



NZ HEMP EXPORT DRIVEN INVESTOR REPORT:

\$2 BILLION AND
20,000 REGIONAL JOBS BY 2030
JUST NEEDS THE NOD...



FULL REPORT

NZ'S HEMP EXPORT DRIVEN INDUSTRY

10 August 2020

By Dr Nick Marsh

1) A 60 page FULL REPORT

<https://joom.ag/attC> for investors, in the NZ iHemp industry

2) A 28 page SNAPSHOT <https://joom.ag/oSiC> of the full report for investors, in the NZ iHemp industry.

ACKNOWLEDGEMENTS

-A huge thanks to my wife Linda Robinson whose writing and editing expertise has been invaluable to this report.

-Thanks to Richard Barge, Chair of NZHIA, Nigel Slaughter from **Ligar Extraction**, and Nigel Hosking from **Midlands Seed** who have guided this project - from seed to product, so to speak.

-Thanks also to all the CEO's and investors who have created and grown the hemp companies including: Dave & Anne Jordan - **Hemp Farm NZ**, Andrew Davidson – **Midlands Seed**, Jacob Draper - **Hemp NZ**, Matt Johnston - **Hemp Connect**, Isaac Beach - **Kanapu Foods**, Andrew Bell - **Kakariki Fine Foods**, Brad Lake, Brendon McIntosh, Michael Burnett - **The Brothers Green**, Chris Woodney - **NZ Hemp Brokers**, Mack McIntosh - **Hemp Seed Holdings**, Tadhg Stopford - **Hemp Foundation**, Lisa Gadsby - **NZ Hempres** and many more.

-And a special thanks to the 150 farmers who have planted around 1,200 hectares of hemp in 2019/2020.

NZ'S HEMP EXPORT DRIVEN INDUSTRY

ISBN 978-0-473-53796-8 – Full Report (softcover)

ISBN 978-0-473-53798-2 – Full report (PDF)

ISBN 978-0-473-54114-9 – Snapshot (softcover)

ISBN 978-0-473-54115-6 – Snapshot (PDF)

10 August 2020

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Author: Dr Nick Marsh

Published by: NZ Hemp Industries Association

Funded by: AGMARDT/NZHIA

Editing, Design & Artwork – Marco Fantham & Chedon Owsley

Printing: NZ Hemp Industries Association Inc
Submit feedback and queries, to the author via admin@nzhia.com

Disclaimer:

The purpose of this report is to explore the commercial, regional, and environmental opportunity for investors in the Industrial Hemp sector in New Zealand.

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AGMARDT

FUTURE SHAPERS

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NEW ZEALAND HEMP REGIONS



**AUCKLAND & NORTHLAND
HEMP REGION: KOEKOEĀ**



**WAIKATO & BAY OF PLENTY HEMP
REGION: HEMP FARM**



**WELLINGTON/MANAWATU-WHANGANUI/TARANAKI
HEMP REGION: HEMP CONNECT**



**SOUTH ISLAND
HEMP REGION: MIDLANDS**

FOREWORD

Industrial Hemp is a treasure trove of potential - New Zealand can grow high quality plants, which can be processed into a wide range of natural health products for consumers, as well as industrial products for different industries.

The environmental and health credentials of hemp are aligned with the values of consumers. Processing has to be situated close to the farms - which leads to investment in regional development. And, the creation of jobs and training opportunities.

80 years of prohibition means there is a tremendous amount of work required. That fits well with our **'can do' attitude, and kiwi ingenuity.** Our research and development ecosystem are well positioned to develop new products and services. Additional rewards come from licensing the technology to process and produce hemp products for global markets. We have the growers, and

the food and fibre hemp industry is moving forward and making huge leaps each season, to develop and service a wide range of expanding markets:

- **The food industry** has embraced the highly nutritious hemp seeds, and the wider industrial applications are starting to be discussed as supply creates a demand for the secondary industries. They being animal foods (currently





- illegal) and industrial uses.
- **The fibre industry** is potentially the largest part of the industry, with a high demand for low and high tech end products. It will provide scalable and bankable business plans for investors and farmers. There is a strong local demand for low carbon construction materials grown and made in New Zealand. Ensuring continuity of supply from local sources is a priority in the 'new-normal' post Covid-19.
- **Growers** will improve their on farm management and their

- yields will increase as new varieties are bred to meet the specifications of the food, fibre and health industries. Farming systems will benefit from this alternate land use, in their rotations. Regenerative hemp will help these systems to become sustainable, and will benefit the soil and ecosystems where it is grown.
- **Health applications**, which are currently limited by our legal framework, have the potential to bank roll the industry and encourage the development of hemp fibre into packaging

and other products that are required to deliver our high value branded products to global niche markets.



Richard Barge
Chair of NZ Hemp Industry
Association Inc (1997)

EXECUTIVE SUMMARY

The global research in this report paints a surprising picture for most New Zealanders. A big opportunity for the New Zealand economy, of which few are aware. In short, ***we could have another crop export success like Wine and Kiwifruit***, but in a much shorter time. Hemp products are making a comeback globally into mainstream consumer markets as well as industrial markets, most notably in the Americas and across Europe.

Hemp manufacturing was for centuries a key economic sector from Asia to the Americas. But this was followed by eight decades of being wrongly designated as a narcotic drug. Hemp and marijuana are two varieties of the cannabis plant. Marijuana contains psychotropic THC, while hemp contains the calming CBD.

The global hemp industry is projected to grow from US\$ 4.6 billion in 2019 at a CAGR of 34%, to US\$64.8 billion by 2030. **The biggest share of this market is expected to be CBD** and other cannabinoid products, followed by seed food products, as well as an increasing demand for low and high-tech fibre products both locally and



20,000 REGIONAL JOBS BY 2030



overseas. A niche market which NZ could quickly dominate is premium seed oils for the discerning consumers of high quality cuisine in San Francisco, London, Shanghai, and Berlin.

The commodity hemp players are China, USA, Canada, and France. But smaller iHemp countries and states around the world (such as NZ) are also positioning themselves to play to their strengths and specialise in key markets. For example, Israel and the Australian state of Victoria are focussed on pharmaceuticals; Canada is building strength in fibre for construction and textiles, while Colorado, California and Hawaii are retailing a wide range of CBD products for different customer markets, including formulations for animal well-being.

This report is to inform

investors and politicians about the opportunity hemp provides to our economy, as we face the challenge of minimising recession by developing new crops and value propositions in world markets. We prosper or decline on our ability to find high value consumer niches in world markets.

In New Zealand Medicinal Cannabis/Marijuana was legalised commercially in April of this year for the production of pharmaceuticals which can include THC and CBD in their formulations. iHemp was partly legalised in 2006, with new regulations allowing for human consumption of hemp seed in 2018, but not the flowers and leaves.

The scaling up of the industry has been led by Dave Jordan (founder Hemp NZ 2009, and Hemp Farm NZ 2011),

also Andrew Davidson and Nigel Hosking at Midlands Seed and Midlands Nutritional Oils in Ashburton

Hemp Farm has grown into Hemp NZ, which operates as a nationwide conglomerate across Foods, Fibre, and Bulk extract markets with a grower's group of 70 farmers across five growing regions.

Other leading hemp companies in different regions have developed brands and market share - Hemp Connect, Kanapu, The Brothers Green group of Companies, Hemp Brokers, Larry's Creek, NZ Hempres, Karariki Fine Foods, and Hopefield Hemp. These entrepreneurs have helped drive consumer demand for hemp seed products including oils, balms, milk, and protein powder.

THERE ARE ONLY 2 PROBLEMS GETTING IN THE WAY:

1. *The general public ignorance, confusion, and outdated stigma about cannabis, marijuana, medicines, and hemp.*



2. *The regulatory block that is delaying our ability to compete in fast-growing global CBD markets with our own brands of hemp nutraceuticals, as well as premium bulk extracts.*

MISUSE OF DRUGS ACT 1975



Investment Fund managers tell us that capital is readily available for the rapid expansion of our hemp industry but that investors need regulatory assurance so that they can enter the nutraceuticals market, as well as the seed and fibre markets. Senior lawyers tell us that the regulatory adjustments needed are really not that hard to accomplish, but we need a similar vision and political will to that which established the iHemp

Industry in NZ in 2006.

This report describes two growth scenarios for hemp in New Zealand by 2030.

SCENARIO 1 - No Regulatory Reform with the seed and fibre products estimated at \$500 million with around 5,000 new jobs in the regions

SCENARIO 2 - Regulatory Reform with total earnings of \$2.0 billion; \$183 million

in seed products, and \$317 million in fibre products, \$1.5 billion in hemp nutraceuticals from cannabinoids, terpenes and flavonoids, and 20,000 new jobs in the regions.

In summary: Does New Zealand want the export earnings of a new \$2.0 billion hemp industry, which plays to all our strengths in agriculture, and global brand marketing of high value food and beverages?

1. INTRODUCTION

PURPOSE OF REPORT

This report was commissioned by the NZ Hemp Industries Association Inc and funded by Agricultural and Marketing Research and Development Trust (AGMARDT). Its purpose is to inform interested parties and potential investors about what has already been achieved in the industry and the opportunities for growth; in particular the extraordinary opportunity for New Zealand to export into a burgeoning global industry in hemp foods, hemp fibre, and hemp health products .

METHOD

The report is based on a substantial number of

interviews and meetings across the industry and also desktop reviews of the literature relating to traditional knowledge, the science and international and national laws relating to the cannabis plant, and to hemp cultivars.

In addition, a market scan has been undertaken of the global market in those countries where there are active industrial hemp sectors. *The international scan includes an understanding of the ways in which law changes have allowed for the development of a market in hemp-based products.*

Finally, the 2030 forecast/ scenario was the result of collaboration with the CEO's of several leading NZ hemp companies and the chairman of the NZIHA.

SCOPE

This report is about industrial hemp, a cultivar of the cannabis plant. Owing to the general prohibition on cannabis, it is necessary to discuss cannabis (marijuana) and medicinal cannabis. However, it is vital that the reader appreciates that industrial hemp, as compared to marijuana, is a non-psychoactive cultivar with enormous health and other benefits, as well as the potential to be a new export industry for New Zealand. It is hoped that this report will assist in overcoming the negative connotations around cannabis and give a new appreciation of the value of hemp. After explaining the industry terms which the

reader will encounter in this discussion, the report looks at the results of scientific study into hemp. It then scans global activity in the industrial hemp market, which is proving very profitable in those countries which have liberalised their legislation by either legalising the cannabis plant, or at the least expressly excluding industrial hemp and its beneficial compounds from their anti-drug laws.

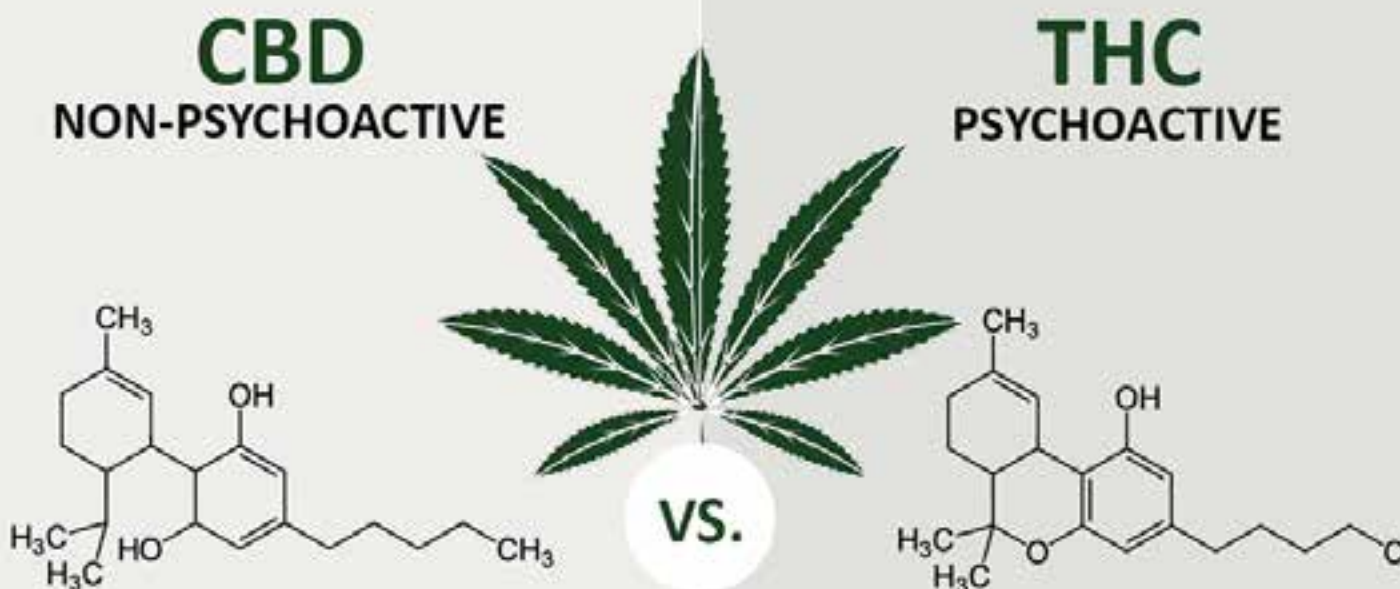
Following on from the global discussion,

the report provides a comprehensive picture of the New Zealand industrial hemp sector at present. Included is a discussion of the present regulatory framework, which is seen as a serious obstacle to the development of a wider, and more lucrative range of products to meet growing consumer demand – both in New Zealand and overseas.

Further discussion includes ways in which the **regulatory framework in New Zealand could be changed so that the non-**

pyschoactive compounds in hemp can be used in a wide range of non-medicine products, such as - foods, nutraceuticals or body care. This would enable hemp growers to use the whole plant, and to grow the industry at a substantial rate.

Finally, a ten-year forecast is given in the 2030 Scenario, based on assumptions including a liberalisation of regulations as seen in other countries, and predicting a \$1.6 billion dollar export sector.



2. WHAT IS HEMP

KEY TERMS SUMMARY

Cannabis Sativa

is an annual flowering plant originating in Central Asia, which has been cultivated for several thousand years, for health and recreational purposes. Recently, it has been bred to enhance its active compound tetrahydrocannabinol (THC) which provides the euphoric effect or 'high' sought by recreational users.

THC

(Tetrahydrocannabinol) the psychotropic chemical compound found in the buds and flowers of marijuana, induces a euphoric effect when heated and consumed.

CBD

(Cannabidiol) a prevalent cannabinoid in the

cannabis flowers which has a wide range of anti-inflammatory effects in the body. CBD is non-psychoactive.

