# TRANSPARENCY, COMPLIANCE AND BUILDING VALUE-ADDED INDUSTRIES

## Digital solutions for New Zealand Hemp

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WEBTOOLS
CUSTOMER MANAGEMENT SOFTWARE

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# PART I: NEW ZEALAND HEMP - CHALLENGES AND OPPORTUNITIES

## Introduction – The importance of Hemp

By many accounts, New Zealand is at the precipice of an agricultural revolution. At the very least, it is experiencing the dual headwinds of the current international transition towards more modern, lower impact, more efficient agriculture but also the need for solutions that feed a growing global population. New Zealand's international reputation for primary production, high-quality food production and attention to environmental issues mean these global challenges are nationally important to us. The ability for New Zealand primary producers to thrive in this evolving marketplace is becoming more challenging. Information needs are higher than ever and digitization of information raises the bar of expectations from both consumers and the Government[i]. It is here that digital solutions are critical.

*"Farmers are now grappling with a multi-headed beast of compliance. Overseas competitors are also upping their game. Ireland is working hard on its Origin Green initiative that has achieved a nearly 90% farmer sign up, in only three years.... The pressure on farmers is intense and reflects in some sobering statistics around farmer confidence, and even mental health.... There is a sense of siege within New Zealand's pastoral sector that comes as much from a sense of being overwhelmed by these demands as it is from a sense of frustration at not being able to deal with them in a single-solution approach.*

*Instead, smart phones are cluttered with apps of various capability to do part of the job, paperwork is having to be entered in farm laptops, and doubling up, or even tripling up on recording is consuming valuable farm and family time. Minister for Agriculture Damien O'Connor recently said if New Zealand is to continue to flourish on the world stage it needs 'one plan' for farmers that will enable them to prove their products are sustainable[ii]".*

Digital solutions are important to these emerging agricultural sectors, not only to meet the needs of New Zealand's domestic markets, but also for New Zealand's ability to compete internationally. This means digital solutions contribute to making New Zealand's agricultural products globally demanded, but also presents an opportunity to be world-leading in Agri-Tech solutions for export.

The emergence of New Zealand hemp and cannabis is an excellent example of an emerging agricultural industry poised for digital solution application.

The dawn of a new decade is a time of great change in New Zealand's relationship with hemp and *cannabis sativa sp*. The New Year heralded in the commencement of the Medicinal Cannabis Scheme (April 1st) and the second harvest for 2018-legislated industrial hemp seed food production. Alongside these monumental events, the cannabis plant is at the centre of one of the most important election issues in New Zealand history – the 2020 Cannabis Referendum. This singular political event represents a range of underlying trends, conversations and issues that surround the cultivation, use and commercialization of the *Cannabis sativa sp.* plant. With multiple potential uses, biological applications, commercial markets, and interested parties; this results in a highly complex and multifaceted environment for stakeholders to navigate, across all sectors. One area of this cannabis conversation is industrial Hemp.

*"The promise of industrial hemp is somewhere between "Hemp is just a stalking horse for marijuana" and "Hemp can save the planet". There is no other example in history of a novel field crop being so greatly impacted by socio-politics[iii]."*

The New Zealand Hemp industry is preparing for domestic and international scalability in the wake of regulatory maturation of C*annabis sativa sp.* Industrial hemp, or iHemp, exists as a distinct sector within an emerging potential cannabis industry. Agriculture Minister Damien O'Conner's comments on passing legislation that re-established the hemp industry in New Zealand:

*"This is great news for the local hemp industry, which has argued for decades that the production of hemp seed foods will stimulate regional economies, create jobs and generate $10-20 million of export revenue within 3 to 5 years,[iv]"*

Since then, the Hemp industry has shown considerable promise:

*"The hemp seed industry is growing at pace. Last year, production scaled up from 200ha to 1,200ha and New Zealand Hemp Industries Association (NZHIA) Deputy Chair Richard Barge expects this progress to continue as markets for low-THC industrial hemp open up[v],[1]"*

[1] Figures updated by R. Barge, now Chair of the NZHIA, to be 259 ha in the 2018; 754ha in the 2019 season, 1,200ha anticipated in the 2020 season. (May 5th 2020, Personal Comms.)

