemp.

4.2 Variety gaps: a global theme

No UK Recommended List exists for hemp, leaving farmers without a clear guide. We rely on imported European C1 seed. Across countries the pattern was the same:

- **Canada:** Alberta's short seasons favoured fibre; further south, seed crops were viable.
- **USA:** Growers tested Chinese lines for fibre production at lower latitudes. IND Hemp and Formation Ag noted instability in seed performance from weak supply chains.
- **Romania:** Research compared seed vs fibre lines and retting inoculants, with wide variation in yield and quality.
- **UK:** Elsoms have begun breeding for local adaptation and NIAB has begun variety trials, but it is early days.

The consistent theme was uncertainty. Without stable varieties suited to UK latitude and harvest windows, yields remain inconsistent, and late September seed harvests collide with autumn weather.

Despite this, hemp has been more successful in these countries. Rather than agronomy, this reflects differences in climate, investment, market focus, and policy support. In Canada, hot, dry, late summers reduce harvest risk for seed and large land areas support commodity scale. Major corporate investments from the medical cannabis space, such as Tilray's purchase of Manitoba Harvest for



C\$419m (~£230m), provided capital to scale (GlobeNewswire, 2019). We will discuss this further in Chapter 6 (Markets) and Chapter 8.1 (Policy's role).

4.3 Breeding priorities

Through my research I have identified some core traits that could make or break viability in the UK, which are summarised in Figure 4.3.

Trait	Why it matters	Farmer impact
Early ripening	Avoids wet autumn harvest	Lower losses, better seed viability
Shatter resistance	Minimises seed drop before harvest	More reliable seed yields
Uniform height	Simplifies harvest and baling	Cleaner operations, consistent straw
Monoecy	Stable, higher seed yields	Predictable harvest timing
Oil/protein profile	Higher food/protein isolate value	Better prices and contract options

Figure 4.3 Breeding traits for hemp

While cereals and oilseeds benefit from decades of structured breeding, hemp has only just begun this journey. Incorporating modern tools, from marker-assisted selection to CRISPR, could dramatically accelerate progress, but investment and infrastructure are needed.

4.4 Pest and disease: not immune

The idea that hemp has 'no pests or diseases' is misleading. Growers in Canada, the USA and Europe all reported challenges: mould on flowers, cannabis aphid, and fungal issues in wet harvests. The relative absence of major problems so far may simply reflect small acreages. As the planted area grows, pest pressure will increase.

4.5 Retting and fibre preparation

For fibre use, timing is critical. Crops are cut at full flowering and left in the field to 'rett', a microbial process that breaks down pectins binding fibre and shiv. Good retting gives cleaner fibre, but the process depends on weather: too wet and mould sets in, too dry and separation is incomplete.



Figure 4.4 Field retted hemp on author's farm showing bast fibre separation from shiv and stand retted hemp at IND Hemp, Montana

Ciprian's inoculant trials in Romania and the trials we conducted in collaboration with NIAB suggested promising interventions, but knowledge is still limited.



Figure 4.5 'Over-retted' (very dark) hemp straw at Harrison Spinks, Yorkshire and samples of processed fibre and shiv at Formation Ag, Colorado, showing the impact retting time has on colour and quality.

Innovation is emerging: at EIHA, Dr. Vita Maria Cristiana Moliterni from Italy presented 'Water Retting 4.0', a closed-loop system cutting retting to three days and reducing water use by 70 per cent. It was early-stage but pointed to how technology could reduce hemp's weather-dependence.

Summary

- Hemp is not 'input-free': fertiliser, establishment care, and disease management matter.
- Variety development is essential; the UK lacks a Recommended List and locally adapted lines.



- Breeding priorities include early ripening, shatter resistance, and uniform height.
- Retting remains a bottleneck for fibre quality, reliant on weather and trial-stage inoculants.



CHAPTER 5 PROCESSING & INFRASTRUCTURE

My experience trialling hemp on our farm and visiting UK growers convinced me that agronomy was not the main barrier to adoption. What set successful UK growers apart was access to processing. I thought this was the missing link: build a plant in the South East and a thriving industry for local farmers would follow.

So when I set out on my international travels, I made processing my focus. I visited models ranging from small farmer-owned facilities and cooperatives, to hybrid shareholder structures, through to developments costing tens of millions of dollars. I wanted to understand what it takes to run a facility that is technically viable and fair to farmers.

Across my travels, farmers and processors agreed that hemp needs regional hubs: bulky, low-value bales cannot travel far without margins disappearing. In Alberta one couple told me, “it grows fine here, but the truck miles eat the profit”, while in Devon, Good Hemp had already stopped growing in the UK because drying and haulage costs outweighed returns.

5.1 Farmer-led models

One response has been for farmers to take matters into their own hands. South Bend Hemp in Kansas started when a buyer for 300 bales let them down. Within nine months the farm had a small plant running and other growers were bringing in bales. By the time I visited, South Bend was contracting fibre and grain on farmer-friendly terms, bundling in seed, agronomy advice, and regular check-ins. As the owner put it: “If the industry is going to take off, let’s help it or get out.”



Figure 5.1 Processing line at South Bend Hemp, Kansas and Author with co-founder Aaron Baldwin

In Saskatchewan, Blue Sky Hemp Ventures modelled themselves on an oil refinery. The plant was built to separate fibre, shiv, seed, and cannabinoids, with the idea that spreading value streams would spread risk. Their ownership



structure brought in farmers as shareholders in the business. It showed a hybrid path: farmer-anchored, but with the capital base to go beyond a farm-scale facility.