Marijuana is another name for these high THC plants and their associated products which have more than 0.35% of THC

Endocannabinoid

system (ECS) a recently discovered, molecular system in the human body responsible for maintaining homeostasis (stability of your internal environment) in many processes in the body including the immune system, sleep, stress, chronic pain and moderating inflammation.

Cannabinoids

More than 100 naturally

occurring chemical compounds in hemp and marijuana which interact with the ECS in our body.

Hemp Fibre

The **Bast** are the fibres that grow on the outside of the plant's stalk- which can be manufactured into textiles, ropes, and all fibre-based products.

The **Hurd** (or shiv) is the high cellulose, woody core inside the stalk, which can be used for hempcrete and various absorbent products.

Hemp Industry in New Zealand

Misuse of Drugs Act (Industrial Hemp) Amendment Regulations 2006 and 2018 allows cultivation of low THC (less than 0.35%)



HEMP



MARIJUANA

industrial hemp, and processing and trading in the seeds and stalk to produce hemp food and fibre products.

Medicinal Cannabis/ Marijuana Medicines in New Zealand

Misuse of Drugs (Medicinal Cannabis) Act 2018-2019 made it legal from 1st April 2020 for licensed companies to grow and manufacture cannabis prescription medicines containing cannabinoids. Including high THC dosages.

To understand hemp one must start with the cannabis plant, and then understand the different characteristics of cultivars of that plant and in particular hemp; these differences are central to the development of an industrial hemp sector in any country, including

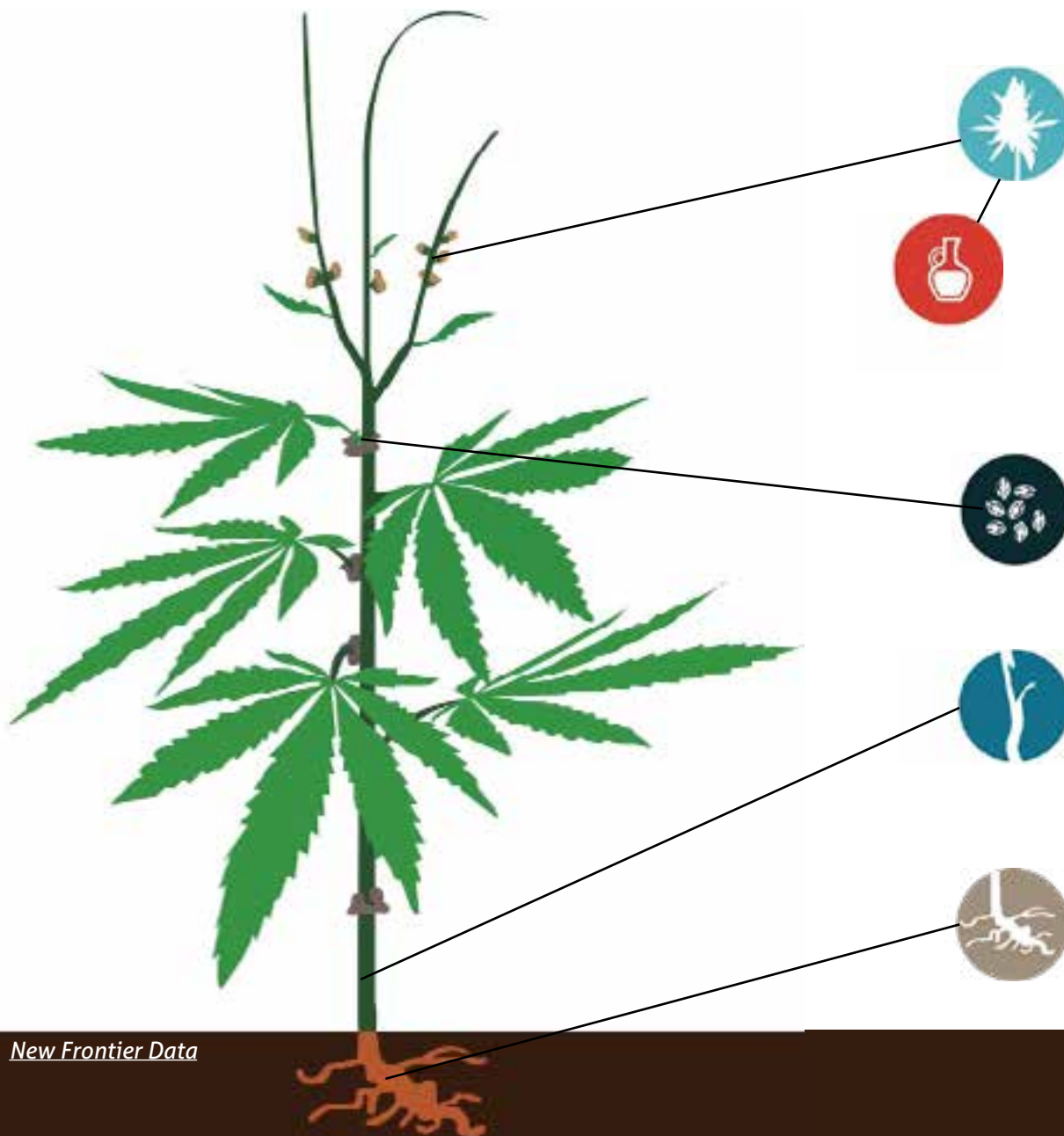
New Zealand.

Hemp (Sometimes called 'industrial hemp') is the name given to cannabis sativa plant strains with extremely low levels of THC. (In New Zealand the permissible level of THC is less than 0.35%, in Australia 1%, and in Europe 0.2%). Hemp is grown both in New Zealand and overseas for industrial and commercial uses. Hemp seed is highly nutritious and very versatile. The entire hemp plant, including stalk, leaves, seeds, roots and buds can be used for a wide range of products, including food, fibre, and health remedies.

Traditional markets exist for hemp food and fibre and as more research is done we are developing many more non-traditional, high and low tech markets.

- **Food products** can be sourced from hemp seeds which are processed into oils, flours, powders and milk. This market started in 2018 when we were granted access to hemp seed foods for human consumption.
- **Fibre** is commonly used for pet bedding, high grade paper making and as a yarn in textiles, plastics and composites. Local demand for construction uses - which range from insulation, MDF boards and hempcrete to acoustic tiles, carpets and soft furnishings - will support the establishment of new industries for the regions.

- A sustainable source of fibre can complement our other primary industries** like wool and forestry and lead to the development of both low and high tech applications. Researchers at New Zealand Universities and Scion Research are already engaged with industry to open up opportunities to utilise the versatile qualities of hemp fibre for industrial applications.
 - Consumer demand will help focus these developments.** By being ahead of the curve we could be developing novel packaging and distribution technology which is supported by science. This complements new product development, and has export potential.
 - A positive future for hemp food and fibre is assured.** As the industry scales up to meet a growing demand for sustainable raw materials, New Zealand is well positioned to be a global leader in these areas. We can play to our strengths, with a sophisticated and ecological R&D system, and an agile manufacturing industry.
 - Hemp is an opportunity to invest in regional
- New Zealand, creating the jobs and opportunities required to scale the industry. And, leveraging the global reputation of New Zealand food and beverages, as a trusted brand.
- Scientific research into the phytochemicals** contained in the cannabis leaf and flower, and in particular compounds known as cannabinoids, has resulted in the recognition that, in comparison to high THC content plants, many strains of Cannabis Sativa can be safely used for medicines and other products. Many research agencies, including the WHO, have published literature reviews confirming that Cannabidiol (CBD) is generally safe for human consumption. (1)
 - The recent discovery of the endocannabinoid system (ECS)** in the 1990's, is very significant for the future of the hemp industry. The ECS is a molecular system in our body responsible for regulating and balancing many processes in the body including immune response, communications between cells, appetite, metabolism and more. Science has revealed a web of receptors, enzyme and biochemical pathways involved in manufacturing and using the human body's own form of cannabinoids. Endo (originating within the body) cannabinoids, can be supplemented by phyto (from plants) cannabinoids.
- The cannabis plant can be used for treating a wide range of illnesses** because it has over one hundred currently known cannabinoids which can each connect into the ECS. The best known of these is cannabidiol (CBD), which is a non-psychoactive compound. ***CBD is highly regarded as a compound with a wide range of medical and health benefits.*** This knowledge has been known for centuries but only recently proved via scientific research.
 - CBD is extracted either through separation of CBD oil from the plant matter,** or by extracting the compound from the stem, stalk, leaves and flowers of the hemp plant.



New Frontier Data

THE HEMP PLANT HAS MANY DIFFERENT USES

The hemp plant has many different uses, which can generally be divided into four distinct categories based on the parts of the plant: Flower, seed, fibre (stalks), roots.

Food products can be sourced from hemp seeds which are processed into

oils, flours, powders and milk. Fibres sourced from the stalks of the plant have been manufactured into textiles, ropes, paper, composites, plastics, fuels and construction materials.

THE HEMP VALUE CHAIN - MANUFACTURING RAW MATERIALS INTO PRODUCTS (2)

THE 3 MAIN PRODUCTION CATEGORIES ARE:

FIBRE

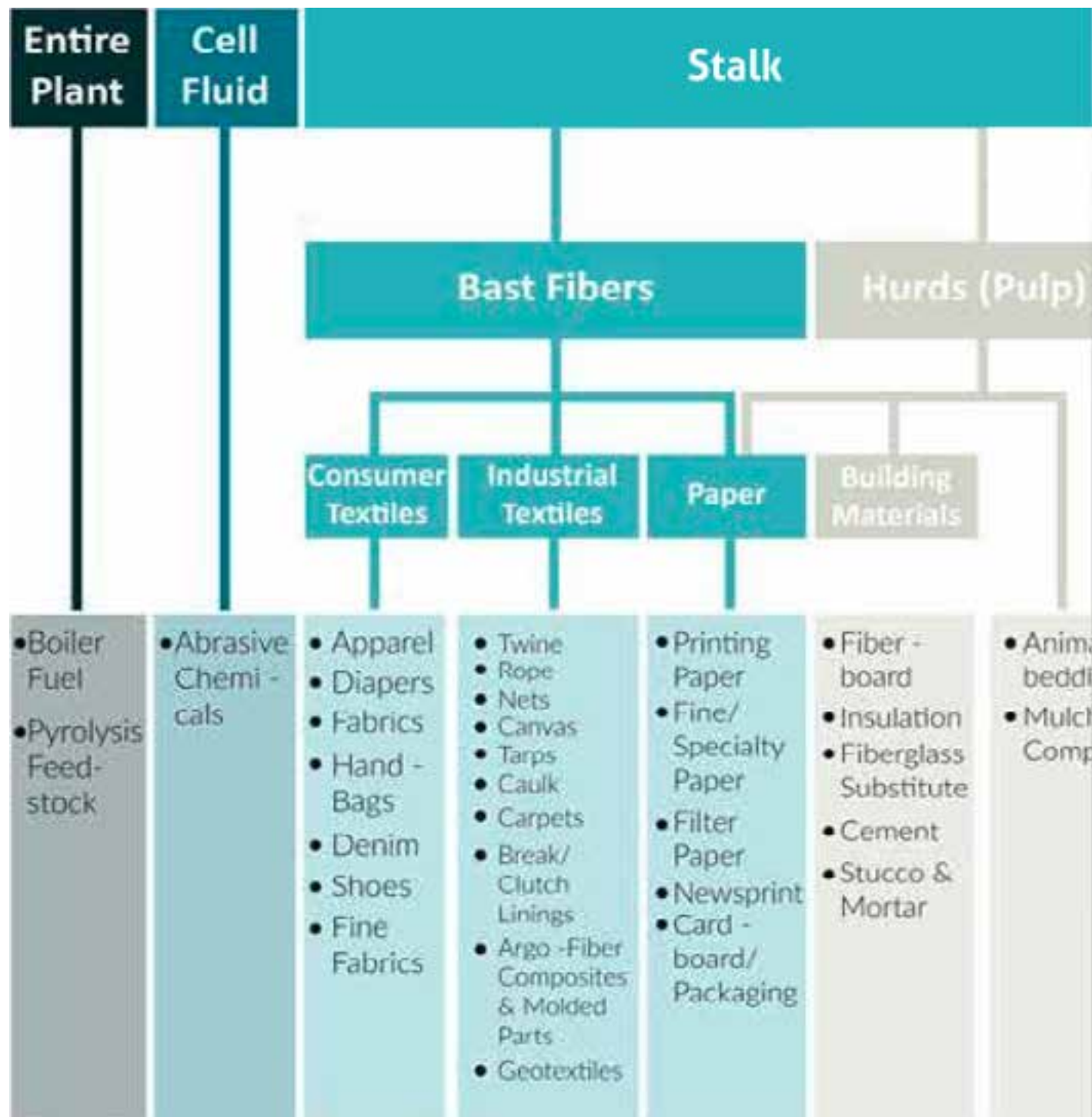
From the bast and hurd in the stalk; is manufactured into a wide range of textiles, ropes, paper, composites, plastics, fuels and construction materials.

