

UK Rural - Spring 2020

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SPOTLIGHT
Savills Research

Hemp Cultivation in the UK



Market evolution • Growing costs • Multiple end uses • Investment opportunities

£500

For one tonne of hemp seeds before processing

7.5

Potential hemp fibre yield in tonnes per hectare

600m

Average annual rainfall needed to grow hemp

Hemp renaissance

Once an essential fibre, hemp had all but disappeared from UK markets by the end of the 20th century

Hemp has been cultivated and used in the UK for centuries for its biomaterial properties – in fact its long fibres have been spun and woven to make sails, rigging and ropes for ships since before the Elizabethan era. Now it is making a comeback for very different reasons. Here we explain the background to its rapid evolution and offer guidance for UK farmers looking to access the market.

Multiple end uses

As a quick growing plant, hemp can rapidly accumulate biomass and so sequester carbon dioxide in the process. Once grown, hemp fibres can be used to create products ranging from paper and building materials to bioplastics and livestock bedding. If the plant is allowed to mature and produce seeds, additional products can be manufactured, including hemp oil for cooking and seed cake for animal feed.

Hemp has received significant attention for its ability to capture carbon and form part of circular systems. Such systems aim to eliminate waste and continuously reuse and recycle resources. Depending on the final use of the plant, this carbon can potentially be stored indefinitely. So called hempcrete is being praised for its ability to both offset a carbon-intensive building material and simultaneously provide a long term carbon store. Alternatively, it is a natural fibre that is biodegradable and can potentially replace synthetic fibres.

Its environmental credentials also extend to soil health. Having a large taproot, hemp can not only reduce soil compaction but also recover nutrients ordinarily outside of the root zone that may otherwise leach into the groundwater and be lost. If correctly deployed into a rotation, it offers a unique variation in crop type and is also believed to shade out weeds. Both of these factors lead to a reduced requirement for pest control.

Obtaining a licence

Cultivating industrial hemp constitutes a “special purpose” under the Misuse of Drugs Act 1971 (MDA), meaning it is permitted once a licence is obtained. There is a wide range of varieties that can be grown and careful attention should be paid to their individual characteristics to select the most appropriate seed. The variety chosen should also comply with the UK definition of industrial hemp by containing no more than 0.2% tetrahydrocannabinol (THC). Knowing this and other traits that are specific to the local climate and soils, means that growers can tailor their crop to the law and their business plan. For example, harvesting seeds for oil extraction requires a shorter-stem crop for the combine harvester.

Only the fibre and seed can be used under an industrial hemp licence. These elements contain the lowest levels of THC and cannabidiol (CBD). Growers looking to produce cannabis for high value cannabinoids should therefore look to the medicinal cannabis licence. Nonetheless, industrial hemp offers numerous benefits for growers, as well as an opportunity for healthy returns. The industrial hemp licence is far more accessible, with less regulation and a lower cost of £580 for a new, three-year licence.



WHAT ARE THE DIFFERENCES?

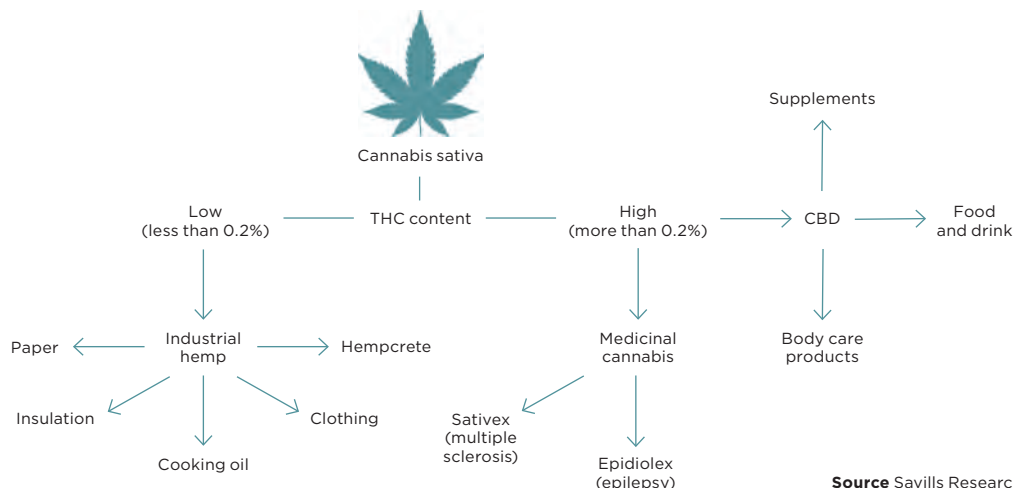
Both hemp oil and CBD oil can be derived from any cannabis plant. They are both non-psychoactive with acceptable levels of THC. But there are some crucial differences.