**From industrial hemp crops:**

- Hemp seed (and protein derivatives)
- Hempseed oil (food and industrial uses)
- Fibre and textiles
- Industrial, construction and building materials

**From cannabis variety crops:**

- Medicinal products
- Health and wellness food and beverage
- Supplements and nutraceuticals
- Adult use and/or recreational products

A key aspect of this promise are multiple product value chains that are possible from the many cannabis varieties, and multiple end uses possible from a hemp or cannabis crop. This means that a successful New Zealand hemp industry could bolster New Zealand's position in a number of overseas markets, and create diverse revenue streams for New Zealand farmers and producers. These multiple uses[vi], [vii] and avenues of opportunity from hemp and cannabis, combined with the increasing emphasis being placed on expanding New Zealand's sustainable, value-added agricultural products on the international stage mean that there is increased demand for progressive digital solutions. Such solutions will enable this next-generation agricultural transition and environmental regeneration, forming a key component of New Zealand's economic strategy for a sustainable, globally-competitive future.

## Research Objectives and Rationale

This research explores current transparency and compliance in the New Zealand Hemp industry. It seeks to understand both current barriers, and areas of opportunity, in the transparency and information flows needed to develop the industry. Research findings are therefore designed to support the development of digital tools in transparency and compliance to facilitate rapid "scaling up" of the fledgling hemp industry. Research background, legal and regulatory context and research methodology are described at the end of this report. A more detailed regulatory summary is provided in Appendix 1.

# Executive Summary

**Regulatory Compliance is manual, paper-based and off-line and this is slowing the industry down.**

Stakeholders want to ensure a value-added market can develop. Hemp has exceptional product diversity opportunities, but most aren't available to New Zealand producers currently.

Digital Solutions will enable the Hemp Industry to meet intersecting consumer trends, but can't be done without consumer education

There are three distinct market entry points for growers – from Arable, to Augmenting Mixed-Use systems, to novice Hemp Enthusiasts.

Each have distinct barriers to entry, and market priorities, representing opportunities past arable broadacre cultivation to market garden and horticulture

New Zealand Research required: the environmental value-add is important to stakeholders, but there isn't enough New Zealand-specific information or data capture right now.

**Hemp Stakeholders across the Industry Ecosystem aren't well connected to local services and supply chains. Digital solutions will be required for them to share information and transparency across their interactions that the industry needs to grow.**

At the highest level, the most important task of a digital solution will be to ensure market-based agricultural industry is built where prices are based on value added.

**Breeders, Merchants and Brokers are pivotal to seed supply – all want improved access to testing, and would benefit from form Seed Isolation Distance systems to assure genetic integrity. Voluntary Seed Certification used in other industries is being considered.**

Critical current trends in sustainability, environment, and consumer demand mean hemp must make informed industry choices to succeed.

Digital Solutions for Market Entry: Hemp and similar emerging in the future will need digital solutions to manage understandable curiosity and enthusiasm for a novel product into effective production capacity.

Digital solutions for the hemp industry will need to recognize and complement existing farm management software already established in the market. Current software is currently farmer-focused, and farm management oriented, rather than towards transparency or value-add

# Research Findings

## Requirements of digital solutions for this emerging agricultural industry

Our stakeholder interviews and literature research identified three key themes regarding the challenges and opportunities regarding transparency, industry development and digital solutions for the hemp industry, each summarized below

### 1. Time-critical trends and choices

As introduced above, the hemp industry in New Zealand is at the confluence of several trends. It is a critical time for sustainability, the environment, and making informed industry decisions. This was reflected in stakeholders' statements and experiences. Almost all stakeholders prioritized the environmental and sustainability aspects of hemp. Hemp products are seen as having notable unique environmental benefits from its cultivation and ability to substitute for energy or waste intensive products (as a protein and as multiple fibre end products[ix]). Hemp products are also seen as having significant unique benefits to human health, which relate to the sustainability concept of improving health and wellbeing of human and animal welfare[x].

These significant opportunities from a hemp industry are developing at the same time New Zealand is increasingly challenged by the negative outcomes from the environmental impacts and long-term commodity value base as a result of established New Zealand agricultural exports, particularly dairy[xi]. This means that New Zealand is ready for the alternative crop options that hemp could provide. As such there is an incredible level of optimism for hemp as a product, and the opportunities hemp products can provide New Zealand producers and consumers[xii]. Within this positive trend there were also a number of stakeholders had a very high level of optimism:

*"It's the queen of plants.... We can do everything here. Why isn't the government embracing this?[xiii]"*

*"The global market for hemp seeds is worth about $1 billion and could eventually generate up to $20 million in exports.[xiv]"*