Figure 5.2 Extraction equipment at the Blue Sky ‘refinery’ and author with co-founder Devin Dubois

5.2 Private and investor-led models

In Montana, IND Hemp showed what investor-led processing can look like at scale. They began with seed, contracting 3,500 acres in their first year and quickly expanded to over 10,000. By 2020 the plant employed 50-70 people - a major boost in a small town. Founder Ken told me: “It’s getting harder and harder for farmers to make it. We’re trying to give smaller communities hope so their kids don’t have to move away.” Their model combined private capital with long-term farmer contracts, fronting seed costs and guaranteeing delivery. The scale and speed underlined the strengths of private-led models: capacity can be built quickly, with growers benefiting from offtake security.



Figure 5.3 Clockwise L-R Oil press, hemp protein horse treats, author with the Elliott family, Laroche fibre equipment imported from France, finished fibre bales for textiles

5.3 Cooperatives

In France, cooperatives underpin much of the hemp sector. Farmers deliver straw to central plants, which decorticate and market fibre and shiv. This collective model has been key to France's position as one of Europe's hemp leaders.



Figure 5.4 The British Wool Yorkshire sorting plant

In the UK, many dismiss co-ops out of hand, but my visit to British Wool in Yorkshire challenged that assumption. Every fleece is collected, graded, and



routed to the best outlet. It proved that when properly structured, cooperative models can deliver scale and market access in Britain too.

5.4 Technology bottlenecks

At Formation Ag in Colorado, I saw the nuts and bolts of processing equipment design. They explained how their machines were based on 19th-century patents (the last time hemp facilities were being built), adapted for modern scale. The challenge is not just building plants but perfecting equipment that can handle variable feedstocks, run reliably, and produce outputs to spec. Processors were continually refining their lines and finding ways to handle challenges such as clogging and dust.



Figure 5.5 Close up of Formation Ag decortication equipment to break apart the shiv and fibre

5.5 What model for the UK?

Farmers and processors both need stability for long-term investment. For the UK, the most suitable structure would be a private processor offering multi-year offtake agreements with a farmer-shareholder model to align incentives. A good example is Colman's mustard, who we visited as part of our CSC. They offer growers clear specifications, agronomy support, and the processor investing for the long term (e.g. Unilever's regenerative programme).

Summary

- Processing is the gateway to usable products.
- Four main models exist: farmer-led, private/investor-led, cooperative, government-supported, each with strengths and trade-offs.
- Technology remains a limiting factor: equipment must deliver consistent outputs to spec.



- Failures in the US and Canada show that infrastructure alone does not guarantee success.
- Collaboration and demand-led development are essential. Private investment with farmer shareholders is a balance which could work well for the UK.



CHAPTER 6 MARKETS & DEMAND

When I began this study, I asked which of hemp's many uses could be viable for UK farmers. I assumed the industry's trajectory was underway and that UK farmers were simply missing out. My travels showed otherwise. In North America I heard stories of farmers contracted to grow hemp only for bales to sit unsold when processors failed or markets collapsed. The bottleneck was not *processing* but *demand*. That lightbulb moment reframed the question: which markets show the greatest promise, and how can they be developed?



Figure 6.1 Unsold hemp bales in Alberta, Canada

6.1 Fibre and shiv

In Cluj, designer Ionuț Rus showed me tailored hemp suits that would not have looked out of place on Savile Row. His brand, De Ionescu, set out to shift hemp's image from 'hippie' to high-end. His advice: "Start at the end of the value chain and work back."

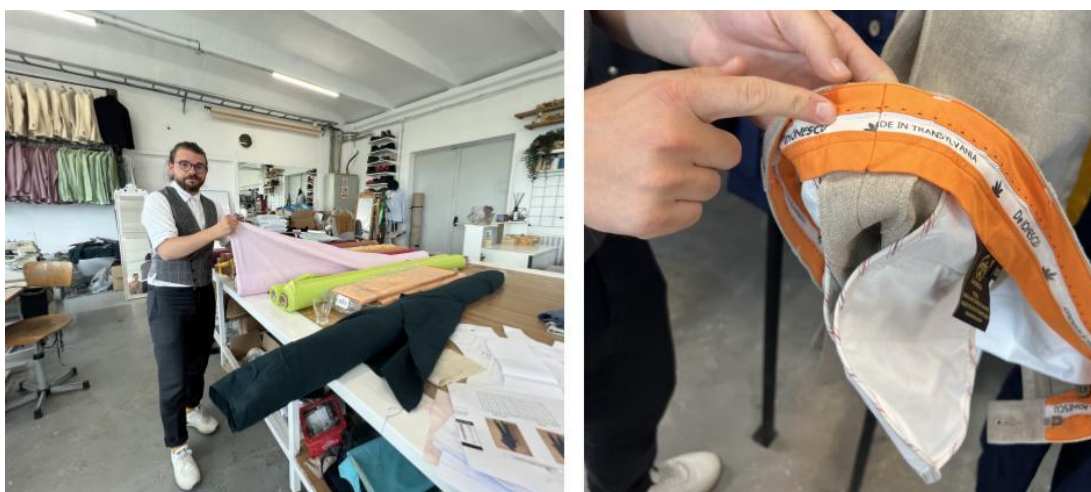


Figure 6.2 Ionuț Rus in the De Ionescu factory and close up of garment finishing - I wore a bespoke suit by them for my Nuffield presentation.



At EIHA, speakers underlined that textiles will only succeed if farmers, processors, and brands work together. French co-ops like Le Chanvrier secured long-term buyers by requiring members to commit for the long haul, while flax and hemp alliances pushed joint branding.

Yorkshire farmer Nick Voase told me he could sell “three to five times what we produce” in shiv for hempcrete and bedding, while fibre demand lagged, leaving him struggling to balance streams.



Figure 6.3 Steve Barron at Margent Farm, Cambridgeshire - a home made out of hempcrete, hemp plaster and corrugated hemp fibre composite panels grown on the farm.

In the Netherlands, I joined a peer review on biobased building in Zeeland, focused on aligning production with demand and supporting growth through policy. Hempcrete and hemp insulation were central examples praised for breathability and insulation.