HEMP OIL

Obtained from cold pressed seeds that contain low volumes of cannabinoids. Hemp oil often does not contain CBD but does possess a mix of nutrients, protein and fats. It can be used in food supplements, cooking oils and body care products.

CBD OIL

Obtained from the leaves, flowers and stalks of the cannabis plant using solvent extraction methods, CBD oil should contain pure CBD and no other cannabinoids. Perceived wellbeing benefits and greater public awareness has resulted in rapid market growth of CBD products.



0.2%
If the THC content is below this, the plant is classified as industrial hemp

“Once grown, hemp fibres can be used to create products ranging from paper and building materials to bioplastics and livestock bedding”



Just another crop?

Hemp is a versatile crop and will grow in a variety of conditions

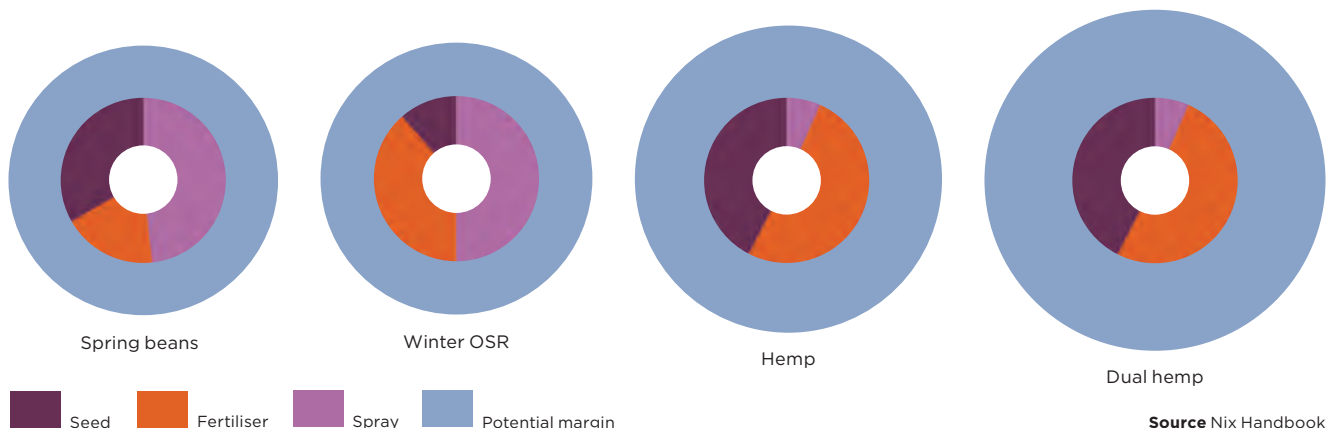
Planting for fibre alone normally begins in April or May before mowing in August. The crop then needs to be left in the field to dry, bleach and partially “ret”, which can take anywhere between two to six weeks, before it can be baled. Retting is the partial decomposition of the plant and necessary to allow processors to separate the fibres from the core. Harvest is delayed if growing dual hemp for both seeds and fibre to allow the crop to mature. Seed moisture content will indicate when the crop should be harvested

and timings will vary with species. When ready, the top of the crop is combined for seed with the remainder left for fibre.