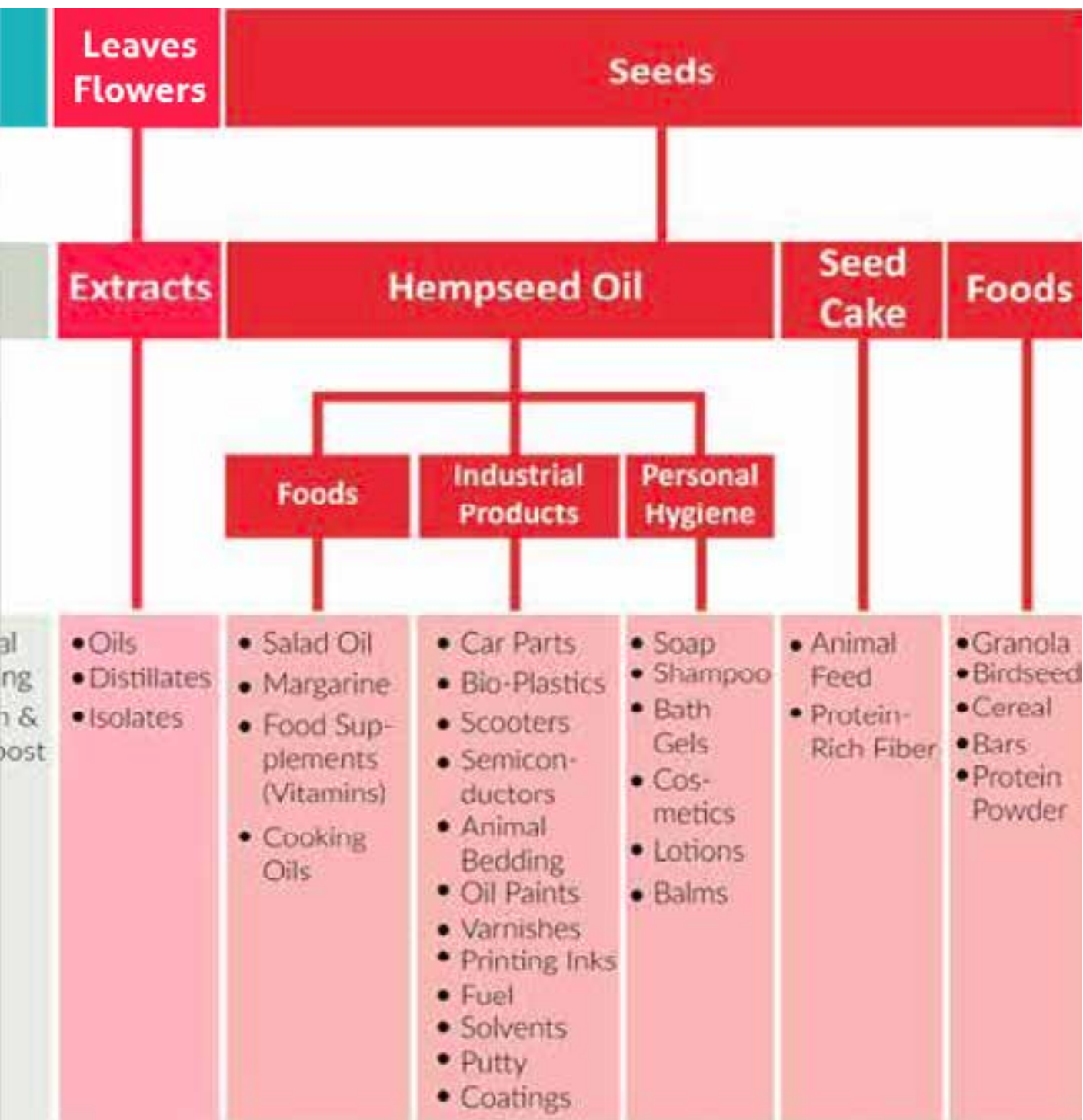
EXTRACTS

Cannabinoids, terpenes and flavonoids extracted from the flowers and leaves into distillates and isolates of which the largest market is CBD (cannabidiol).

SEEDS

Manufactured into oils for consumer products including natural health products, food products, such as oils, flours, milk, supplements, powders, balms, industrial oils, lubricants.





While the cultivation of hemp is permitted in New Zealand for the production of hemp seed oil and hemp seeds, as well as fibre, it is important to note that **products containing CBD are regarded by the regulator, the Ministry of Health, as being prohibited.**

The only exception to this is a designation of CBD and CBD derived products, containing less than 2% THC, as medicines, which are governed by the Medicinal Cannabis Agency, and must be prescribed by a doctor.

Due to its derivation from a plant infamous as an illegal recreational drug, the development of CBD (and minimal THC) based products overseas has required a liberalisation of legislation and other controls, and a **recognition**

of the safety, health and nutritional benefits of cannabinoid-based products.

The discussion around liberalisation of cannabis can be confusing, as for many people cannabis is a synonym for marijuana, whereas for those in the research sphere or hemp industries 'cannabis' is simply a plant genus, which includes both marijuana (containing THC) and hemp (minimal THC) cultivars.

Without the psychoactive THC, Industrial hemp is just another agricultural crop. But unlike many other crops it can be used by a wide range of industries. Providing a safe and plentiful resource with great physical properties makes it an attractive and sustainable raw material for industry.

NUTRACEUTICALS AND FUNCTIONAL FOODS

- The Growth Space for Hemp

Many analyst reports over the past ten years have pointed out the growth opportunities which lie in the space between 'Food' and 'Pharmaceutical Medicine'. As pointed out in Chapter 3 it is in this space that the largest boom in the American and European hemp markets has occurred, focused on nutraceuticals and functional foods. The following diagram shows the continuum between food and medicine, which are categorised as the 'natural health foods' market:

1. FUNCTIONAL FOODS

Foods fortified with

THE GROWTH SPACE FOR NUTRACEUTICALS BETWEEN FOOD AND MEDICINE

INDUSTRIAL HEMP INDUSTRY

FOODS WITH STRONG NUTRITIONAL HEALTH RELATED LINKS

Raw Hulled Hemp Seeds
Hemp Seed Oil
Hemp Protein Powder
Hemp Milk

FUNCTIONAL FOODS/ INGREDIENTS

Hemp Protein Powder
Hemp Snacks
Hemp Flour
Hemp Skin Balms

HEMP NUTRACEUTICALS

FULL SPECTRUM OILS
CBD OILS
CBD PET FOOD

MEDICINAL CANNABIS

PRESCRIPTION MEDICINES

Epidiolex
Sativex

added or concentrated ingredients to functional levels which improve health or performance.

2. NUTRACEUTICALS

'The term 'nutraceuticals' was coined in the late 1980s to describe food products that have a health benefit. They are natural product extracts sold in dosage form as capsules, tablets, powders, etc.

THE NATURAL HEALTH PRODUCT MARKET

1. Hemp health products are part of the natural health products industry, which is a \$2.5 billion industry.
2. The Natural Health Products Association holds the membership of 136 NZ companies which are primarily making nutraceuticals from plants.
3. However, one could argue that hemp is the queen of all the plants from which nutraceuticals can be extracted, because of its unique ability to work with our own endocannabinoid system, to help keep all our physiological systems in homeostatic balance.

GROWTH SPACE EXAMPLES



3. HEMP HEALTH MARKETS - COUNTRY COMPARISONS

HEMP CANNABINOIDS (CBD) AND THE ENDOCANNABINOID SYSTEM

The endo-cannabinoid system (ECS) is responsible for managing the complex parts of a human: A vast range of physiological processes including mood, memory, pain-sensation, and appetite. It monitors irregularities in different systems and helps communicate corrective action to restore homeostasis. Body temperature is a simple example, and the immune system is a more complex one. **Research has proved that humans create their own endocannabinoids,** such as dopamine and serotonin, inside the body. These are not stored, but formed as and when the body needs them.

Cannabidiol (CBD) was discovered in 1940 and THC in 1963. Professor Raphael Mechoulam has led a major output of Israeli research studies in the 1970's, 80's and 90's which has identified more cannabinoids, along with an understanding of the endocannabinoid system (discovered in the 1990's) and its relationship to cannabis-sourced (phyto) cannabinoids. Through the continuous research findings and influence of Mechoulam's work, Israel has become a global centre of research and commercial development. (3, 4)

Further research studies relating to CBD and THC

have shown that while these cannabinoids are chemically similar, they have almost opposite effects on the human body in the way they interact with the body's receptors.

Research studies appear to show that CBD can help with conditions such as:

- Seizures, inflammation and pain
- Psychosis or mental disorders, depression and anxiety
- Nausea and inflammatory bowel disease
- Migraines

THC research studies suggest that THC can help with

- Pain and nausea

- Glaucoma
- Muscle spasticity
- Insomnia, anxiety and low appetite

Interestingly, the first

FDA approved cannabis medicine formulation, Epidiolex, used to treat epilepsy contains both CBD and THC. Many pharmaceutical

companies' research includes a focus on formulations using different doses of CBD and THC, as they have useful interactive effects.



HEMP SEED RESEARCH

A review of the research literature (5) on the benefits of hemp seeds shows that they;

- Are an excellent protein source;
- Are an excellent source of vitamin E and minerals such as phosphorus, potassium, sodium, magnesium, sulphur, calcium, iron and zinc;
- Hemp contains all 21 amino acids which are in a perfect ratio for humans, making it an ideal food for vegetarians / vegans (and those cutting down on meat)
- ***Hemp contains a number of essential fatty acids, including Omegas 3, 6, and 9, which have major health benefits; and most notably,***

- Contain GLA (gamma linoleic acid) which is considered to be beneficial to brain function, hair growth, and in reducing arthritic inflammation pain.

These benefits can be enjoyed through consumption and use of hemp seeds in a number of ways including:

- raw hulled seeds
- hemp oils
- protein powder
- milk
- balms for the skin.

The Global Hemp Picture

There is a burgeoning cannabis and industrial hemp industry worldwide in hemp foods, hemp fibre and hemp nutraceuticals. It is important to remember that in previous

centuries most countries grew and processed hemp.

But the world was divided in the 1960's between those which accepted the UN Single Convention on Narcotic Drugs and made Hemp illegal and those refusing to impose a ban, including China and France.

Hemp is today grown in around 30 countries; it began its resurgence in Europe in the 1980's, in Canada in the 1990's and in the USA in 2018.

Today the top six hemp-producing countries are:

- China
- Canada
- USA
- France
- Chile
- North Korea (6)

The fastest growth in the last 5 years has been in the use of cannabis for medicinal purposes and in FMCG (fast moving consumer goods) - via the development of a wide range of hemp health products, including oils, capsules, tinctures, teas and balms.

In addition, hemp seed and seed oil are being used as a food supplement, a health food product, and an ingredient in cosmetics. Also, hemp fibre products are becoming very popular as a textile and as a substitute for fossil fuel plastics and construction materials.

Hemp Industry Daily (12) reports that the USA hemp products market in 2019 was around US\$1.6 billion revenue, and dominated by CBD products

- **CBD - US\$1.2 billion**
- **Seeds and Oil - US\$200 million**
- **Fibre - US\$200 million (10)**

There has been a strong consumer interest in Cannabidiol (CBD) as an ingredient in a wide range of products. CBD is prized for its anti-inflammatory and calming effects for humans and also pets.

Consumer awareness and market penetration over the past 4 years has been extraordinary, led by the USA and Europeans. US surveys indicate that up to 25% of consumers

aged 18+ have tried CBD, and that 50% of those consuming it, are doing so as a substitute for other wellness products.

Similar surveys in Europe are indicating a similar picture as CBD products are widely available in large retail chains nationwide. (7)

The cultivation and development of these hemp health products has been facilitated by legalisation of cannabis for medicinal purposes. As well as a trend towards the easing of regulations which had previously hampered the production and sale of hemp health products, including those containing CBD.

Demand Drivers

When considering these developments, it can be seen that the growth of the cannabis/hemp industry globally can be attributed to a number of drivers.

These include traditional knowledge in regard to the plant's efficacy, present day trends in consumer demand for plant based remedies and products, research based discoveries, and activism around the use of cannabis products for the treatment of certain diseases.

This liberalisation, with the resulting growth in their respective hemp industries, has occurred

in a number of European countries, also in the United States and Canada, Australia, and Israel.

Each country or state has a slightly different profile in regard to this. At the highly proscribed end of the continuum are countries such as Germany and New Zealand, which continue to classify cannabis as an illegal substance under anti-misuse of drugs legislation, but which permit certain exceptions to that prohibition. These include medicinal cannabis, and the cultivation, processing, use and consumption of hemp seeds and oils containing minimal THC or CBD.

Other jurisdictions such as Hawaii and the United Kingdom, retain the illegal status of psychotropic cannabis (marijuana), however they have legalised the production and/or importation of hemp health products containing CBD extracts and other cannabinoids.

At the most liberal end are countries such as Canada and Israel, and various American States, which have legalised cannabis containing THC for recreational use.

Flowing from this has been the growth of hemp industries ranging from medicinal cannabis, to cannabis edibles and other more consumer

- accessible products containing THC, and to non-psychoactive health products, food supplements and nutraceuticals containing CBD and other beneficial cannabinoids.

Before reviewing the New Zealand situation, both in the present and in regard to future potential, it is helpful to look at the hemp industries in some of these overseas countries.

This helps with both appreciation of the potential for a developed hemp industry in New Zealand, and the regulatory means by which that might be achieved.

Additionally, it highlights those countries which are sufficiently liberal to have developed consumer demand for, and understanding of, hemp health products, and therefore qualify as valuable export markets for NZ producers.

CANADA

Canada is at the forefront of the cannabis/hemp global industry in regard to research, investment and substantial production.

This has been enabled by broad liberalisation of controls of the cannabis plant and products arising from it. Medicinal cannabis was legalised in 2001, and in 2018

this was expanded to the legalisation of cultivation, possession, acquisition and consumption of cannabis and its by-products (i.e. as a recreational drug).

A licence is required to grow cannabis commercially, process it into finished products, conduct research on it and sell it for medical purposes.

In what is regarded by commentators as an extremely important further stage of liberalisation, regulations came into force in October 2019 for the production of edible cannabis, extracts and cannabis topicals. These may contain THC and/or CBD and other cannabinoids.

There is expected to be strong demand for these products by consumers who were previously reluctant to use or consume cannabis products. While the existing market of legal cannabis was estimated (in 2019) as C\$5.6 billion, the creation of a consumer market for edibles and other alternate cannabis products is predicted to be worth another C\$2.5 billion per annum.

The Deloitte Report, when discussing the Canadian industry's competitive advantages, cites government support, access to capital markets and the banking system

(due to legalisation), and a unified market, that is not hampered by state/federal conflict as has been the case in the United States).

Canada can expect competition, however, from other jurisdictions where relevant legislation is being rapidly liberalised, in particular the United States.

ISRAEL

As we have seen, Israel has been a global leader in research and development of medicinal cannabis and recognition of its beneficial attributes. As a result, its medicinal cannabis programme was introduced in the early 1990's.

The country has stayed in the vanguard of legalisation, permitting recreational use of cannabis from April 2019.

GERMANY

Germany was one of the first countries to advocate for CBD legalisation in Europe, and it has developed a diverse CBD product market, both off and online.

In 2017 the German government amended its Narcotics Law to make a clear distinction between cannabis for medical and non-medical use. This resulted in the legalisation of medicinal cannabis, with a licensing scheme for production, and prescription only by medical practitioners.

Cannabis/marijuana retains its classification as an illegal narcotic.

In addition, the amendments exempted (industrial) hemp and CBD from the definition of dangerous substances.

This allowed for cultivation of hemp with less than 0.2% THC, and products with less than 0.2% THC are available over the counter. A range of CBD products are also available over the counter; however, edibles are excluded from this, due to their prohibition under the EU Novel Food Regulation. This regulation requires businesses to apply for a novel food authorisation in the European Commission before they sell CBD foods. (Designated 'novel' because there is no evidence of significant consumption before 1997). Although authorisation is anticipated, the application process is lengthy.

The sale over the counter of CBD hemp flowers is prohibited because they are unprocessed. Hemp flowers containing quantities of THC are only sold for scientific purposes or commercial use.

UNITED KINGDOM

Medicinal cannabis products were legalised in late 2018, with restricted access by prescription

through registered specialist doctors.