At EIHA, Daniel Mack of Kingspan called hemp “the best potential for natural insulation”. Key barriers to adoption flagged were architect and builder familiarity with the materials and a lack of consistency. For hemp construction products to succeed, they need familiar formats and consistent specs so that builders find them easy to work with.

Capital is already coming to products which meet these criteria. Hemp-insulation company IndiNature recently received £8.5m from Scottish National Investment Bank to scale manufacturing at their Jedburgh plant (Scottish National Investment Bank, 2025). In late-2023, Kingspan acquired a majority stake of HempFlax Building solutions and shortly after launched their HemKor line of hemp insulation (Kingspan Group, 2023). This shows how large incumbents are making pragmatic moves in anticipation of future sustainable policy.



6.2 Seed and food

Some UK companies such as Good Hemp and the British Hemp Co already sell seed products, showing demand exists. Yet Canadian processors highlighted that prices keep hemp seed in expensive niche health food markets and imports undercut domestic supply. Moving beyond this niche will require better yields and technical improvements such as oil stability for cooking.



Figure 6.4 L-R Hemp seed awaiting processing, packaged hemp hearts and oil and the author with farmer Shanán Wright at High Mountain Hemp, Colorado

6.3 CBD: Niche premium only

The CBD boom of 2018-19 left barns of unsold biomass in the USA. At the NOCO conference in Colorado, I heard that only about 3,000 acres would be enough to meet US tincture demand. Licensing prevents UK farmers from entering this market. If that changes, CBD may keep a premium niche but it is not a foundation for UK hemp.



Figure 6.5 Medical Cannabis growing in a greenhouse at Mad Grows, Zimbabwe

In Zimbabwe, Forbes and Craig of Mad Grows explained their pivot from tobacco to cut flowers and then medical cannabis. Their view was blunt: only differentiated products close to processing sites can succeed; competing in bulk commodity markets is a dead end. Low labour costs gave them an edge in high-value niches, not in volume supply.

6.4 Future opportunities

These opportunities are still at early stages and will require significant R&D and investment before reaching commercial scale, but give a taste of the potential for future demand.

Lyocell (often branded as Tencel) is a cellulose-based fibre made from wood pulp. It is widely promoted as a sustainable alternative to cotton and polyester. The global lyocell market is valued at ~\$1.5bn and projected to double by 2030 (Mordor Intelligence, 2025). Replacing some wood pulp with hemp could reduce pressure on forests and create a higher-value use for hemp shiv.

Hemp hurds and fibres can be processed into graphene-like carbons with potential applications in batteries, supercapacitors and lightweight composites (Wang et al., 2013). Graphene is a form of carbon just one atom thick, prized for its exceptional strength and electrical conductivity. Supercapacitors are energy storage devices that can charge and discharge far faster than conventional batteries, with potential uses in electric vehicles and grid balancing.

Innovations like this are worth watching closely as signals of where longer-term growth may come from.

6.5 What unlocks demand

- **Leveraging technical properties:** Professor Cecilia Sirghie in Romania demonstrated functional fabrics and medical dressings, arguing that



science exists but industry pull is missing. The future depends on applications that justify a premium.

- **Clustering and ecosystems:** In Yorkshire I saw the beginnings of an integrated system: growers experimenting with hemp, research at the University of York, and textile-processing heritage from the wool industry. British Wool's model shows how coordinated infrastructure could underpin hemp.
- **Standards and certification:** Builders stressed that until hempcrete and insulation are certified, consistent and easy to use, architects will hesitate to use them.



Figure 6.6 Author with Cecilia Sirghie in front of her cupboard of fabric samples and close up of technical fabric sample book. Hemp fibres are absorbent and have a hollow, capillary-like structure that manages moisture well. This makes them attractive for wound dressings, combining high absorbency with breathability and natural antimicrobial properties.

Summary

- Hemp has many potential markets, but none are developed enough yet to give UK farmers scale or secure returns.
- Fibre markets in construction, insulation and biocomposites are the most credible opportunities for the UK.
- Seed and CBD remain niche or impractical for the UK in their current form.
- Unlocking demand depends on clusters, policy support, standards, and consumers prepared to pay for hemp's unique qualities.



CHAPTER 7 ECONOMICS & VIABILITY

When it comes down to it, economics is what decides whether a crop takes off. Farmers are willing to experiment, but they need to see a fair return for the risk involved. On my travels I found that, while there are examples of hemp working economically, margins are inconsistent and depend heavily on local cost base, end use, and infrastructure. For UK farmers, the question is: can hemp make a margin comparable to break crops like oilseed rape, beans, or linseed? Right now, the answer is “not yet”.

7.1 Seed: too much risk for the UK

In the UK, seed is a high-risk bet. Harvest falls late in September, and uneven ripening makes it hard to meet moisture targets of 8-9%. On my farm, I saw how seed varieties seemed less tolerant of drought stress, and many UK farmers I spoke to reported similar disappointments. Large-scale seed production is not practical without better adapted varieties. For now, seed hemp might be grown on small areas to limit exposure, but it is not yet a reliable mainstream crop.

7.2 Straw: the stronger UK opportunity

Straw offers a stronger opportunity for the UK. In my trials, fibre hemp grew well and cutting and baling were straightforward. The weak point is retting, as its long time window reintroduces weather risk. The economic challenge is price. At current levels, margins are too slim to justify the risk compared to other break crops. For straw to become a serious option, either prices must rise or processing efficiency must increase so more value passes back to the farm gate.

7.3 Dual-use: maximum return, maximum complexity

In theory, the best outcome is to stack income from both seed and straw. In practice, this is difficult. In Romania, Bart from HempFlax explained that dual-use often meant compromising on both: seed was not fully mature, and fibre quality was reduced. Farmers in Canada echoed the same challenge. For now, dual-use remains more appealing in theory than in practice.