With the optimal site, yields of hemp fibre can reach 7.5 tonnes per hectare with a value of around £160 per tonne. If pursuing dual hemp, fibre yields will fall to 5 to 6 tonnes but with one tonne of seeds worth around £500 (before processing) waiting is worthwhile. This dual hemp approach improves margins and could be increased further with investment in on-site processing and direct selling.

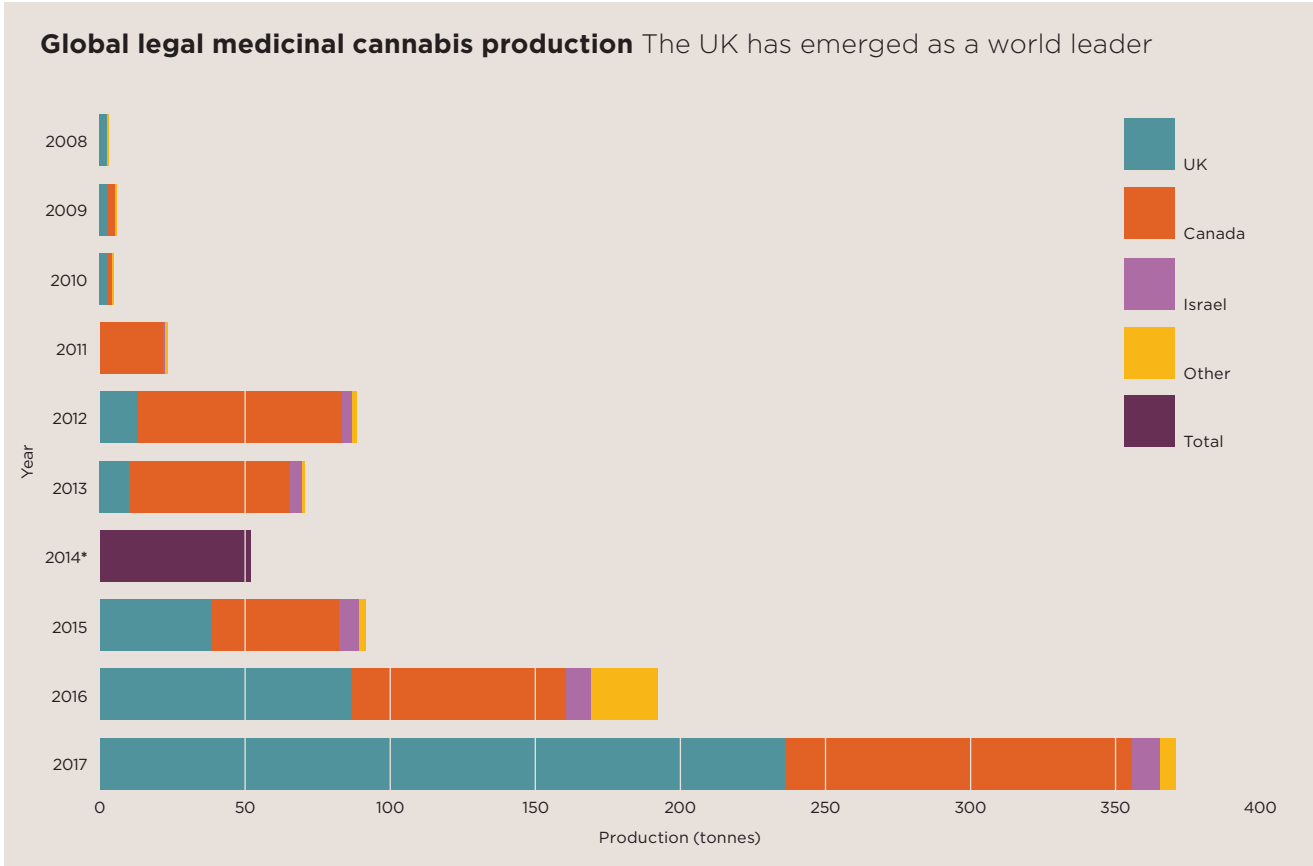
Hemp is an exceptionally versatile crop and will grow in a variety of conditions. It performs best when grown in well-aerated, loamy soils rich in organic matter and with a pH between 6 and 7.5 are ideal. Warm temperatures and sun will promote growth. Around 600mm of average rainfall is also needed, particularly before flowering where irrigation may be required. There are some restrictions, with the Home Office recommending sites away from schools or public rights of way.