Cultivation and processing are permitted through a licensing scheme. CBD oil (less than 0.2% THC) is permitted to be sold, in both pharmacies and health stores, as a nutritional supplement.

The CBD industry in the United Kingdom is one of the largest in Europe, based on imported raw ingredients. As in other jurisdictions, however, there are issues around the seller's ability to make therapeutic claims.

EU

In addition to the EU Novel Foods regulation referred to above, the EU has also set up the Rapid Alert System for Food and Feed (RASFF), to facilitate the quick exchange of information amongst EU member countries on possible health risks related to food or animal feeds. This applies to CBD products on sale in the EU.

DENMARK

Denmark is another country which has legalised medicinal cannabis, prescription-only from a doctor. A small number of licences are granted, and market supply is mostly dependent on strategic alliances with international companies for all elements, including research, cultivation and manufacturing. However, CBD and other

hemp based oils are controlled substances, as is cannabis containing THC for recreational use.

AUSTRALIA

Having legalised medicinal cannabis in 2016, Australia has seen a growth in supply and demand of medicinal cannabis products. This has been limited, however, by the normal prescription/medical doctor framework, due to the need to train doctors in the medicinal benefits of the cannabinoids - especially THC and CBD.

A Senate Inquiry was set up in late 2019 to review how the medicinal cannabis system in Australia could be reformed to better serve the public.

Most products are imported; by June 2019, the top twenty listed cannabis companies in Australia had a market capitalisation of A\$1.8 billion.

More relevant to this report, however, are recent moves in Australia to liberalise its narcotics scheduling of CBD to make it available over the counter in limited doses. Under the Australian Therapeutic Goods Act 1989, CBD is listed in Schedule 4 of the Poisons Standard. The Health Department has proposed that CBD should be moved to Schedule 3 of that Standard, (pharmacist

only) which would mean that no prescription would be required so long as:

1. The CBD is either plant-derived, or when synthetic, is subject to certain conditions;
2. The maximum recommended dose is 60 mg or less;
3. The product is in packs containing not more than 30 days' supply;
4. CBD comprises 98% or more of the total cannabinoid content of the preparations;
5. Any cannabinoids, other than CBD, must be only those naturally found in cannabis and comprise 2% or less of the total cannabinoid content of the preparation; and
6. The product is for adults 18 and over.

The consultation document relating to this proposal states that "A safety review conducted by the Therapeutic Goods Authority has established that low doses of CBD may have possible clinical utility when used via the oral route in the management of some conditions, that do not require medical practitioner oversight". (8)

The proposal advises that the current controls in Australia are much more restrictive than those for comparable regulators in other jurisdictions, with CBD products available over the counter in the

United Kingdom and in some US states.

The argument for keeping the products as pharmacist only, compared to freely over the counter (OTC), is that they consider this to be more appropriate as pharmacist advice is necessary to mitigate safety risks associated with CBD's potential for drug-drug interactions when used at the same time as many other commonly prescribed drugs. Schedule 3 also requires that Product Information and Consumer Medicine Information is available to reinforce the safe use of CBD. (9)

These proposals are presently being considered by the Advisory Committees of Medical Scheduling and Chemical Scheduling.

This initiative in Australia is of particular relevance to New Zealand, where there is substantial impetus in the hemp industry, to definitively remove CBD extracts from the Misuse of Drugs Act 1975 (MoDA).

UNITED STATES

As of 2019, 22 states across the US have legalised medical use cannabis, and a further 11 states have broadened to allow adult-use of cannabis, for recreational and other uses. An additional 15 states allow the sale of some form of CBD oil, and of low

THC products for medical purposes.

Federally, recreational and medicinal use of cannabis containing THC remains illegal, as well as transporting cannabis across state borders.

However, there has been an important change in the federal attitude to (non-THC) hemp, as compared to cannabis. This change is manifested by relevant provisions in the Farm Bill of 2018.

In 2018 the Hemp Farming Act removed hemp (with less than 0.3% THC) from Schedule 1 Controlled Substances and made it an ordinary agricultural commodity.

Its provisions were incorporated in the 2018 US Farm Bill, which became law at the end of that year.

Usually the Farm Bills provide important agricultural and nutritional policy extensions for five years; however cannabis is not typically part of the discussion around farm subsidies, nutritional assistance and crop insurance. Then, in 2018, it was.

For decades, federal law did not differentiate hemp from other cannabis plants, all of which were in effect made illegal in 1937 under the Marihuana Tax Act, and formally made illegal in 1970 under the

Controlled Substances Act, which banned cannabis of any kind.

Federal policy did recognise 'industrial hemp' to the extent that pilot programmes to study hemp and market interest in hemp-derived products were approved by the USA, and by state departments of agriculture. This permitted small-scale expansion of hemp cultivation, for limited purposes.

However, the US Farm Bill is much broader, and is regarded as "drastically" transforming hemp policy in the US. It allows hemp cultivation broadly, not just pilot programmes. It explicitly allows the transfer of hemp-derived products across state lines for commercial or other purposes. In addition, it controls the sale, transport or possession of hemp-derived products, so long as those items are produced in a manner consistent with the law.

There is significant, shared state-federal regulatory power over hemp cultivation and production. State departments of agriculture must consult with the state's governor and chief law enforcement officer to devise a plan that must be submitted to the Secretary of USDA. A state's plan to license and regulate hemp can only commence once the Secretary of USDA approves that state's plan.

In states opting not to devise a hemp regulatory programme, the USDA construct a regulatory regime under which hemp cultivators in those states, apply for licences and comply with a federally-run programme.

The effect of the Farm Bill has been to dramatically increase the number of US hemp cultivation licences. Moving from pilot programmes to Farm Bill endorsed cultivation has meant an increase in licences from 3,546 in 2018 to 16,877 in 2019. Similarly, hemp acreage has increased from 78,176 in 2018 to 230,000 in 2019.

There is a misperception that the Farm Bill legalises CBD. While it has removed hemp-derived products from its Schedule 1 status under the Controlled Substances Act, the legislation does not legalise CBD, which remains a Schedule 1 substance under federal law.

The Farm Bill creates exceptions to that illegality; it ensures that any cannabinoid that is derived from hemp will be legal, if and only if that hemp is produced in a manner consistent with the Farm Bill, associated federal regulations, associated state regulations, and by a licensed grower. All other cannabinoids, produced in any other setting, remain

a Schedule 1 substance under federal law and are therefore illegal. (The only exception are pharmaceutical-grade drugs approved by the FDA).

Previously CBD products produced by state-legal, medical or recreational use cannabis jurisdictions - were illegal products under federal law, both within states and across state lines. Under the Farm Bill, CBD products are more broadly available, however this does not mean that all CBD products are legal.

In addition, state legal cannabis (as compared to hemp) programmes are still illegal under federal law. However, there is hope among interested parties that reforms to hemp policy under the Farm Bill may serve as a first step toward wider cannabis reform.

The US Food and Drug Administration (FDA) is an agency that is also obstructing the industry to some extent. To date, it has approved only one CBD product, a prescription drug to treat two rare, and severe forms of epilepsy. Its position is that it is illegal to market CBD by adding it to a food or labelling it as a dietary supplement.

The FDA states that it is "committed to protecting public health while also taking steps to

improve the efficiency of regulatory pathways for the lawful marketing of appropriate cannabis and cannabis-derived products". (13)

As a result it has been consulting with the hemp industry in the US for over a year, and evaluating the regulatory frameworks that apply to certain cannabis-derived products which are intended for non-drug uses. This consultation includes whether the FDA might consider updating its regulations, in what way, and whether legislative change is appropriate. Unfortunately for the industry, to date no report or proposals have come from the FDA as to its position.

In the meantime, it continues to send warning letters to CBD companies which it considers are making unproven health claims and/or dealing in a non-approved medicine.

KENTUCKY STATE - A CASE STUDY

Kentucky is an interesting case study, as it shows the scale of growth in the hemp/CBD industry of a country or state in which legislation has been changed to untether hemp from (illegal) cannabis.

Kentucky is a state with a population of 4.67 million - comparable to New Zealand. It has a large

hemp industry which has developed in a very short time.

Before hemp was banned again after World War 2, Kentucky was the leading hemp-producing state in America.



Mitch McConnell is the senator for Kentucky and an ardent supporter of the hemp industry. He is also one of the Senate House leaders who influenced the President to sign the 2018 Farm Bill.

The result has been accelerated economic growth for the state. In 2019, the statistics from the Kentucky Department of Agriculture show a thriving industry, with 209 licensed growers. Particularly of interest are the increase in licensed growers, and the valuable income from hemp for the farmers, from hemp flowers for CBD.

- 209 licensed growers
- 43 licensed processors
- 12,800 outdoor cultivated acres
- Hemp flower wholesale price US\$35.00/pound
- Hemp Seed wholesale

price \$US0.75/pound

- US\$53 million paid to Kentucky farmers for harvested hemp materials
- US\$194 million in gross product sales
- US\$207 million in capital investments
- 1,304 people employed

CBD FUTURE GROWTH PROSPECTS FOR US INDUSTRY

Estimates for the CBD market in 2024 vary from US\$10 - \$20 billion, with a compound average growth rate (CAGR) from 22% upwards (11)

(Analysts vary in their forecasting models due to product definitions, and the proliferation of CBD as an ingredient.)

There are a number of reasons for the predicted rapid growth in the United States CBD products sector. These may be applicable in other countries (depending on regulation) and include:

Depth of market penetration.

CBD products in the USA have been distributed through many states in supermarkets, petrol stations, and a range of large retailers which has made them very visible to consumers.

The versatility of CBD and the nature of consumer demand mean that it will grow from inclusion in health products to being



Photo credit: Matt Barton, University of Kentucky Ag Com

an ingredient in a broader range of products aimed at the mainstream lifestyle market, including products intended for pets. An example of CBD products moving into mainstream **is the replacement of alcoholic beverages with CBD-based beverages.**

DECLINE OF CONSUMER TRUST IN PHARMACEUTICAL COMPANIES AND REGULATORS.

Trust has been shaken by the opioid addiction scandal. This leaves chronic pain sufferers in the US, which could be as many as 50 million people, looking for an alternative solution. Increasingly these sufferers are very attracted to medicines and nutraceuticals containing THC and/or CBD for a non-addictive solution to their problem.

CBD can be added to most fast moving consumer products which are eaten or applied to the skin. These include various food, beverages, skin balms and cosmetics. This

potential widespread use of CBD in products makes sales growth very hard to forecast accurately. Analyst forecasts of the CBD market vary widely, possibly totalling US\$25 billion by 2024. This wide variation is explained by different market information feeds and different product definitions.

Hemp growers get higher returns from harvesting hemp flowers for CBD.

This has resulted in a majority of growers (94% in 2019) planting hemp cultivars, the flowers of which are rich in CBD. In comparison, only 11% of growers are planting for the production of fibre, and 10% for seed.

Clearly, the US Hemp market was transformed in 2019 despite concerns from the FDA regulator.

To some extent, the market jumped past the regulatory confusion to get the product to the customer. CBD products are widely distributed to the mass market

via supermarkets and petrol stations, which has increased consumer awareness very quickly.

In the US this has then created a virtuous investment circle

of awareness, demand, product creation, distribution, access to capital, and impressive sales growth; thus sparking more investor demand, which has spread to the UK and European markets. The downside has been that the lack of product regulation has seen many products of inferior quality enter the market, and this has made consumers mistrustful.

The hemp sector in the US has attracted many entrepreneurs

from other industries, who have strong marketing skills, and have set up manufacturing companies in many states. For example, Global Widget CBD Corp executives in Florida have a background in the car industry, and have brought manufacturing disciplines

such as industry testing, compliance, and quality management into the hemp industry.

CONCLUSION

The global experience of growth in the hemp sector points to exciting opportunities for the New Zealand Industrial Hemp Sector, both in the domestic market and for our exports.

The process in other countries of liberalisation of **laws blocking CBD extraction and products**, as discussed above, demonstrates to New Zealand legislators and regulators that there are a range of different approaches which will allow growth to occur. To enable the industrial hemp sector in New Zealand is to allow agricultural growth at an exponential rate.

History also clearly shows that being a signatory to the United Nations Single Convention on Narcotics 1961 has not hindered any countries in their amendment, re-definition or complete removal of the prohibition in that Convention on cannabis sativa. At most it has visited a little disapproval on those countries which

have liberalised marijuana, but that does not appear to have deterred them, nor has it changed their status in regard to membership as a Convention signatory.

Even the World Health Organisation has recently recommended to the United Nations that cannabis be **reclassified**, by removal from Schedule IV of the Single Convention, which is the most restrictive level of the Convention (and includes heroin). The recommendation is that it should be maintained under a less restrictive level of control than Schedule I, which applies to "harmful psychoactive substances" which could have a medical use (such as morphine).

In regard to CBD, the WHO recommends that preparations containing predominantly CBD and with no more than 0.2% THC should not be placed under international drug control, and that this should be expressly stated in the Single Convention. This recommendation is based on reviews by the WHO's Expert Committee on Drug Dependence on cannabis and cannabis related substances (including CBD) - which found CBD to be a

relatively safe drug.

Interestingly, one commentator's view was that "the WHO's slow-moving suggestions may be obsolete by the time they are implemented, given that more progressive organizations are so far ahead". (13)

Australia is an interesting example of a country

which is moving ahead with the concept of down-scheduling low dose CBD, a move which has been proposed by the Therapeutic Goods Agency. In proposing this course, reference is expressly made to WHO's recommendation that **CBD should not be placed under international drug control**. This is of particular interest to New Zealand given our Trans-Tasman relationship and the harmonisation of various standards including food standards relationship and the harmonisation of various standards including food standards. For the New Zealand hemp industry, and those lawmakers who have the power to remove the constraints on its growth, the question that is begged by this review of the global growth and opportunity in the hemp industry is:

"If not now then when?"



4. HEMP FOOD PRODUCTS - IN NEW ZEALAND

REGULATION

As previously noted, New Zealand remains at the proscribed end of the cannabis continuum. Like many countries which are signatories to the UN Single Convention on Narcotics 1961, the cultivation and use of Cannabis Sativa has been illegal in New Zealand for decades.

Specifically, it is a specified substance under Schedule 2 and 3 of the Misuse of Drugs Act 1975 (MoDA).

Also similarly to other signatories, New Zealand legislators have slowly drawn back from that position, although there is still a ban on recreational cannabis cultivation and

use.

There is also confusion around the status of products which contain CBD and/or other cannabinoids, but are neither medicines nor considered to be psychotropic.