Figure 7.1 A middle ground? HempAlta, Alberta focussed on processing straw from seed growers for consumer products such as animal bedding, cat litter and mulch, allowing them access to the raw material at a far lower price. Unfortunately since visiting they have stopped processing to focus on hemp carbon credits as they couldn't make the economics work.

7.4 UK costings example

To ground this in numbers, I calculated gross margins for four scenarios (see Figure 7.2) and on paper, hemp compares well to the average OSR gross margin of £531/ha (Farm Business Survey, 2024). But there are caveats. Dual-use looks attractive on paper, but producers report quality for both products is diminished. Straw can pay at good yields, but margins evaporate quickly if yields fall. Seed looks stronger on paper but carries much higher biological risk.

A major cost driver is seed. Improved UK supply, or relaxing the CI requirement to allow farm-saved seed, would transform margins. See Appendix D for full calculations.



	Dual Use	Seed Only	Straw Only (Good Yield)	Straw Only (Low Yield)
Seed Yield (t/ha)	1	1	0	0
Straw Yield (t/ha)	3	0	8	4
Costs				
Seed	£239	£458	£286	£286
Establishment	£120	£120	£120	£120
Fertilizer	£78	£102	£63	£63
Seed harvest	£130	£130	£0	£0
Straw harvest	£110	£0	£160	£110
Drying	£15	£15	£0	£0
Total	£677	£810	£629	£579
Revenue				
Seed	£1,500	£1,500	£0	£0
Straw	£600	£0	£1,600	£800
Total Revenue	£2,100	£1,500	£1,600	£800
Gross Margin	£1,423	£690	£971	£221

Figure 7.2 Hemp gross margin calculations for a range of production scenarios

7.5 Risk and reward

Farmers are used to taking some level of specification risk but require stable contracts and fallback markets to justify investment. With hemp, the lack of clear buyers and inconsistent yields make it a risk most UK farmers should not take on yet.

For the numbers to stack up, either end-users pay more so farmgate prices rise, or research and efficiency gains must improve yields and reduce costs so hemp is viable at current prices. A supplementary route could be carbon payments, but this is still early-stage.

Summary

- Seed hemp is too risky for UK farmers under current conditions. Unsuitable varieties and late harvests mean poor consistency.
- Straw is a better fit, but prices must rise or efficiencies improve to make it viable.
- Dual-use offers maximum return in theory but is impractical in most cases.



- Profitability depends on stable end markets, processing capacity, and supportive policy.



CHAPTER 8 DISCUSSION

At Farming Smarter's trials site in Alberta, I discussed with the station manager how hemp could be 'the next Cinderella crop' as oilseed rape had been. Until the 1970s rape was rarely grown, limited by bitter taste and volatile compounds in its oil. Canadian investment in breeding produced canola: mild, stable, and marketable as a healthy cooking oil. With consistency, policy support, and a clear consumer use-case, adoption followed quickly. The canola story shows how research and demand alignment can transform a marginal crop.



Figure 8.1 Farming Smarter's trial site and the author with Director, Ken Coles

For hemp, the gating factors are clear: varieties adapted to UK conditions, reliable establishment, and predictable retting. Without them, neither costings nor processor contracts can hold. Processing models varied but the common lesson was risk management and education. Guaranteed offtake and minimum prices gave confidence while a 'build it and they will come' approach left processors and growers exposed.



- **1960s** - Canada: barriers to use of rapeseed oil, erucic acid and glucosinolates which cause bitter taste and negative health impacts, identified. A focused breeding programme begins.
- **1970s** - 'Double low' breeding breakthroughs are branded as canola and commercialisation begins.
- **1980s** - UK adoption of Canadian canola accelerates. Area expands from less than 50k ha to over 500k ha. Processing investments at Erith and Liverpool expand crushing capacity. CAP oilseed aid stabilises prices. OSR proves valuable as a wheat break crop. Consumer demand for healthy vegetable oils grows.
- **1990s-2010s** - OSR becomes a mainstream break crop, peaking at 500–700k ha.
- **2013** - Neonicotinoid ban; Cabbage Stem Flea Beetle pressure increases causing OSR to become unviable for many farmers.
- **2012-2020** - UK OSR area halves.
- **2020s** - OSR remains an important break crop but volatile.

Figure 8.2 Timeline of Canola/OSR development and UK adoption

8.1 Policy's role

In Europe, biobased building materials have advanced through regulation. France's RE2020 requires life-cycle carbon assessments and sets embodied-carbon thresholds that tighten every three years, directly advantaging low-impact materials. Biobased insulation materials are predicted to reach about 13% market share in France by 2030 (Rabbat et al, 2022), while in the UK similar products currently account for only around 1% (Construction21, 2022).



Figure 8.3 Policy makers and subject matter experts at the Zealand Biobased Building peer review. Communication and branding were identified as important areas for local government to focus on to build public awareness of sustainable construction.

In the UK, licensing restrictions around site location have also discouraged farmer experimentation with hemp. However, removing these restrictions will not create a thriving industry. Research funding, certification support, and sustainable material incentives are required to reinforce market dynamics.

8.2 Towards sector development

This points to three steps to develop hemp as a viable crop:

1. Link researchers with industry to commercialise high-value niches (e.g. Sirghie's medical dressings).
2. Reinvest early revenues in breeding and knowledge exchange to lower risk.
3. Scale into higher-volume markets once yields and prices are consistent, just as Canada did with canola.



Figure 8.4 The author at the EIHA conference which showed the importance of a strong co-ordinating body for market development and lobbying.

8.3 Closing synthesis

Agronomy gaps, fragile economics, and restrictive policy all matter, but the bottleneck is demand. Demand makes the chain function, justifies infrastructure, and gives farmers confidence to plant.