Potential gross margins compared with other crops



Source Nix Handbook

“Though initial capital outlay for controlled systems is significantly higher, a high value product provides ample opportunity to recoup initial investment and achieve healthy returns”



The UK is world’s largest producer of legal medicinal cannabis

We look at the rapid growth of this crop and how investors can access the market

We are unlikely to see UK companies fulfilling the requirement for high quality CBD products in domestic markets. Where licences are granted, extracted CBD and other cannabidiol compounds are utilised for medicinal or scientific purposes as they are higher value products. UK production of cannabis derived medicinal products increased by over 500% between 2015 and 2017, to 235 tonnes, making it the largest global producer by a significant margin.

Plants with high cannabidiol and, therefore, high THC levels are regarded as medical grade cannabis and require a different growing regime. A demand for premium quality requires the crop to be grown in a controlled environment. Extraction of cannabidiol compounds is also highly regulated, meaning markets are largely inaccessible. Partnerships may be needed to market end produce, such as in the case of medical preparations. Pharmaceutical companies will have

strict production criteria already in place to ensure products comply with safety and quality legislation.

Though initial capital outlay for controlled systems is significantly higher, a high value product provides ample opportunity to recoup initial investment and achieve healthy returns. Prices for all varieties of cannabis are less susceptible to market volatility due to the tight controls, this is particularly the case for high THC varieties where controls are stricter.

Licensing and standards

A separate licence must be obtained from the Home Office for varieties that contain more than 0.2% THC. Unsurprisingly, requirements for these licences are far stricter but not unattainable. Between 2016 and March 2019, the Home Office granted seven High THC cannabis cultivation licences for research and 30 for the extraction of cannabinoids. The cost of such a licence is higher

at £4,700, but the option to produce cannabinol products also gives the opportunity for higher returns.

Partnerships are necessary here as licences will only be granted for scientific or medicinal purposes. Several other requirements must also be met and can be demonstrated through a robust business plan. When creating a plan, ensure all movements and transactions concerning the crop are accounted for, as well as how and when destruction will occur. Security is often a chief concern and must also be demonstrated in your plan.

To make, assemble or import medicines, you also need a manufacturer licence, issued by the Medicines and Healthcare Products Regulatory Agency (MHRA). This in turn relies upon compliance with good manufacturing practice that demands products be of a consistent high quality, appropriate to their intended use and meet the requirements of the marketing authorisation.

500%

Increase in UK production between 2015 and 2017

235

Tonnes of cannabis derived medicines produced by UK

250k

Number of CBD oil users in the UK in 2018

The CBD market

This burgeoning market is expected to more than triple in the next five years

There is no definitive cause behind the recent growth in the cannabis market. Changes to legislation in certain jurisdictions and the isolation of the cannabinoid cannabidiol (CBD) as a medicine and food ingredient are likely to have contributed, as well as the increased awareness among the public of its perceived wellbeing benefits.

The market is currently worth £300 million in the UK, a figure that is expected to more than triple in the next five years. That equates to a £1 billion market in CBD alone by 2025. The number of CBD oil users also doubled from 125,000 to 250,000 between 2017 and 2018. High street chains such as Holland & Barrett, Boots and Lloyds Pharmacy are all stocking CBD products as they provide the most accessible products for both producers and consumers.

All CBD oils incorporated into high street products are imported into the UK, predominantly from the US and Eastern Europe. It is questionable whether all these imports go through

the rigorous testing process required here to confirm compliant levels of controlled substances.

Tests have found that up to 62% of UK high street products that were analysed did not contain the CBD content indicated on the product labels. Others were found to have unacceptable levels of controlled substances, such as THC. Many producers are, therefore, turning to self-regulation and independent verification to ensure compliance and a quality product.