MODA REGULATIONS 2006 AND AMENDMENT 2018

A slight softening in regulations was seen in 2006 under the MoDA, which exempted "Industrial Hemp" from the ban. These regulations defined hemp as "cannabis plant, seed or fruit", and "industrial hemp" as hemp in the form of plants with a THC content that is

generally below 0.35% and is not above 0.5%. The regulations apply to Cannabis Sativa only.

The Misuse of Drugs (Industrial Hemp) Regulations 2006 allowed general cultivation, research, and plant breeding to be carried out under a licence from the Ministry of Health. It has been a highly regulated system.

The 2006 regulation was subsequently amended by the Misuse of Drugs (Industrial Hemp) Amendment Regulations 2018. These extended permission to possess, use, and trade in:

- Hemp products (a product derived in

whole or in part from industrial hemp, including a hemp seed food product)

- Hulled hemp seeds and
- Stalks of industrial hemp (limited to stalks which do not have leaves or fruit).

Hemp seed food products can be produced from hemp seeds but must not be produced from any other part of the plant, including flowers, buds or leaves.

The amendment also allows importation and exportation of these same products.

Hemp seed and oil products for consumption must also meet the requirements of the Food Act 2014, to ensure that the products are safe to eat.

New Zealand industrial hemp growers and hemp companies are allowed to:

1. Grow industrial hemp which meets the THC maximum levels under the 2006 regulation (under licence);
2. Procure non-approved cultivars for cultivation, breeding and research purposes only, under licence.
3. Import (but not sell) whole hemp seeds (not hulled/viable) under licence and with mandatory customs declaration indicating that the importer has a permit to import a controlled drug, and

has the prerequisite phytosanitary documents;

4. Process and sell hemp product (e.g. oil made from seed), hulled hemp seeds and stalks of industrial hemp; (under licence)
5. Import and export hemp products as defined in the regulations, including hulled hemp seeds or food containing hulled hemp seeds, without a licence. In relation to seeds the importer must make a mandatory customs declaration that the hulled seeds are not a controlled drug.

The 2018 Industrial Hemp amendment did not alter the prohibited status of foods infused with or containing cannabinoids such as THC or CBD, hemp oils other than oil derived from hemp seed, full spectrum hemp extract and other medicinal products.

Medicinal amendment

An important step, and recognition of the therapeutic benefits of the cannabis plant, was a further amendment to the MODA, the Misuse of Drugs Act (Medicinal Cannabis) Amendment Act 2018. This allows for the use of cannabis for medicinal purposes.

Subsequent regulations in 2019, allow a New Zealand-based industry that can cultivate

cannabis, and manufacture and supply medicinal products, which can then only be obtained by consumers with a doctor's prescription. Quality standards and prescriber guidelines are covered by the regulations, which also allow the importation of medicines produced overseas.

Activities must be carried out in accordance with a Medical Cannabis Licence which is issued by the controlling body, the Medicinal Cannabis Agency.

A major barrier remains for the availability of medicinal cannabis to those who need it, namely the cost of medicines which typically do not qualify for Pharmac subsidies.

In order to facilitate the amendment allowing for a medicinal cannabis scheme, and in anticipation of the fact that such medicine was likely to contain not just THC but also CBD, a new definition was inserted into the MoDA.

In summary, **the definition states that 'CBD Product' means a product that contains cannabidiol** and either does not contain a specified substance under the MoDA or contains specified substances that are no more than 2% of the cannabinoid content in the product.

In effect this means that the THC content must be only 2% of the overall CBD/THC content. The balance of the definition basically defines 'specified substance' as THC or related substances, those related substances only meeting the test of a 'specified substance' if they are 'capable of inducing more than a minor psychoactive effect in a person'.

Most importantly this amendment had the effect of rescheduling CBD (a controlled drug under MoDA) into a prescribed medicine under the Medicines Act 1981. However the fact that this was embedded in the amendment which provided for a medicinal cannabis scheme has led to a sometimes heated debate between the industry and the Ministry of Health, as to the status of non-medicine CBD products, such as balms and bodycare products. Confusion still exists, given that the stated purpose of descheduling CBD from the principal Act, was recognition of CBD's non-psychoactive properties.

A further change of note in the same amendment was the provision of a statutory defence to a charge of possessing and using cannabis, specifically for persons using it for palliative care purposes.

A person requires palliation if "in the opinion of a medical practitioner or nurse practitioner, the person has an advanced progressive life-limiting condition and is nearing the end of their life".

This is somewhat vague, and does not necessarily protect those with terminal diseases where their life expectancy is difficult to predict. It also completely excludes people suffering from chronic diseases, which while not terminal, can cause great pain and suffering.

There is pressure from organisations such as the NZ Drug Foundation to extend this defence to a wider range of patient and carers, including individuals who grow and provide cannabis to such patients, the so-called "Green Fairies".

Growth in Hemp Cultivation

While there were licensed hemp growers (universities, hemp enthusiasts) in New Zealand taking licences to enable cultivation and research, it was not until the 2018 amendment to the regulations came into law that the hemp industry in New Zealand really got underway.

Previously, a number of individuals and companies had, under the cultivation licences, grown hemp and

researched manufacturing fibre products (such as the concrete substitute known as hempcrete), and seed and hemp seed oil products. In addition, they researched the environmental benefits of hemp, including the use of hemp cultivation for the purpose of extracting heavy metals from the soil. However, they had not been able to commercialise their crops; the 2018 amendment changed that. In relation to cultivation, the number of hemp licences increased from 65 licences (259 hectares) in 2018 to 169 licences (2,627 approved hectares, 754 actually grown) in 2019.

The NZ Hemp Industries Association (NZHIA) estimates there were approximately 1,200 hectares grown in the 2019/20 season (There is often a difference between approved hectares and what was actually planted).

In fact, the conditions in New Zealand have proved to be excellent for hemp production, resulting in high yields per hectare. The crop can be harvested within 100 days or matured to produce a seed crop within 140 days.

The versatility of hemp means that seeds, hurd (pulp), fibres, leaves and roots can all be harvested and put to use.

ONE HECTARE OF HEMP CAN PRODUCE

(14)

- 250 litres of hemp seed oil used for everything from paint, to food-grade culinary oil. High-quality food grade hemp seed oil retails for up to NZD\$75 per litre; or
- One metric tonne of hemp seed, a nutritious cereal that is rich in easily digestible protein and omega 3 fatty acids. (Hulled hempseed retails for up to NZD\$70 per kilogram); or
- Three metric tonnes of hemp fibre, valuable for the manufacture of rope and textiles - retails for around NZD\$2 per kilogram; or retails for around NZD\$2 per kilogram; or
- Six metric tonnes of hemp hurd (pulp), useful for the production of paper and construction materials such as hempcrete (retails for around NZD\$1 per kilogram).

RETURNS FROM HEMP

- Seed prices per ton NZ\$4,000-5,000
- Fibre prices per ton US\$500 – depends on the specification

HECTARE	SEED	FIBRE
Yield	800-1,000 kg	8-10 tonnes Dry Weight
Value per kg	NZ\$4.00-NZ\$5.50	\$225/350 kg Bale
Revenue	\$3,200-\$5,500	\$5,150-\$6,450
Seed rate and cost \$20/kg	1-30 kg = \$20-\$600	30-50 kg = \$600-\$1,000
Gross Margin	\$1,500-\$4,500/hectare	\$2,500-\$4,000/hectare

These calculations are estimates, and are subject to environmental and other conditions, which could cause crop failures and no earnings. Irrigated land can yield higher than the target ranges above.

After the 2018 Industrial Hemp amendments, while existing health food companies took a 'wait and see' approach to the opportunity, a number of entrepreneurs set up businesses to grow hemp and to make hemp products. These included those enthusiasts who had for some time been growing hemp and experimenting with possible products.

DIRECTORS OF HEMP COMPANIES IDENTIFY THREE MAIN MOTIVATIONS

1. **The investment opportunity offered by hemp foods** which, with their proven health benefits, will meet increased consumer interest in plant based and healthy diets;
2. **Fascination with the natural healing power of the whole hemp plant.** Quite often this has been the result of family health issues.
3. **Environmental benefits;** hemp extracts carbon from the atmosphere, and heavy metals from the soil via phytoremediation. Hemp fibre provides a green alternative to fossil fuel-based plastics and construction materials.

A number of hemp companies have quickly

developed infrastructure and scale, even though they are restricted to processing the seeds and fibre only (as the flowers contain CBD).

ACTIVITIES IN THE NEW ZEALAND SECTOR INCLUDE

Grower groups have farmed at least 1200 and possibly up to 1500 hectares of hemp in the 2019-20 season.

Food manufacturers are adding hemp ingredients to existing and new branded foods and beverages.

Online retailers, supermarkets, and health food chains are selling hemp foods.

Associated businesses include agritech companies, contract processors, testing companies, and extraction companies.

Fibre product innovations including hemp fibre for textiles and carpets (NZ Yarn Limited) and research into the concrete substitute hempcrete.

Industrial corporates are exploring the use of hemp fibre for building construction, concrete, roading and packaging.

The sector includes **vertically integrated businesses,** that is businesses which grow, manufacture and sell

hemp and the resulting products. The largest of these is Hemp NZ Limited which mainly operates through its subsidiary Hemp Farm NZ. This company has a bottom to top interest in the hemp industry including:

- **Contracts** with a grower group of more than eighty hemp farmers;
- **A large processing plant** and storage facilities at Tauranga;
- **An e-commerce site** and export sales of a wide range of consumer seed products including premium oils and capsules, protein powders, raw seeds, balms, and hemp milk;
- **White label** (pre-packaged but wholesaled to retailers who add own branding) seed products, as well as bulk products for food manufacturers; and
- **Fibre sales** – bast and hurd products.
- In addition, the parent company has a shareholding in NZ Yarn in Christchurch which manufactures high value carpets for export.



HEMP PRODUCT COMPANIES

There are a number of other hemp seed food companies with online sales and branded product ranges (as well as white label products) including Midlands Seed, Midlands Nutritional Oils, Hemp Farm, Hemp Connect, Kanapu Foods and Brothers Green.

These companies operate in many regions throughout New Zealand

and are using both locally sourced and imported hemp seed.

Hemp seeds, oils, protein powder, and milks entered the FMCG market strongly in 2019 as natural food products with a health benefit.

Also available are a wide variety of snacks and edibles along with an

increasing interest in using hemp as an ingredient, including recipe suggestions by celebrity chefs such as Nadia Lim and Simon Gault.

Hemp balms and topicals are also popular for skin care.

NORTH ISLAND



"The call for urgent action against the threat of climate change" says it is time for hemp. This is the dawning of the biggest industry on the planet." Dave Jordan, Hemp Farm and Hemp NZ Tauranga.



"We Promote, Educate, Partner and Invest In The Hemp Industry. Hemp offers a vital solution to the growing environmental challenges we face today" Jacob Draper, Hemp NZ, Tauranga.



"The future of the hemp industry looks brighter than it ever has. The end consumer is now valuing the environmental factors that were once ignored" Matt Johnson and Werner Schulze, Hemp Connect, Wellington.



"Creating jobs, caring for our environment and providing healthy foods for the whanau (family) is our vision" Hayden Hape, Pure Heart Aotearoa, Dannevirke



"Kanapu Hemp Seed Oil is inspired by and created for chefs in New Zealand" Isaac Beach and Simon White, Kanapu, Hawkes Bay.



"Our specially formulated natural products, harness the powerful properties of hemp oil used for centuries to rejuvenate the skin" Kirsty Harkness, Hark & Zander, Auckland



"Our business is the use of hemp products for the beauty and health of our customers" Tui Qauqau, Koe Koea, Kaitaia.



"Hemp Is all about transforming the food we eat, and our national health" Andrew Bell Kakariki Fine Foods, Rotorua.



"We share the passion for hemp's time-honoured agricultural tradition and the positive difference it can make as a sustainable farming crop" Chris Woodney, NZ Hempbrokers.



"The Hemp Industry in New Zealand will transform our nations economy and environment for the better" Richard Barge, Hemptastic, Auckland.

SOUTH ISLAND



"Midlands is the premier Hemp seed production company in the southern hemisphere, and a manufacturer of high quality Hemp seed foods including the New Hemisphere product range" Andrew Davidson and Nigel Hosking, Midlands Seed, Ashburton.



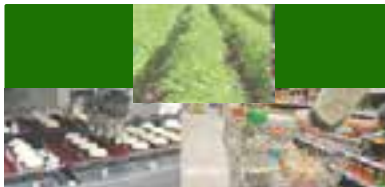
"We are developing a series of products across the FMCG market that will utilize NZ grown hemp to address the health concerns faced by our people and planet" Brad, Brendon, Michael, Brothers Green Group of Companies, Christchurch



NZ Yarn Ltd manufactures and markets high quality yarns for the carpet industry throughout the world. Colin McKenzie, Christchurch.



We grow hemp as a mid-row cover crop in vineyards. Adding bio-diversity to the grape microclimate and health to the soil" Kirsty Harkness, VinHemp, Marlborough.



The God-father of NZ Hemp - Mack McIntosh, founded Hempseed Holdings Ltd to develop hemp cultivars, based on the Aotearoa 1 breeders selection. He pioneered hempseed food products, soaps and balms in the 1990's and set up the NZHIA in 1997.



"In 2018 after much discussion and research we decided we wanted to venture into the Hemp industry because we loved the idea of growing a crop that was widely beneficial for people's health" Blair and Jodie Trestle, Southland.



"We believe that making non-psychoactive hemp products available to New Zealanders can lead to better health outcomes for our country by reducing health costs through a more sensible cost-effective natural health alternative" Lisa, Tarryn and Nick, NZ Hempres, Christchurch.



We wanted to do something that ticks all the boxes a healthy product, no need to exploit animals and environmentally sustainable" Sarah and Aaron, Larry's Gold, West Coast.



Hemp seeds, oils, protein powder, and milks entered the FMCG market strongly in 2019 as natural food products with a health benefit.



Also available are a wide variety of snacks and edibles along with an increasing interest in using hemp as an ingredient, including recipe suggestions by celebrity chefs such as Nadia Lim and Simon Gault.