Figure 8.5 The author in front of an oil pipeline at Fort McMurray tar sands, Alberta

At the start of this report, I asked if hemp could be the ‘new oil’. Petroleum became a globally significant commodity because consumer demand and refining capacity rose in tandem. In the mid-19th century, petroleum had limited uses, but the arrival of kerosene lamps in the 1850s created a clear consumer pull which unlocked a mass market and triggered the wider oil boom.

While hemp is unlikely to get a single ‘kerosene moment’, this underscores that demand development is what predicates scale. For hemp, this is likely to be a slower path, either through applications that offer a premium for its unique



technical properties or pricing mechanisms which give environmental impact proper economic value.

Summary

- Variety development and consistent production packages are needed to derisk hemp and improve yields.
- Processing access alone is insufficient; collaboration models matter.
- Policy can accelerate but not substitute for demand.
- Sector development requires a staged path: high-value niches provide capital for reinvestment in research leading to scaling into volume markets.



CHAPTER 9 CONCLUSIONS

My Nuffield travels and trials at home have shown me that while hemp has potential to be a valuable diversification for UK farmers, there is no 'silver bullet' that will kickstart the sector. Around the world, pioneers are still figuring out where it fits in a lower-carbon world. To unlock its potential, key conditions need to be met.

- **Hemp is too high-risk for UK farmers at present.** Seed crops are unreliable: late harvest, uneven ripening, and drought undermine yields. Fibre is a better fit but only pays if markets deliver stronger prices or volumes. Dual-use models look attractive on paper but rarely work in practice.
- **Demand is the bottleneck.** Infrastructure and agronomy only matter if end markets exist. Niche and premium uses can provide an entry point, but long-term viability depends on scaled commodity demand driven by sustainability targets and hemp's technical advantages.
- **Farmers need realistic, UK-specific guidance.** Hemp is not a 'no input, no pest' crop. While it can be grown with low inputs, the best results come from careful management. Honest evidence on varieties, yields, and economics is essential if farmers are to make informed choices rather than rely on hype.
- **Adoption depends on risk-sharing.** Gross margins potential alone will not secure farmer commitment and leaves the processor carrying risk if a better cropping option comes along. As demand scales, guaranteed buyers, fair contracts, and processor-farmer alignment are essential for confidence to scale from trials to committed hectares.
- **Policy is supportive but secondary.** Licensing reform can ease entry, but the real levers are standards, grants, and procurement incentives that amplify demand rather than substitute for it. Policy accelerates or slows adoption; it does not create demand by itself.



CHAPTER 10 RECOMMENDATIONS

Hemp's potential will only be realised if each part of the chain takes responsibility. The following recommendations set out where action is most needed.

Farmers

Focus on straw opportunities first and approach seed with caution until earlier, more reliable varieties are available. Only grow hemp with a guaranteed offtake, working with processors on contracts or by taking equity stakes to reduce exposure. Contribute to on-farm trials and share results to build a practical knowledge base for UK conditions.

Processors and investors

Secure end markets before building new capacity: 'build it and they will come' does not work for hemp. Offer farmers guaranteed contracts with clear specifications, and consider models that give farmers a stake in processing to align incentives. Keep an eye on carbon policy developments which may unlock demand. Invest in fibre-quality R&D and develop downstream markets such as biocomposites, insulation, and specialist textiles.

Researchers

Prioritise UK-specific variety trials and agronomy packages to improve yield reliability. Develop consistent retting methods, including inoculant trials, to improve fibre quality. Quantify follow-on crop benefits such as soil health, weed suppression, and yield effects in rotations. Investigate hemp's carbon sequestration and lifecycle performance to underpin new markets and potential income streams.

Government and policymakers

Complete licensing reform to give farmers confidence in growing hemp. Support demand by incentivising the use of biobased materials through planning rules, building standards, or tax relief. Provide grants and research funding to accelerate variety development, agronomic knowledge, and processing innovation.

Industry bodies

Coordinate demand-building efforts, particularly in construction and textiles where market pull is strongest. Provide farmers with honest agronomy and market data to counter hype. Facilitate collaboration between farmers, processors, and end users to strengthen the value chain. Communicate hemp's environmental and carbon benefits credibly to buyers and policymakers.



CHAPTER 11 AFTER MY STUDY TOUR

When I applied for a Nuffield Scholarship, my focus was narrow: one crop, one question - how could hemp be scaled as a viable break crop in the UK? I imagined I would find a model abroad, a silver bullet to bring home. Instead, my journey widened into something much bigger.

Across Colorado, Canada, Yunnan, Zimbabwe, and Romania I saw agriculture in contexts far beyond Kent. Conversations about water scarcity, skies darkened by forest fires, and terraces farmed by hand all underscored how climate, economics, and people shape farming everywhere. I came home with fewer simple answers, but a broader outlook and lasting connections.

Seeing agribusiness up close shifted how I view farming. I knew in theory how genetics, agrochemicals, and commodity markets influence us, but witnessing the same boar genetics used in Zimbabwe and Canada made that power tangible. Farmers may pride themselves on independence, yet much is shaped by global forces: a reality that will also define regenerative agriculture.



Figure 11.1 Along the Athabasca River in Fort McMurray, young saplings regrow after the 2016 wildfire that devastated the town. The orange haze in the sky is smoke from fires further north, near Fort McKay, just 34 miles away. The 2023 wildfire season went on to burn the largest area in Canada's recorded history.

Climate was the most consistent theme. In Colorado, a rancher's first words were "we've got water." In Romania, irrigation investment unlocked yields. In China, dams supplied whole provinces. Canada's wildfires brought the climate crisis close enough to smell. Back in Kent, drought impacted our production. I left convinced that water will define the future of UK farming, and that soil health is our best tool for resilience.



On my own farm, hemp trials proved instructive if not transformative. Seed crops were patchy and vulnerable; straw more promising but hard to market. Pausing hemp felt like failure at first, but I came to see it as stewardship: recognising risks and protecting the business. The real value lies in sharing honest lessons so others go in with eyes open.