Extraction of cannabidiol compounds is highly regulated, meaning such markets are largely inaccessible. Yet this makes the UK an attractive prospect for those capable of overcoming regulatory barriers, owing to the reduced competition in this country. Those who obtain a licence to extract and utilise cannabidiol compounds for medicinal or scientific purposes are few and far between and so the production is likely to be a high value product.

A SCIENCE LESSON

Cannabis sativa, often known simply as cannabis or hemp, contains at least 113 different cannabinoids. Cannabinoids are a class of similar chemical compounds that act on specific receptors in the brain. Amongst those 113, there are two of specific interest:

1 Tetrahydrocannabinol (THC) produces the psychoactive effects that cannabis is synonymous with. As the principal psychoactive compound, THC is responsible for the “high” that cannabis can produce, as well as its medicinal properties. Unsurprisingly, it is this compound that is most closely regulated.

2 Cannabidiol (CBD) is the compound providing cannabis with its recent market success in the UK. The compound is not psychoactive, but many people believe it has numerous wellbeing benefits. While not producing a “high”, CBD has been linked with pain relief and reduced feelings of anxiety. CBD is not regulated like THC and greater awareness of these perceived benefits has led to this growing market.



\$228m

Predicted value of CBD sales in China in 2020

33

Numer of US states where medicinal cannabis is legal

2013

Year recreational cannabis use was legalised in Uruguay



International opportunities

Attitudes to the growth and use of hemp and cannabis vary around the world, which in turn is reflected in international legislation and world trade

Europe

With a combined population of nearly 750 million, Europe could potentially offer a larger market than North America. Momentum is also building with more nations within the bloc permitting some kind of medicinal use.

Germany has been widely hailed as a progressive leader in the area, with a broad list of qualifying conditions leading to a marked increase in registered patients. It is also the first nation in the world to cover the cost of medicinal cannabis.

Europe is a continent of contradictions. France, despite legalising cannabis for medicinal use in 2013, has so far not seen a single patient use any form of cannabis based drug.

North America

Canada became the first G-7 nation to legalise recreational cannabis use in 2018. Since then, innovation and investors have flowed into the market. Eleven US States legalised recreational use before Canada, but it ultimately remains prohibited at a federal level. Medicinal use is permitted in a further 33 states.

South America

Uruguay often steals the South American spotlight when it comes to cannabis, being the first nation in the world to fully legalise recreational use of cannabis in 2013. Despite this, production in the region is not particularly high. Yet it could eventually rival North America and Europe with ideal conditions, large areas of arable land and cheaper labour costs.

Asia and the Middle East

China grows nearly half the world's legal hemp, with sales in 2018 totalling \$1.2 billion. Unlike the UK, leaves and flowers may be processed for CBD leading to a burgeoning market. Sales of CBD are predicted to reach \$228 million this year, quadruple what it was only a year ago. The nation is not entirely permissive and the anti-drugs squad declared that China has never approved industrial cannabis as a medical or food additive. Tighter monitoring is expected in the future, coupled with wider application of by-products.

Israel has been a leader in medicinal cannabis research for a number of decades. With an ideal climate, no restriction on

production volumes and a high quality seed bank, it is well positioned to be a global leader. Indeed, the lack of restriction on production volumes explains why this small nation is one of the largest exporters at present (generally only outdone by Canada and the UK).

Oceania

Australia legalised cannabis for medicinal use in 2016 and is the production and distribution hub for the Asia Pacific region. The medicinal market remains highly regulated however, as indicated by a relatively low number of registered patients.

Cultivation and production is permitted under licence and exports are also allowed providing regulations are met and domestic supply is not affected. Australia already has an established pharmaceutical brand in the region, which means there is significant potential for growth.

In New Zealand, medicinal cannabis can be prescribed through special permits or licences but only for defined conditions and at personal expense. Recreational use is currently illegal, though that could change following a referendum in 2021.