Nadia: [Foodtolove](#)
Simon Gault: [Plant Culture](#)

BELOW IS A SMALL SAMPLE OF THE RANGE BEING MARKETED IN NZ

HEMP HEARTS



HEMP FLOUR



HEMP MILK



HEMP EDIBLES



HEMP OILS



HEMP BAKING



HEMP PROTEIN POWDER



HEMP COSMETICS



HEMP SNACKS



Hemp online retailers have been instrumental in building a customer base for people to try hemp foods and other products, and then to become repeat customers. In addition to the manufacturers' online sales these retailers include:

Hemp retailing specialists (other than manufacturers selling online)

- 'Everything Hemp' hempwellness.co.nz
- "Introducing hemp" hemphub.co.nz
- The Hemp Store - NZ's high-grade hemp specialists since 1997 hempstore.co.nz

Natural health foods specialists - e.g. 'New foods from NZ and Around the world' matakanasuperfoods.com

Hemp Healthcare specialists

- 'Hemp and skincare' hhhempsouth.com
- 'Hemp for skin and haircare' koekoeahemp.com
- 'Healthcare from Hemp products' futurehealth.co.nz
- 'Natural health and supplements' healthpost.co.nz

Supermarkets and Stores

- Health 2000 health2000.co.nz
- Countdown countdown.co.nz
- New World newworld.co.nz
- Farro Foods farro.co.nz

Bulk Hemp Ingredients

Due to the versatility of the hemp plant, there is an emerging discussion around bulk hemp ingredients (as distinct from retail product), for use in many industries including:

- Food producers to add hemp flour to products such as biscuits, bread and breakfast cereals
- Food supplement companies to add hemp products to protein powder
- Snack manufacturers considering a range of hemp edibles.

Building the hemp innovation eco-system

While competition between companies in the hemp sector is a given, it will also be important to collaborate in order to expand the whole market and "grow the revenue pie". Entrepreneurial energy, strong leadership and collaborative partnerships will be needed to create a 'hemp innovation eco-system'.

Priorities include:

- Export planning from an early stage will be essential for growth
- Considering collaboration and managing the scaling up of the industry
- Monitoring international hemp markets – following trends and innovations,

building strong relationships and intelligence networks, identifying high value global niche markets

- Encouraging the creation of IP and technology that can be licensed to the global industry.

Eco-systems are both organic and structured, they run on torrents of new information, from informal networks and relationships.

Hemp companies and agencies in each hemp region have the benefit of shared location which can lead to partnerships, contracting, and sharing infrastructure.

Below are set out some organisations and suggested networks and resources that are likely to assist the process of developing the hemp innovation ecosystem.

NZ Industrial Hemp Association (NZHIA) is a hemp eco-system with 150 grower and R&D members. It provides information, events, and advocacy programmes for its members' benefit. NZHIA is also well connected to other national hemp associations in Australia, America, Canada and Europe (nzhia.com).





THE IWI'S OF NEW ZEALAND

The Hemp Health Story has been well understood by Maori even though hemp was not an indigenous plant in New Zealand.

Maori natural health medicines (Rongoa) are based on a deep understanding about plants and the ingredients in them that are nutritious which can heal different ailments and injuries.

Mother Suzanne Aubert, the Catholic missionary recruited by Bishop Pompalier from France in the 1860's brought European medicinal seeds (including cannabis). And, learned about Rongoa from Maori practitioners and used it to treat Maori children.

Most iwi's have looked into hemp and many have invested in it, as it offers a cash crop, and manufacturing opportunity, which is very compelling. Some examples are:

- **Rua-Bioscience** in

Ruatoria, who have pioneered research into the interface between Rongoa and cannabis. They have now acquired a medicinal cannabis licence to develop pharmaceuticals under the Rua-Bioscience name.

- **Tupu.nz** supported by Te Puni Kokiri is the best site for Maori landowners to get all the information needed to invest in growing hemp for seed or fibre.
- **Callaghan Innovation** has set up a Maori Economy Team which works on research initiatives with both hemp and medicinal cannabis Maori companies.
- **The Poutama Trust and North Island hemp companies** have set up the **Mihi Hemp Collective** as part of their Maori business development programme - to connect up investors, companies, researchers and Maori landowners

in the hemp industry across New Zealand

- **In Dannevirke Ngati Kahungunu ki Tamaki nui-a-Rua** is investing in hemp in partnership with Massey University and Chinese company Qiaopai Biotech.

An informal '**national innovation eco-system**' is being built by hemp leaders and government agencies based on relationships and networks, both formal and informal and to gather information which will help in the development of the industry.

- Export led growth
- Regulators
- Government economic agencies
- Research agencies
- Infrastructure companies
- Industry groups and associations
- Industrial customers

Education for Innovation; The Hemp Foundation thehempfoundation.org.nz trains health professionals to understand the health benefits of hemp cannabinoids.

5. HEMP FIBRE INVESTMENT

THE USES OF HEMP FIBRE

The use of hemp fibre dates back centuries, which has resulted in extensive knowledge relating to its cultivation, processing and uses.

Subsequent modern scientific research has revealed the properties of fibre, and its potential for high technology and high value applications.

Funding for research into hemp fibre was originally difficult to obtain due to the negative connotations of cannabis, however in the early 2000's in some countries (and in NZ in 2006) restrictions on the cultivation and processing of hemp fibre were removed. As a result, substantial research has

taken place, in both the public and private sectors, into the attributes of hemp fibre.

The bast fibre and hurd from the stems are suitable for a range of high spec medical applications filters and linen, through to low tech weed mats and insulation materials. These attributes include:

- high tensile strength
- odor resistant
- antibacterial, antimicrobial, antistatic
- mould resistant
- hypoallergenic
- high heat capacity
- absorbent
- conductive
- lightweight
- long fibres excellent for composites
- breathable and blocks

UV rays

- lightweight, strong, substitutes or reduces hydrocarbon plastics
- rapid growth, lower energy than timber
- strong, biodegradable, long carbon chains.



THE GLOBAL HEMP FIBRE INDUSTRY:

The hemp fibre industry is very fragmented with a scattering of small companies and a few larger companies, mostly in textiles:

China is the world-leading producer of hemp, with a focus on servicing the textile industry.

Companies include :

1. **Shanxi Greenland Textile**
2. **Shenyangbeijiang**

Europe is an important production area. Fibre is produced in France, Netherlands, Germany, UK, Italy, Romania, with its main use in pulp & paper, horse bedding and composite materials. Russia and Ukraine are also important providers of hemp products, and the main use is in the textile industry.

Major players are:

1. **Hemp Flax** – growing 3,500 hectares in 2020
2. **BAFA** in Germany
3. **Cavac Biomateriaux**- France - construction and insulation
4. **Cavvas Textiles**- Romania - with offices in all the EU countries
5. **Dun Agro Group**- Netherlands - construction materials

USA Companies include:

1. **American Hemp** - N Carolina-animal bedding
2. **Hempline** – Delaware
3. **Hemp Inc** - Nevada

INVESTMENT VISION FOR HEMP FIBRE

Panda Biotech is a company in Texas which has been analysing the investment prospects for the hemp fibre industry. Scott Evans, executive vice president of Panda Biotech said in December 2019:

*"After more than a year of due diligence - which has included an analysis of the hemp fibre and cellulose industries in the People's Republic of China, various European countries and Canada - we have concluded that **the processing of hemp stalk for industrial uses will be the next multi-billion-dollar business in the United States. Hemp fibre and cellulose will help manufacturers meet the needs of today's eco-conscious consumers who increasingly require environmentally friendly products and services. As a result, hemp will be a game changer for both agriculture and industry for generations to come.**"*

Panda Biotech in Texas has plans to construct the largest industrial hemp processing facility for fibre and cellulose in the United States. A facility to produce high-quality, textile-grade fibre and premium cellulose.

Panda Biotech believes that:

"Industrial hemp used for manufacturing applications is highly

valued for its **natural durability, rapid growth and environmental sustainability.**

The **processed fibre and cellulose** from industrial hemp can be used in the production of a multitude of products including textiles, a wide array of building materials, paper products, automobile composites, nanomaterials, bio-plastics and finishing products such as caulking, sealants, varnishes and paints.

In addition, research indicates that **hemp-based supercapacitors** offer a less expensive alternative to materials currently used in rechargeable batteries for applications such as smartphones and electric cars. As a result, industrial hemp is poised to transform numerous multi-billion-dollar industries"

<https://www.businesswire.com/news/home/20191210005183/en/Panda-Biotech-Plans-Largest-Industrial-Hemp-Processing>

GROWTH FORECAST

- The reliability of worldwide hemp fibre sales data is challenging due to different data sets. However, analysts expect hemp fibre sales to outstrip hemp seed and oil sales in the US by 2024.
- **Fibre sales** are expected to range between US\$260-700 million by 2024,

while seed sales are forecasted to remain steady at US\$180-200 million (10).

HEMP FIBRE COMPANIES IN NEW ZEALAND

Hemp fibre companies operating under the current licensing regime are in their infancy in New Zealand, but there is a real opportunity to invest in fibre, both for the local market and for export to a growing global market. Considerable research has been carried out in New Zealand on hemp fibre and some small hemp fibre companies have operated from time to time. However, it has been difficult to build a sustainable business for many reasons, including lack of capital, lack of customer awareness about hemp, building regulations, market size/ lack of scale, and lack of harvesting and processing plants.

Some examples of commercial initiatives in fibre based building construction in NZ include: An example of a family shifting to a sustainable lifestyle, featuring a hemp house.
<https://thisnzlife.co.nz/build-house-hemp>

Hemp hurd materials for building are available at <https://www.hempfarm.co.nz/hemp-building>

Hempcrete - <https://hemptechglobal.com/nz/>

[styled/](#)

Hempcrete is made from a mixture of hurd/shiv, lime and water, mixed like concrete and pressed between boxing to form an interior and exterior wall simultaneously.
<http://hemptastic.co.nz/uses/construction/>

'The hemp fibre manufacturing industry has been held back by the lack of processing facilities with the necessary technology. However, in late 2020 this problem should be solved when the NZ Yarn plant in Christchurch is transformed into a hemp fibre processing facility with a European sourced "decortication" machine which processes stalks, separating different grades of fibre suitable for different end user customers'. **Dave Jordan, CEO Hemp NZ and Hemp Farm NZ (15)**

NEW PROCESSING TECHNOLOGIES

In addition, technological developments around the processing of fibre will lead to new opportunities

- **Hemp processing machinery** that separates hemp fibres, hurd and leaves.
- **Machinery that converts hemp into pulp**, lignin, sugars, flowers and seed oil.
- **Machinery that manufactures fibres of various grades**, including soft fibres for clothing.

- **Methods of making 100% hemp plastics** and packaging materials which can be molded and used as coatings.
- **Use of hemp to make carbon nanosheets** which store energy better than graphene (at much lower cost) and can be used to make supercapacitors and batteries.
- **Rapid production of 'hempwood'** which is 20% denser than oak.
- **Hemp fabric blends** that are highly resistant to bacteria.
- **Hemp insulation**, building materials and geo textile applications.

ENVIRONMENTAL BENEFITS

The carbon reduction targets to which NZ is committed to, require all industries to urgently address the reduction of their carbon footprint.

The hemp industry has the opportunity to grow rapidly by becoming a low carbon substitute for fossil fuels in almost every manufacturing and service industry. These include:

Construction Insulation material (breathable, fireproof, degradable at end-of-life)
Use of hempcrete, hemp fibreboards and hemp insulation and composites in new buildings, reclads, and retrofits.
In residential

applications, this would improve the quality of housing stock, create healthy homes which meet carbon targets and green building standards, and appeal to an increasingly eco-aware population.

Agriculture Cultivation of industrial hemp is beneficial for the agriculture sector and is known to remove cadmium and other accumulated metals from soils through phytoremediation. Riparian planting, a valuable alternative land use, working in rotation with a variety of existing farming systems.

Road construction

- Incorporation of hemp into asphalt will increase strength
- Hemp can be used for roadside geotextile weed matting (and pegs)

Councils

- **Purchasing policies** focused on eco-alternatives to standard materials can have a significant positive impact on environmental targets.
- **Encouraging and facilitating the use of hemp materials** in construction would also help create local eco-businesses, which is of regional benefit.

DIY retailers

Hemp-based building and gardening products are higher value alternatives to existing products. Use of hemp in own-range products may be to this sector's advantage.

Boatbuilding

Need for lightweight, waterproof, extremely strong, eco-friendly composite materials can be met by hemp products.

Plastic products

Explore the use of hemp as an additive – even reducing hydrocarbon plastic content by 10% is a significant improvement and there are examples of 100% hemp plastics.

Food producers

- Include hemp as a healthy ingredient
- Use hemp-based packaging,

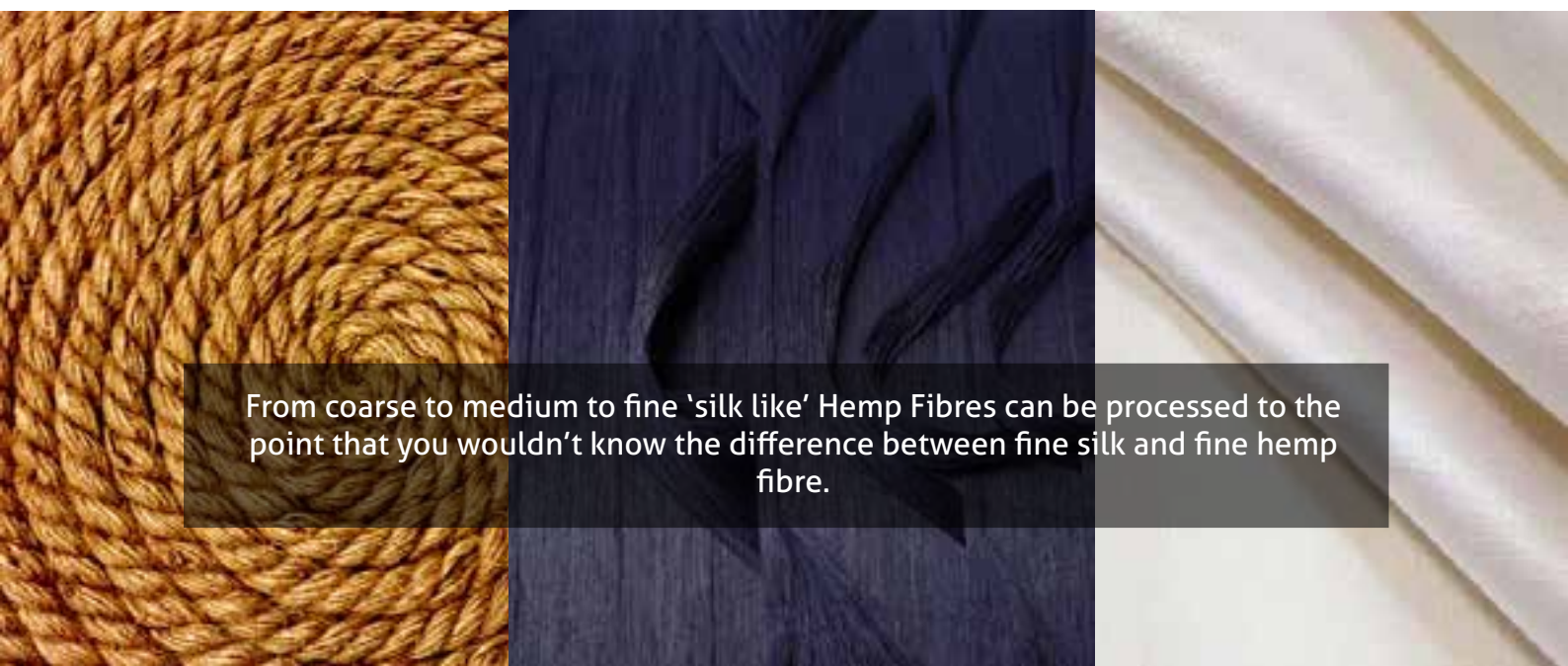
Supermarkets and Big Box retailers

Packaging and logistics materials, products of all kinds from consumer to industrial goods, especially where sustainable solutions are required

Tourism

Hemp products such as bed linen, soap and food products can help the industry meet tourist demand for eco-friendly solutions in accommodation, food and destinations generally.