For my career, hemp is a case study in how agricultural innovation succeeds or stalls. The parallels with my work in ag-tech are clear: carbon credits are like a novel crop, adoption depends on demand, trust, and fair risk-sharing. Nuffield also opened doors into biobased building and policy discussions, giving me new ways to contribute.

Looking ahead, I want my work to be impactful and climate-positive: whether in hemp, sustainable fashion, building materials, or carbon markets. The ethic I carry is clear: be sceptical of hype, ask “what’s in it for the farmer?”, and value collaboration over isolation.



CHAPTER 12 ACKNOWLEDGEMENTS AND THANKS

I am profoundly grateful to the Nuffield Farming Scholarships Trust for the opportunity to undertake this journey, my sponsor, the NFU Mutual Charitable Trust, and my Nuffield mentor, Chris Graf-Grote, for his prompts to keep searching for that “lightbulb moment.”

This report has been shaped by the generosity of farmers, researchers, businesses, and organisations around the world who shared their experiences with me. I have tried to list as many as I can in Appendix E but there are so many to thank it is inevitable a few will be missed. Whether our conversations came after a long email chain or a chance meeting in a diner, every story added perspective and depth.

I owe an immense debt to my parents, Keith and Sue, for their unwavering love and support, and believing in me enough to try this experiment on our farm. Thank you also to our farm team, who put my ideas into action.

Jordan has been a constant source of encouragement, belief, and interest in my subject (even coming with me to hemp protest events!) and I am grateful to my friends who have listened to me enthuse about the many uses of hemp through the peaks and troughs of this project.

My Nuffield cohort and the “NAT” Zimbabwe travel crew always lifted my spirits, while my colleagues at fieldmargin and Agreena made it possible for me to step back and travel. I am especially thankful to my boss, Rob Carter, for his backing.

Finally, I want to thank those who provided practical advice and collaboration in growing hemp in the UK. Particular thanks go to Nathaniel Loxley of the British Hemp Alliance and Lydia Smith of NIAB, whose support and collaboration in the Innovate UK Hemp Excellence Project helped ground my on-farm experiments in science.



APPENDIX A HEMP TERMINOLOGY

Because hemp is still an unfamiliar crop to many UK farmers, this glossary sets out key terms used throughout the report.

Plant parts

Seed - rich in protein and omega-3 fatty acids. Can be pressed for oil, milled for protein powders, or sold dehulled as hemp hearts.

Bast fibre - long fibres running up the outside of the stem, prized for strength and durability. Used in textiles, rope, biocomposites, and high-value applications.

Shiv (hurd) - the woody core of the stem, lighter and more porous than fibre. Used in construction (hempcrete, blocks, insulation), animal bedding, and bulk applications.

Flower/leaf - contain cannabinoids (e.g. CBD, THC). Not permitted for UK farmers under current licensing.

Processing terms

Decortication - mechanical process of separating bast fibre from shiv.

Cottonisation - treatments to make hemp fibre compatible with cotton spinning systems.

Dehulling - removal of the shell from seeds to produce hemp hearts.

Agronomy & harvest terms

Varieties

Seed, fibre, and dual-use. Dual-use compromise on both ends.

Retting

Biological process breaking down pectins that bind fibre and shiv.

Field retting

Stems are left on the ground for 2-4 weeks after cutting depending on weather and are turned at least 2 times. Fungi and bacteria from the soil inoculate. This requires warm but damp weather to work successfully. Low cost but high risk as the long time period introduces risk of wet weather making the straw too wet to bale and then becoming 'over-retted'.

Water retting

Immersion in water. Traditionally this would have been pools or streams but in contemporary settings would happen in tanks. Produces higher-quality fibre but is now banned in the EU due to the production of polluting effluent. New water retting systems are investigating how to treat and recycle effluent to reduce environmental impact and water use.



Frost/over-winter retting

Stems are left standing in the field over winter and freeze-thaw action breaks down the bonds in the stem rather than microbes. I saw this trialled with success in Montana (which has cold, dry winters) but also tried on our farm with positive results for fibre quality.

Inoculant retting

Microbial sprays applied to accelerate lignin breakdown and improve consistency; promising but still early-stage.

Monoecious vs. dioecious

Hemp plants can be either monoecious (male and female flowers on the same plant) or dioecious (separate male and female plants).

Dioecious hemp produces both sexes in a field. Male plants grow taller with finer stems and yield longer, finer fibres prized for textiles. Female plants are shorter and thicker, producing coarser fibre but higher seed yields. The mix can give good fibre quality but creates uneven stands and staggered maturity.

Monoecious hemp is more uniform; all plants have both flower types. This makes crop management and harvest easier, especially for seed.

Day length dependence in hemp

Hemp is a short-day plant, meaning flowering is triggered when day length shortens below a critical threshold. Until that point the crop remains in vegetative growth, extending its stem and building biomass. This makes latitude highly significant: in regions with longer summer days, flowering is delayed. Jan Slaski highlighted this effect in Alberta, where northern areas (~58°N) receive 1.5-2 hours more daylight around the solstice than southern Alberta (~50°N) which he reported resulted in 20-30% higher fibre yields.



APPENDIX B HISTORY OF HEMP IN THE UK

Hemp has a long history in Britain. Its fibre was used for rope, sails and textiles as far back as the Tudor navy, when Henry VIII instructed landowners to grow hemp to supply the fleet. At its peak, hemp was widely grown across southern and eastern England.

By the 19th and early 20th centuries, hemp declined sharply as cheaper imported fibres like jute and cotton took over, and synthetic fibres later dominated. The crop's association with cannabis prohibition in the mid-20th century further erased it from fields and supply chains.