“Hemp represents a niche opportunity for farmers to diversify. Besides providing reduced exposure to risk and opportunity for enhanced returns, hemp may bring other benefits”

Three things to know before growing cannabis

Establishing a robust business case is crucial to success in this highly regulated sector

1 Two separate opportunities
It should now be clear that hemp and cannabis, despite belonging to the same family, are two very distinct crops that require entirely separate approaches. This disparity will mean the correct direction for your business is already determined.

For the average farming business, the capital intensive and highly regulated cannabis regime may well be unobtainable. Such undertakings are only possible for companies with significant capital and expertise available to invest.

In contrast, growing hemp represents a niche opportunity for farmers to diversify. Besides providing reduced exposure to risk and also opportunity for enhanced returns, hemp may well bring other benefits. Improved soil health, carbon sequestration and reduced nutrient loss are all possibilities that are increasingly well regarded by both regulators and the public.



2 Invest in expertise
Whether growing hemp or cannabis indoors or outdoors establishing the enterprise can be complex both from a regulatory and practical perspective. Poor siting and care can lead to diminished yields, while falling foul of regulations can lead to whole crops being destroyed.

Seeking advice from specialist consultants can, therefore, prove invaluable in both instances until experience and expertise in the sector is acquired. Such expertise is often an easier pathway into the wider network of producers, manufacturers and distributors that are key to success. This is particularly the case for medicinal grade cannabis where partnerships are essential from the very beginning of the process.

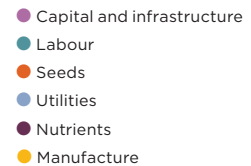
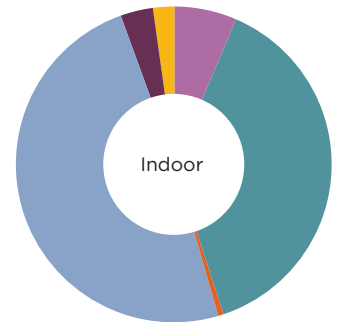
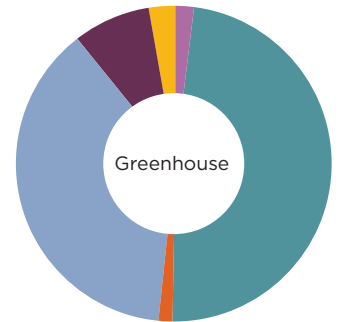
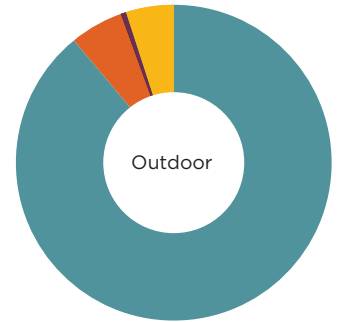
3 Keeping costs down
To achieve a premium-grade cannabis product, a high capital controlled environment system is needed. It is the only method for growing high THC medicinal cannabis, which can attract greater returns.

These costs are dominated by utility bills for the lighting, heating and water pumping that are necessary to maintain optimum growing conditions. Co-siting your greenhouses with another business that is generating waste heat and carbon dioxide, such as an anaerobic digestion plant, an internet server or a boiler room in a commercial property, can be advantageous and also help to minimise costs.

Given the sensitive nature of the crop, security procedures will also need to be considered. Controlled cultivation methods have improved security because the buildings themselves count as an obstacle in themselves, but this alone will not be adequate. Measures such as fencing, CCTV and alarms will be required for any site to obtain a licence.

Growing costs

Comparing medicinal cannabis farming types



Source Deloitte

Outlook and opportunities

The versatility of hemp has been well known for generations and its use as an alternative to plastic will be of increasing interest. Growing acceptance of its medicinal usage increases the scope for further market development. Increased cultivation will improve the affordability of cannabis-based medications and likely expand their use and the research around them. Even without recreational use, the cannabis market is ripe for investment. Potential investors should carefully consider which of the many end-markets they will focus on. Once such a business plan is in place, significant returns on investment are certainly possible.

\$66.3bn
The predicted value of the global cannabis market by 2025



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