HEMP ROPE, HEMP DENIM, HEMP SILK



From coarse to medium to fine 'silk like' Hemp Fibres can be processed to the point that you wouldn't know the difference between fine silk and fine hemp fibre.

6. THE ROAD TO A MAJOR HEMP EXPORT INDUSTRY

REGULATION

New Zealand is in an excellent position to develop a substantial industrial hemp product export sector. In particular it has:

- **Expertise in plant genetics**
- **Experience in development of natural health products**, including functional foods and nutraceuticals;
- **History of cultivation, research, plant breeding** and recently processing of industrial hemp in New Zealand;

- **Trusted country brand and 'green' reputation**
- **An existing industrial hemp sector** which has developed rapidly since 2018.

However, in order to leverage these advantages there must be an acceptance at government level, of the safety and value to New Zealand of industrial hemp products, which will lead to a facilitation of the industry's growth.

At the forefront of these changes should be hemp

regulatory framework reform, allowing industry access to the revenue streams from the whole plant.

REGULATORY FRAMEWORK REFORM FOR THE HEMP INDUSTRY

As can be seen from the discussion of overseas developments in the hemp (and cannabis) markets arising from the liberalisation of the relevant legislation, there have been many approaches, some radical and others far more moderate. There is substantial

pressure in New Zealand to move to a more liberal approach to cannabis itself, and/or to industrial hemp. The approach worldwide can certainly inform this process, and help decision-makers to overcome the all-or-nothing mindset which exists at present, and which is obstructing the development of an industry based on the use of the whole hemp plant, including CBD extracts.

In October 2020 the New Zealand electorate will vote in a non-binding referendum on adult-only recreational use of cannabis. The referendum seeks opinion on a bill setting out the process and supervision of cannabis cultivation and use. Clearly this must by definition involve cannabis varieties containing THC. If the vote is 'yes' then that will have wide ranging impacts for industrial hemp, CBD products and the possible re-definition of medicinal cannabis.

If the referendum results in a 'no' vote for recreational cannabis use, then certainly interested parties will be lobbying hard to have legislators/regulators re-visit the present regime, with a view to untethering cannabis-containing-THC from industrial hemp varieties which are rich in cannabinoids, and in particular, CBD.

The research findings in regard to the non-psychoactive nature of industrial hemp, along with the benefits of CBD and other cannabinoids are now regarded as sufficiently trustworthy for the World Health Organisation to recommend to the United Nations that the definition in the Single Convention on Narcotics should be limited to cannabis varieties containing THC.

Clearly this is an intelligent response to the changing nature of our understanding of how the cannabis plant and its varieties work. Therefore it no longer makes sense to include non-psychoactive plants or 'extracts' in a treaty (and national legislation based on it) for the purpose of preventing the abuse of psychoactive drugs.

A SENSIBLE PATH IN NEW ZEALAND MIGHT BE THEREFORE TO:

- a) **Narrowly define cannabis in relation to THC;** the narcotic drug MoDA was set up to control in 1975
- b) **Re-visit the Classification of medicinal cannabis** as a prescription-only medicine; this would sensibly differentiate between medicine containing THC, and those CBD products principally intended for a therapeutic purpose as required under the Medicines Act, some of which may be of low

dosages, which allows them to be classified for example, as a pharmacist-only or over-the-counter (OTC) product.

c) Decide the status of products containing CBD (or other cannabinoids) which are not medicine.

The answer in other jurisdictions has been "Natural Health" type laws. These typically constrain the representations that can be made in relation to the product, but also endeavour to establish a reliable quality control chain from plant to consumer.

d) Where the CBD/hemp product is a food, then clearly the Food Act will apply. Clarity is required in regard to functional foods containing CBD.

It must be said that the path to gaining support for these types of changes to the cannabis/hemp regime has been a rocky one for our industry members. Only recently has it led to permission to grow, process and/or trade in seed, and hemp seed oil for human use. A welcome change but a limited one from the perspective of industry growth, given that CBD and other beneficial cannabinoids are found in the leaf/flower. Which at present is being discarded, or donated for research purposes.

Other suggestions for

change have consistently been met by objections and fears, many of which could, and should, be overcome by consideration of the present scientific knowledge and legislative changes overseas.

For example:

The idea that no further changes can be made to the Misuse of Drugs Act (and/or its regulations) in regard to industrial hemp because of the UN Single Convention is challengeable. Clearly this adherence to the Convention has not stopped several other signatories to the treaty from narrowly defining illegal cannabis and expressly removing CBD from anti-drug prohibitions (a position now endorsed by the WHO and likely to be adopted by the UN in late 2020.

e) **The argument that any CBD-containing product, if not a medicine, is still illegal under the MoDA.** Given the general acceptance that low-

dosage CBD is quite safe and non-psychoactive, then this appears almost nonsensical, and not in keeping with the thinking of other countries we have discussed.

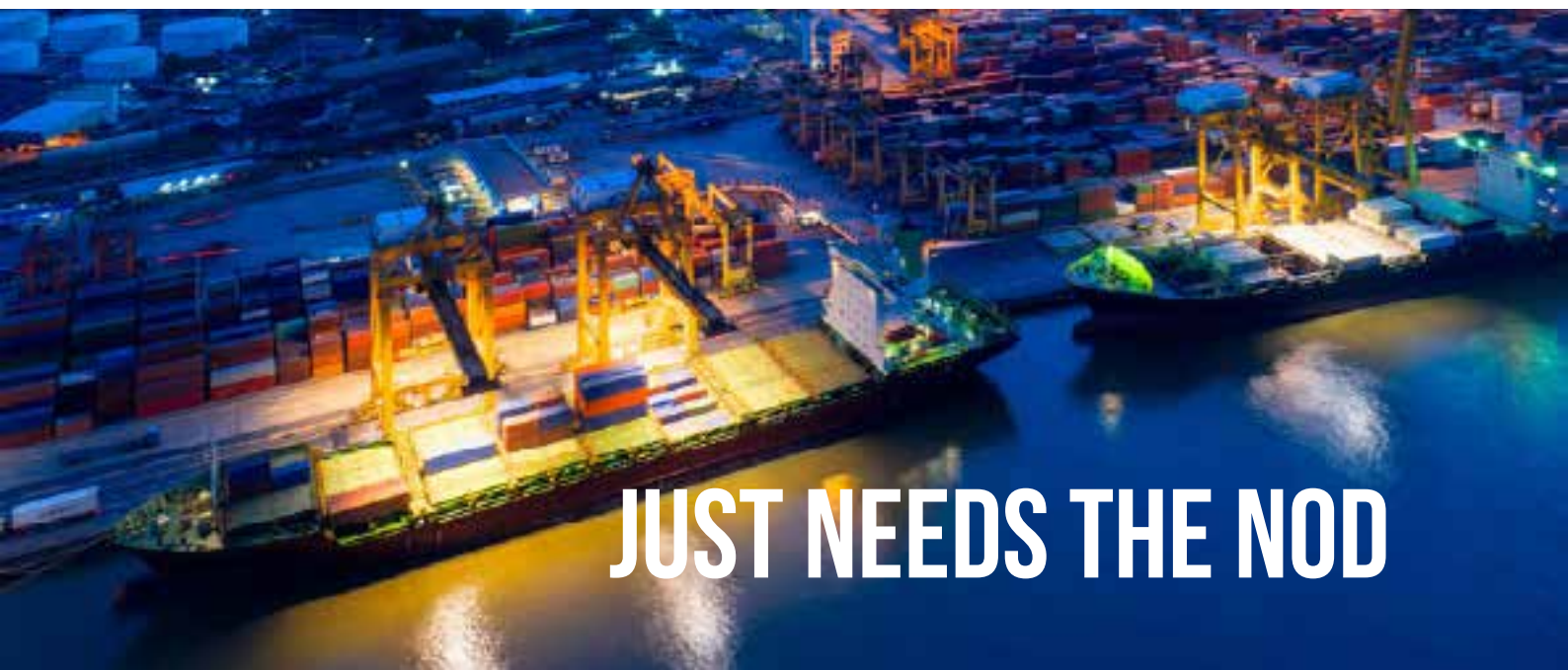
f) **The idea that while CBD is not expressly banned by the MoDA,** it is an isomer of THC which is banned. This argument put forward by the Ministry of Health is in fact not supported by the scientists at Environmental Science Research Limited (ESR), which is the MOH designated science testing facility, being a Crown Research Agency.

g) **The Industrial Hemp Regulations' limitation** - both in regard to only utilising the stalk and seeds, (and not leaves or flowers) and only processing and selling seeds and seed products - could be considered out of step with the principal Act, under which the regulations are made, the MoDA, which has now descheduled CBD as a

specified substance.

In summary many commentators, including business analysts and stakeholders in the industrial hemp industry, have noted that the industry in New Zealand will grow substantially if a regulatory framework is put in place which enables the manufacture, sale, import and export of non-medicine hemp products containing CBD. This would facilitate investment in research and development, infrastructure and new product development, to enable substantial export activities.

Also noted is the growth of competitors in the market for example; in Canada, Australia and the US, which makes it imperative that the regulatory framework, and particularly the clear reclassification of CBD, both for medicines and other CBD products, should be treated with urgency.



JUST NEEDS THE NOD

7. HEMP GROWTH SCENARIOS - A \$2 BILLION INDUSTRY BY 2030

The NZ industrial hemp industry is a commercial start-up which, despite cultivation and research activity since 2006, has in fact only been able to develop since the Industrial Hemp Regulations were amended at the end of 2018.

As shown in chapter 4 of this Report, even in that short time a substantial industry has built up particularly around hemp seeds and oil, along with an increasing consumer awareness of the health benefits of hemp food and other products.

As indicated in Chapter 3 discussing the global hemp industry, those

countries where law changes were made some time ago, have shown substantial growth.

The nature of that growth (for example, the different products and market segments that have been developed), is helpful when considering a likely "scenario" which could exist in New Zealand in ten years' time.

However, any strategy for future growth in the hemp industry must consider New Zealand's own unique circumstances.

New Zealand's small population is a case in point, and it has long been recognised here that substantial

industry growth will only be achieved through an aggressive export strategy, and this has certainly been seen in the horticultural sector.

Exporting has been central to the success of horticultural industries in New Zealand. Such as kiwifruit and wine. These industries have played to the country's strengths and built profitable niches in global markets.

The hemp industry has much to learn from the wine Industry, which has implemented a high value export strategy, with products aimed at discerning customers.

To be successful, the New Zealand wine industry could not be a 'commodity' supplier; it had to be different from Australia, whose cheaper wines dominated the 'new world' wine category. Despite initial scepticism about the idea of high quality new world wine, in the mid-1980's New Zealand Sauvignon Blanc wines began to achieve recognition and win prizes. Other wine varieties, such as chardonnay, pinot noir and pinot gris followed.



We envisage a similar success with NZ Hemp's impact on niche overseas markets with:

- **CBD from New Zealand** – premium and quality assured
- **Cannabinoid Product extension** - as the consumer market opens up beyond just CBD, and into other cannabinoids, terpenes, flavonoids and a range of Full Spectrum oils from different regions.

- **Well branded premium hemp oils** . Aimed at those same discerning customers who highly value cuisine and fine dining, as well as quality ingredients with health benefits. This strategy would focus on the major cities of the world where the NZ brand is held in high esteem.
- **'Food Basket' Exporting** – co-operation between hemp product producers and other NZ high-end foods and beverage exporters such as the Fernmark Food Basket initiative in China (sold on Ali Baba).

KEY ASSUMPTIONS UNDERPINNING THE SCENARIO

This scenario is based on the following assumptions regarding certain circumstances that will prevail, and actions that will be taken in New Zealand from 2021.

- **The CBD boom worldwide will continue** as this cannabinoid ingredient continues to be ubiquitous across an expanding range of food, beverages, and topical products. In addition markets continue to grow overseas in hemp seed, oil and fibre products.
- **It is recognised by the New Zealand**

government that this country should seize the opportunity offered by this growing global market to export a range of industrial hemp products, and in particular CBD based products.

- **The cannabis and hemp regulatory framework is changed** to clearly differentiate between cannabis containing THC as an illegal drug, medicinal cannabis, hemp products generally and in particular non-medicinal products containing CBD.

While the above assumptions are essential to an export growth scenario for the hemp industry in New Zealand, the following are highly desirable and would support the predicted earnings below.

CABINET PROVIDES SUPPORT FOR THE HEMP OPPORTUNITY:

A Minister is designated to coordinate across the agencies to advance the hemp sector.

A rapid shift of hemp regulation from MOH to MPI is prioritised.

Hemp is brought into the Low Carbon policy framework; fast tracks low carbon materials building materials regulations, and government procurement

STRONG HEMP SECTOR LEADERSHIP BY CEO'S AND BOARDS

A **CEO's alliance** is formed which coordinates closely with the Medicinal Cannabis council and NZHIA to develop an overall strategy for growth.

Export collaboration - a 'NZ Inc' approach is taken towards export markets, implementing high value export strategies and branding in selected discerning customer export markets.

Innovation Coalition - The CEO Alliance, MBIE, MPI, MFAT Callaghan, NZTE and the CRI's collaborate with the hemp companies to rapidly develop the innovation and infrastructure required for a multibillion-dollar industry

Major investors, both local and global, are willing to provide the capital necessary for development of infrastructure, including technology and processing plants, which are necessary for the industry to grow.

VISION:

'The New Zealand Hemp sector is respected globally for its innovative solutions to address the world's pressing issues'

Hemp is grown across the country in different climate zones which allow for variation in cannabinoids, seed and fibre crops (similar to the wine regions of New Zealand).