The modern industry began to re-emerge in the 1990s when EU subsidies supported non-food crops, and hemp returned on a small scale. By the mid-2000s there were a handful of processors and around 3,000-4,000 hectares in production, but this quickly fell back as markets failed to materialise and processors could not make the economics of drying and moving bales of straw work.

In the 2010s, interest rose again, this time linked to CBD. However, because UK licensing rules prohibit use of the leaves and flowers, most of that opportunity passed farmers by. By 2019/20, Defra reported only a thousand or so hectares under licence nationally, a fraction of what is needed for a functioning industry.



APPENDIX C UK HEMP COSTINGS & ASSUMPTIONS

Details behind the gross margin scenarios referenced in Chapter 7. Figures reflect a combination of our farm costs and benchmark prices.

Yield and prices

Seed yield is taken as 1 t/ha, which sits at the high end of likely yields which range from 0.8-1.2 t/ha.

Straw yields are assumed at 4-8 t/ha, a range in line with European trial data (typically 5-7 t/ha) and UK farmer experience. Nick Voase, for example, has reported around 5.5 t/ha under good retting conditions.

These figures are therefore realistic but optimistic; poor establishment or unfavourable weather can quickly halve returns. Dual-use crops usually compromise, with lower seed yield and fibre quality reduced.

Seed price: £1,500/t (farmgate) - this can be higher for certified organic.

Straw price: £200/t (farmgate)

Costs

Seed

Seeding rates

Optimal seed rate is dependent on end use.

Fibre: 50-70 kg/ha - a dense stand results in long, fine fibres. This is not as important for non-textile applications.

Seed: 30-40 kg/ha is typical for the UK - lower seed rates encourage more branching and greater seed yield, similar to OSR.

Dual-use: 40-50 kg/ha - compromise between the two.

Rates used: Fibre 55kg/ha, Seed 40kg/ha, Dual use 45kg/ha

Seed cost

Seed (based on our purchase of imported Finola via UK Hemp) £11.25/kg, £11.45/kg inc shipping

Fibre (based on our purchase of imported Futura from Hemp-IT in France) £4.50/kg, £5.20/kg inc shipping

Dual-use (based on our purchase of imported Ferimon from Hemp-IT in France) £4.35, £5.30/kg inc shipping



N.b. Shipping costs included in unit cost for transparency, these would come down with higher order volumes

Nitrogen rates

As discussed, trials show nitrogen application results in optimal performance but less is required for fibre (too much can result in coarse fibre) than seed. When growing on our farm we did not use fertiliser on any of our hemp crops.

Fibre: 60-100 kg N/ha

Seed: 100-150 kg N/ha

Dual-use: 80-120 kg N/ha

Fertiliser taken as urea with 2024 price of £360/t.

Use	Seed rate kg/ha	Seed £/kg	Seed cost	Nitrogen rate kg/ha	Fertiliser cost
Seed	40	11.45	£458	130	£102
Fibre	55	5.2	£286	80	£63
Dual use	45	5.3	£239	100	£78

Figure C.1 Seed and fertiliser costs used in gross margin calculations

Field operations

Guidance for optimal **establishment** is to produce a fine seed bed for optimal emergence and seed-soil contact. In these costings I used a min-till scenario with cultivation (£42/ha), rolling (£24/ha) and drilling (~£55/ha) = **£120/ha**. However on our farm we established with direct drilling which puts the cost at about £55/ha. I also saw this approach used on farms in Canada and Romania.

Combining for seed is estimated slightly higher than the NAAC benchmark to account for the issues reported with fibre wrapping which slows down the process = **£130/ha**

Fibre harvest requires mowing the stems, turning them at least twice during the retting period, raking and baling: £38.35 + 2x £15 + £24.24 + £50-£100 for baling depending on yield = **£110-160/ha** (lower cost used in low straw yield scenario because of reduced number of bales).

Drying down to 8-9% moisture at **£15/t** - this could be far higher if seed is green or grain is harvested wet.

Field operation costs sourced from NAAC 2025.



Notes

Exclusions: Overheads, licensing costs (£580 for a three-year first-time license), and haulage to processor are not included.

Sensitivity: Margins are highly sensitive to yield, straw price, and the presence/absence of the seed harvest cost in straw-only scenarios.



APPENDIX D OUR FARM'S HEMP TRIALS

2020 - First hemp licence

- Back and forth with the Home Office to find an acceptable site (away from view and public rights of way) delayed progress significantly.
- Late seed order because of waiting for our license meant we missed the ideal drilling window and hit a drought in May so had to postpone for a year.

2021 - 4 ha dual-use trial

- Ferimon drilled in early May at 50 kg/ha.
- Seed combined on 30 September.
- Straw left to stand rett over winter, then cut and baled the following May.

2022 - 20 ha seed and fibre

- Additional site licensed.
- Finola seed crop drilled early May at 30 kg/ha.
- Fibre crop with 4 varieties (Futura 75, Muka 76, Santhica 70, Tiborzasasi).
- Seed delivery delays meant late drilling (15 June) at 40 kg/ha.
- Fibre cut 16 September, seed cut 11 October, fibre baled 14 November.

2023 - Innovate UK Hemp Excellence Project

We were successful in securing Innovate UK grant funding to do on-farm trials researching ways to improve growing hemp in the UK within a regenerative system. We trialled hemp under no-till establishment, carried out soil health testing, and worked with researchers and product developers to assess end-use quality.

Establishment: No-till into grass cover worked well, suggesting hemp can fit regen systems. Compared with cultivated seedbeds, emergence and early growth were comparable.

Soil health: Root digs showed hemp rooting deep but also spreading laterally to bypass compaction. Soil tests showed rises in P and K post-harvest, plus small but measurable increases in soil organic carbon. Lab analyses suggested hemp residue breaks down quickly, releasing nutrients.