HEMP INDUSTRY SUCCESS FACTORS (GLEANED FROM THE WINE INDUSTRY EXPERIENCE)

- **Timing** - the right vision at the right time
- Set the **vision** in the future - and use it to guide action today
- Clear **leadership**, does not mean a single person
- Both **competition** and **collaboration**
- Recognise that the **NZ brand** is intrinsic to the story taken to the global market
- Use **overseas investment** and specialist skills to enhance growth
- **Partner with government**
- Put in place **quality standards** and assurance, rules and regulations that enable growth

THE 2030 FORECAST GROWTH SCENARIOS

(developed by senior executives and analysts in the hemp industry) are as follows.

SCENARIO 1

No Regulatory Reform - is based just on the seed and fibre products expanding to \$500 million with around 5,000 new jobs

SCENARIO 2

Regulatory Reform - is based on political reform of the regulations allowing for the rapid expansion of cannabinoid products for nutraceuticals, most notably CBD. It forecasts total earnings of \$2.0 billion; with \$183 million in seed products, and \$317 in fibre products, \$1.5 billion in hemp nutraceuticals from cannabinoids, and 20,000 new jobs in the regions

Regional growth - How hemp is grown and processed in regional clusters building on the platform laid by existing companies:

- **North Island** - Hemp Connect, Pure Heart Aotearoa, Hemptastic, Aotearoa, Hemp NZ, Hemp Farm, Ligar Extraction, Kakariki Fine Foods and Kanapu
- **South Island** - Midlands Seed, Midlands Nutritional Oils, NZ Yarn, Hopefield Hemp, Larrys Gold, Hemp Cottage Farm

IWI ARE MAJOR INVESTORS

Iwi are major investors in hemp cultivation, processing and bioscience which aligns with their 'Kaitiakitanga' guardianship beliefs.

Hemp Farming - 500 farmers in different regions have built hemp crops into their business model.

NZ wine growers plant hemp as a cover crop as standard practice across 40,000 hectares of vineyards in New Zealand for benefits including soil compaction, organic matter, improved wine quality and a second income for growers.

Hemp Agritech Companies - investments in testing, traceability, and extraction technologies, fibre

harvesting and processing technologies, high value nutritional products, GMP production facilities for nutraceuticals.

Hemp Fibre companies have partnered with local manufacturers to supply fibre to 'pull carbon out' of many products including materials for roading, construction and packaging. And, to manufacture hemp plastics which are fully biodegradable.

The scenario growth figures shown below for 2030 are undoubtedly aggressive, but they are well founded.

The most compelling reason for modelling them is to look at our other crop success stories which all have a similar success DNA - wine, kiwifruit, and manuka honey, but also A2

milk, among many others. When you travel the world, you are constantly reminded by business leaders that New Zealand is exceptionally good at:

- **Growing** things
- **Researching** and innovating
- Has **high quality** standards
- Understands discerning **global consumers** and knows how to target them
- Can leverage the exceptional **country brand** that is 'NZ'
- With the **entrepreneurship** determination to win in global markets by being different and commanding higher value for that.



2030 NEW ZEALAND HEMP INDUSTRY SCENARIO 2	Domestic market	Export market	Total market
CANNABINOID EXTRACTS PRODUCT SALES <ul style="list-style-type: none"> • Bulk CBD • CBD Pet Foods • CBD Beverages • Balms • CBD Oil and tinctures • CBD for high performance athletes • Animal Feeds 	\$300mil	\$1.2mil	\$1.5bil
HEMP SEED OIL PRODUCTS SALES <ul style="list-style-type: none"> • Bulk Pressed oils- bulk 20% • Premium Pressed oils -own brand- 5% • Pressed oils (cannabinoids removed) 1% • Nutraceutical extracts from seeds / hulls 5% • Seeds and fibre for food manufacturers 50% • Premium Own brand /health products 19% 	\$37mil	\$146mil	\$183mil
FIBRE PRODUCT SALES <ul style="list-style-type: none"> • High tech textiles for high end clothing • Hemp bio-composite materials • Technical fabrics • High end carpets • High tech laminate • Hemp wood alternative (building materials) • New high tech fibre application • Supercapacitors & graphene type applications • Low tech laminate (vs plywood & bamboo) • Insulation • Furniture • 3D filament 	\$63mil	\$254mil	\$317mil
TOTAL REVENUES	\$400mil	\$1.60bil	\$2.0bil
NEW JOBS CREATED	5,000		20,000

8. CONCLUSION: A MASSIVE OPPORTUNITY FOR JOBS AND BUSINESSES IN REGIONAL NZ

THE OPPORTUNITY

This report shows the unquestionable opportunity that industrial hemp offers to New Zealand, as evidenced by growing awareness of its benefits, substantial consumer demand and a US\$26.6 billion (NZ\$40.7 billion) industry in 2025. (16)

While an industrial hemp sector has developed recently in New Zealand, the regulatory framework is highly proscribed and if left unchanged will obstruct further development.

Legal liberalisation in various countries overseas provides a

blueprint for New Zealand law makers in regard to a range of approaches to facilitate the hemp sector here.

NZ advisers to the government can also take comfort from the fact that not only have those members of the Single Convention on Narcotics who have liberalised their laws faced no penalties for so doing, but also the WHO expert committee has recommended to the UN that CBD is safe, and should not be included in an anti-narcotics convention.

In any new or amended regulatory framework,

clarity around the status of a range of products containing CBD is essential.

At the moment the Ministry of Health will only acknowledge CBD products as medicine (whether or not they do in fact meet the definition of a medicine) or as a product in breach of the MoDA (despite CBD having been descheduled from that Act in recognition of its non-psychoactive nature).

This approach, which ignores low CBD non-medicinal products, creates a maze which industry members are

finding increasingly difficult to navigate, in spite of their many submissions to, and discussions with the Ministry of Health. [The latter controls licensing for cultivation, processing and sale of hemp and medicinal cannabis in New Zealand].

Adding insult to injury, the very products which the New Zealand hemp industry is forbidden to produce, sell or import, are being sold online and brought into this country by New Zealand purchasers.

Clearly there needs to be a balance between the interests of consumers, and those of the industrial

hemp sector, as well as the possibility of creating a lucrative new export sector for New Zealand.

Consumers do need to be kept safe, whether that is by limiting THC content in products, by designating the amount of CBD or other cannabinoids that are acceptable, or by applying food law or natural health product controls, where appropriate.

On the other hand, if a blanket prohibition applies, the industry will be stifled and New Zealand will be on the back foot with regard to competing in the global market.

This scenario is not only bad for the industry but also for the economy.

What is needed is a co-operative exploration involving industry members and regulators, of cannabis and hemp related products, the appropriate level of regulation to apply to those products, and a plan to amend existing law and possibly create new laws to facilitate the production, sale and export of hemp products.

It is hoped that this report will go some way towards clarifying the issues and assisting that process so that the full potential of a substantial New Zealand industrial hemp industry can be realised.

<p>Hemp looks like this.</p> <p>100% natural, smooth, of high quality industrial hemp construction for U.S. hemp products. No smell, light, easy-to-roll, and easy to take care of. Available in a variety of colors and patterns. A lot of hemp uses, including fashion, bedding, towels, and more. For more information, visit www.dunsthemp.com. #Tn4Hemp</p> 	<p>Hemp looks like this.</p> <p>100% Hemp. Low THC. 100% U.S. Hemp. No smell, light, easy-to-roll, and easy to take care of. Available in a variety of colors and patterns. A lot of hemp uses, including fashion, bedding, towels, and more. For more information, visit www.dunsthemp.com. #Tn4Hemp</p> 	<p>Hemp looks like this.</p> <p>100% Hemp. Low THC. 100% U.S. Hemp. No smell, light, easy-to-roll, and easy to take care of. Available in a variety of colors and patterns. A lot of hemp uses, including fashion, bedding, towels, and more. For more information, visit www.dunsthemp.com. #Tn4Hemp</p> 
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APPENDIX 1 - SCENARIO MODELLING ASSUMPTIONS

Extracts Value

(cannabinoids etc) in 2030 - NZ\$1.5 billion

- 1,000 hectares CBD flowers planted
- Using Wine share as a surrogate variable for the CBD market- NZ has 1% of the global wine production in 2019 and 1.5% of total CBD /cannabinoid nutraceuticals
- Total World Market CBD value in 2030 is forecast to be US\$ 64.5 billion (NZ\$ 100 billion) with an annual CAGR of 22.2% (<https://www.grandviewresearch.com/industry-analysis/cannabidiol-cbd-market>)
- Total = NZ\$ 2.0 billion (2% of the global

market)

Fibre value in 2030- \$317 million

- 10,000 hectares of Hemp fibre is planted in 2030
- Fibre: 80% medium to high tech applications, 20% low tech
- Hurd: 20% low tech applications, 80% medium to high tech
- Total = \$317 mil

Seed Value in 2030 - \$183 million

- 10,000 hectares for seed planted in 2030
- Pressed oils- bulk 20%
- Pressed oils -own brand- 5%
- Pressed oils with cannabinoids removed

1%

- Nutraceutical extracts from seeds / hulls 5%
- Seeds and fibre for food manufacturers 50%
- Own brand /health products 19%

Job Creation in 2030

Hemp is comparable to the Wine Industry which has a similar industry value chain and 20,000 jobs:

- Growers
- Wine makers
- International wine marketing
- Hemp estimate - 20,000 full time jobs (based on \$100,000/job with \$2 billion revenues).

APPENDIX 2 - BIBLIOGRAPHY

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APPENDIX 3 - NZ FOOD, FIBRE, AND HEALTH - KEY REPORTS

Despite its long history hemp is a 'new boy on the block' within the family of arable industries of New Zealand.

Whilst it is not well understood it does have an important place in several existing industry groups including Food and Beverage, Natural Health Foods, Fibre, Health, and Agritech sectors.

A lot of work has been done to inform the wider Food, Fibre and Health industry investors, and to strategise sector futures working with government agencies over the past few years.

The following brief review indicates key Insights applicable to the future of the hemp industry in New Zealand: Nutraceuticals & Foods for Health Food & Beverage Information Project 2011

www.foodandbeverage.govt.nz
Author comment- although ten years old this report has an outstanding analysis of the New Zealand nutraceutical market which has direct relevance to the growth of Hemp nutraceuticals

Investor's guide: The New Zealand food & beverage industry 2014 - Food and Beverage Project - 2014 - Coriolis Analysts

'New Zealand is a young country still discovering its comparative advantages and new industries continue to emerge. In the past twenty years New Zealand wine, honey, aquaculture and avocados have all emerged from almost nothing into world leading sectors. Author comment- 'and also Hemp'?

The Investor's guide to the New Zealand processed Food Industry,

MBIE - New Zealand Food & Beverage Information Project 2017.

'Nutraceuticals and 'innovative foods' are New Zealand's biggest and fastest-growing food and beverage export categories

Hemp – a snapshot- MPI Intelligence Unit 2018

'From a consumer-facing perspective, hemp product development faces a decision to either:

- Invest in developing a product where there is already substantial competition but where there is a lack of compelling product offerings (e.g. personal care (bathing products or makeup), or snack foods which leverage hemp's high protein nutritional profile); or,
- To create compelling products in niche product categories with limited exposure (e.g.

oils, skin care or herbal supplements).’ Author comment- this study was done before the dominance of CBD FMCG products in the US market 2018-19

‘Nutraceuticals: the future of Intelligent Food -where food and pharmaceuticals converge’ 2018 KPMG- ‘The term ‘nutraceuticals’ was coined in the late 1980s to describe food products that have a medicinal benefit. This fast-growing sector includes functional foods (such as vitamin-enriched products), nutritional supplements, sport drinks, and medically formulated foods.’

Understanding the Modern CBD industry – Evolving Regulations, Increasing competition, and the Legal marketplace’ - Green Flower 2019 www.greenflower.com

A record 511,000 acres were licensed for cultivation in the US in 2019- a 476% increase over 2018-most of that Hemp is being turned into CBD products including Pet Care, Sports , Food and Beverage, Beauty and Skincare, Infused Alcohol, and Health and Wellness.

Annual Hemp and CBD Industry Factbook Survey

2019- Hemp Industry Daily 2019, www.hempindustrydaily.com Denver. With 37 charts showing new insights into the hemp market from farm to store shelf this report offers exclusive intelligence about the USA Hemp industry from extensive research with business operators.

Global Hemp Markets: Product and consumer landscapes- MPI 2019 <https://www.mpi.govt.nz/dmsdocument/35142-global-hemp-markets/sitemap> This report shows the emerging scale of investment in Hemp and the product range in the US market and the potential for NZ to develop an export industry in Hemp products. It does not pick up the CBD consumer product boom which took off in 2019 and which has transformed the amount of Hemp grown all around the world

‘Exporting Aotearoa – New Zealand: A new business model for nutrition and health-focused export companies’- Andy Elliot, Nuffield Report, March 2019 **New Zealand can be different from other Hemp countries- a hemp plant provides a whole**

cascade of value and it is very tempting to chase a single primary product proposition and not look at the secondary value that exists within the one plant’

Draft Agritech Industry Transformation Plan 2020 - David Downs, Agritech Taskforce Lead, MBIE **Agritech is a \$1.4 billion industry with a Vision to be a globally competitive agritech eco-system, producing ingenious value-adding companies that provide meaningful jobs, solving New Zealand’s and the worlds sustainability problems’**

The ‘now normal’ future-food and fibre in a world emerging from Covid-19- KPMG Agribusiness agenda May 2020 **‘Now is the time to radically accelerate plans that enhance your position in the ‘now normal’ while being prepared to cancel projects that have become irrelevant. It is also important to recognise that the change we have experienced is so extensive that plans that had been discarded as impractical or impossible may now be achievable. Now is the time for organisations to be bold in the investment decisions they choose to make.’**



The Snapshot version of the Report can be found at:

<https://joom.ag/oSiC>



NZ HEMP EXPORT DRIVEN INVESTOR SNAPSHOT

**\$2 BILLION AND
20,000 REGIONAL JOBS BY 2030
JUST NEEDS THE NOD...**

A world map with dashed lines connecting New Zealand to Europe, China, India, Australia, North America, and South America. Below the map, the word "GROWTH" is spelled out with wooden blocks, and an arrow points upwards from the "H" block.

SNAPSHOT

You are invited to the
NZHIA iHemp Summit and Expo
20-22 May 2021, Rotorua
www.hempsummit.nz



The New Zealand Hemp Industries Association Inc is the go-to resource to help you with your iHemp journey, for more information and to join go to www.nzhia.com



We would like to thank AGMARDT for recognising the importance of the iHemp industry and for helping to fund this report.

The logo for AGMARDT, featuring the word 'AGMARDT' in a bold, black, sans-serif font centered on a bright yellow rectangular background.

AGMARDT

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