Harvesting & retting: Field retting trials showed later 'second cut' straw produced the strongest fibres. Desk research pointed to the three-cut mower as most practical, though our bar mower was sufficient.

Textile trials: Fibre tested by Nicholas Kirkwood's team. Adding second-cut fibre to a cellulose 'leather-like' material made it stronger and suitable for sneaker uppers, showing how end-use demand can guide farm practice.

Despite success with growing and useful insights on how we could improve processes on farm, the biggest gap consistently was arranging processing and



marketing of products. This has strongly influenced the advice I give to aspiring growers in the report.



APPENDIX E FULL LIST OF VISITS

This is a more complete list of the people and organisations I visited and spoke to during my Nuffield travels. It is still not exhaustive, and I am sure I will have missed some. My thanks go to everyone who shared their time and knowledge with me.

United Kingdom & Jersey (2021 - 2024)

In the UK I began close to home. I visited Good Hemp in Devon (Henry Braham) to see seed processing, Margent Farm (Steve Barron) for building materials, and Yorkshire Hemp with Nick Voase who also demonstrated retting and baling practice. George Young and Hempen both provided early inspiration. I also saw Tatham processing equipment with Dan Matthews and visited British Wool with Haldi Kranich-Wood to learn about cooperative models. Jersey Hemp showed the island's more flexible licensing regime for CBD production, while I also met Jersey Tea. In the UK I also spoke with Steve Glover (UK Hemp), Jamie Bartley (Unyte Hemp), and Harrison Spinks on their integrated mattress production. BioYorkshire's Hemp SIG further highlighted collaborative research underway.

USA (March 2022)

In Kansas, Aaron and Melissa Baldwin of South Bend Hemp showed me their farmer-led cooperative. I visited Great Bend Feedlot and Coop to understand local markets. In Montana, Ken Elliot of IND Hemp deserves special thanks for welcoming me on short notice, including to a family meal and accommodation. Randy Wright of Formation Ag in Colorado demonstrated machinery innovation. I also spent time at Blue Range Ranch with George Whitten and Julie Sullivan, learning about regenerative cattle alongside hemp. The organisers at the NOCO hemp conference kindly allowed me to volunteer so I could afford to attend. Cannabis researcher Christopher Pauli also deserves a shoutout for meeting last minute in a Boulder bar and even offering his sofa.

Zimbabwe (Late 2022)

Zimbabwe offered huge contrasts. At the Savory Institute I joined a custom programme on holistic grazing and rangeland restoration. I toured Colcom Factory in Harare (large-scale pork processing), CCC Pigs with Phillip Odendaal (intensive pigs), and Red Dane Dairy in Beatrice, with cattle talks led by Jappie Jackson. Bruce Travers at Imere Tobacco showed conservation farming alongside tobacco, followed by a game drive. PHI's Goromonzi farm and ARDA Shamva demonstrated large-scale row cropping and mixed systems. Phillip Weller demonstrated drip irrigation in blueberries, while the airport enterprise combined marijuana production with cut flowers. Peter Shepard gave an irrigation lecture, complemented by a Waterwright site visit in Pomona. I joined cattle production workshops in Banket. PHL introduced me to the ICFA CEO and hosted visits to their crocodile farm, while Lake Harvest showed tilapia aquaculture. Charara Estates, led by Steve Crawford (a Nuffield Scholar), provided insight into banana and mixed farming. Chirundu Estates showcased sugar cane.



I also engaged with the Zimbabwe Hemp Association through Tafadzwa Dutoit Nyamande.

Canada (May-June 2023)

In Saskatchewan, Shelley and Kelvin Meadows deserve special thanks for hosting me in Saskatoon, sharing their farmer-shareholder oat processing model, and inspiring my reflections on hemp processing. I also visited 9 Mile Legacy Brewing (Shawn Moen), Black Fox Distillery (John Cote and Barb Stefanyshyn-Cote), and Blue Sky Hemp Ventures (Devin Dubois).

In Alberta, I spent time with Emily Ford at Quattro Ventures and with Will and Jean Van Roesse at Speciality Seeds. HempScape provided further fibre context. Ken Coles at Farming Smarter deserves thanks for hosting me and connecting me with many Canadian hemp contacts. I also visited HempAlta for fibre and shiv processing, and InnoTech Alberta with Jan Slaski, who has led decades of agronomy and processing research.

Commonwealth Scholars Conference (CSC), Alberta

I was fortunate to participate in the 2023 Duke of Edinburgh Commonwealth Study Conference, which convened ~300 emerging leaders from government, industry, NGOs and labour across the Commonwealth. It centred on experiential learning and cross-sector exposure. As part of CSC, I visited Sunterra Farms, the Canadian Chamber of Commerce, the Child Advocacy Centre, Red Deer Community Garden, the Nerval Building, Beaver Hills Biosphere, Enbridge, InnoTech Alberta, Alberta Hub, Portage College, Cenovus (tar sands), Faba Canada, Ecoflex, Alberta Industrial Heartland, and Women Building Futures.

Romania (May 2024)

In Romania, I visited HempFlax (Bart de Vries), the University of Arad with Prof. Cecilia Sirghie, and the Agricultural Research and Development Station at Lovrin with Ciprian Bozna. Designer Ionut Rus of De Ionescu demonstrated high-end hemp textiles. I also met large-scale farmer Arnaud Charmetant (60,000 ha).

Netherlands (May 2024)

I joined the Interreg Biobased Building Project, which highlighted hempcrete and insulation materials alongside supportive policy initiatives.

Czech Republic (June 2024)

I attended the EIHA Conference in Prague, and am grateful for the journalist pass which enabled my attendance.

China (Feb 2025)

In Yunnan Province, I saw smallholder hemp grown on terraced land, still hand-worked but feeding into the world's largest hemp textile industry. I also met representatives of the Chinese textile sector, who underlined China's dominance in industrial-scale processing backed by state support.



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