## Glossary of terms

**Cannabis** – the Cannabis sativa plant and its varieties with scientific name of *Cannabis sativa sp.*
**Hemp** – Low-THC varieties of *Cannabis sativa sp.*, and plant material from these varieties
**iHemp** – Term used by the New Zealand Hemp Industries Association (NZHIA) to refer to Industrial Hemp, as defined by the Misuse of Drugs (Industrial Hemp) Regulations 2006 and subsequent amendments and revisions.
**THC** - tetrahydrocannabinol. Under the Misuse of Drugs (Industrial Hemp) Regulations 2006, low-THC is considered to be a THC level of under .35%, up to .5%
**CBD** – cannabinoid. A group of chemical compounds naturally occurring in *Cannabis sativa sp*. Plants, of which there are over 80 different types[viii].
**MoH** - Ministry of Health of the New Zealand Government
**MODA** – Misuse of Drugs Act (1975) and its amendments
**MPI** – Ministry of Primary Industries of the New Zealand Government.
**Medicinal Cannabis** – Cannabis products which may be accessed via a prescription from a Registered Medical Practitioner in New Zealand under the Misuse of Drugs (Medicinal Cannabis) Amendment Act which came into effect in December 2018. Also termed pharmaceutical cannabis or medical cannabis.
**Adult-use Cannabis** – Cannabis products restricted based on age. Includes terms such as recreational, therapeutic, wellness, or nutraceutical use. These forms of cannabis are currently not permitted under New Zealand legislation, and a referendum is scheduled on this issue at the time of the New Zealand General Election 2020.

Amongst this positivity for hemp products, some stakeholders expressed skepticism for the market potential of the industry despite agreeing with the product benefits. They noted that to take hemp from the cottage scale, from which many of hemp's most ardent proponents base their optimistic perceptions on, requires commercial considerations that have yet to be validated and have been difficult to successfully commercially meet for other 'miracle' or 'wonder' crops[xv].

This is related to the concern a number of stakeholders raised where they judged that particular overseas markets have failed to capture the anticipated (and potentially unjustifiably optimistic) value from hemp and cannabis industries to their full advantage, for a variety of reasons[xvi], [xvii], [xviii]. On the other hand, stakeholders also pointed to observations of international markets[xix] where product availability and earnings potential exceed that which is currently able to be accessed by New Zealand stakeholders – our laws don't currently allow New Zealand producers to do this[xx]. Together, these points underpin the concern that New Zealand is on the verge of a significant opportunity and must take care not to 'go down the wrong track', fail to make the most of the opportunity, or make poor choices. Numerous Stakeholders suggested the importance of making the right decisions moving forward:

> *"This is a unique opportunity to shape the industry ... to bring cannabis out of the shadows and into the light. We have the opportunity create a new industry...."*
>
> *"If you come to a crossroads....and you embark down the wrong road, thinking it's the right road, then you've gone a long way down that road until suddenly you find you're on the wrong track. You don't keep going down that track, you either go across country onto the right road – if you've got a map – or you back-track to the crossroads and take the right track. And that's what we need to do."*

Overall, there is a concern from some stakeholders that excessive optimism of hemp and cannabis ("a silver bullet") is reason to be concerned[xxi]. It potentially creates unrealistic expectations for industry entrants and stakeholders because to bring food and medicine to market through the standards and requirements that already exist in our modern marketplace is challenging for all products irrespective of origin or history.

> *"It's not that the regulations are onerous, it's that hemp attracts people unfamiliar with food or medicinal regulations, so it's overwhelming to them."*

## 2. Barriers to Regulatory Compliance

There is a perception among many (but not all) stakeholders that the regulations and compliance associated with hemp are difficult, creating barriers to industry development[xxii]. In large part, this stems from how the industry's legislative structure for this industry have developed: multiple legislation and multiple regulating Ministries[2]. At the time of the 2006 Legislation the intention was to move hemp regulation from MoH to MPI over time. More than a decade later, there is significant desire to see this transition happen. Such a transition is somewhat unprecedented and both ministries are keen to have solid industry management systems and processes in place to enable this to be accomplished. Here, digital tools that improve industry transparency could be key to enabling regulatory oversight to make this transition.

The key reason that the MoH were the regulating agency established in 2006 is also a key reason for stakeholder's perceptions of regulatory burden currently. The exact nature of the barrier this Act and Ministry presents to the hemp industry proved nuanced during this research: it appears to be a matter of perception and perspective. Government officials within MoH are designed to administer issues of a health and medicine nature yet hemp regulations now require them to administer an agricultural and food crop, for which is outside their previous experience. There exists a difference of perspective, where the Ministry is charged with controlling risk, while the Hemp industry requires support for commercial activities. It is suggested that this government department is well intentioned but ill-prepared to administer hemp as a crop, as opposed to the illicit drug it was previous classified as and this is exacerbated as the law creating that illegal classification (I.e. MODA) is still in place.

> Hemp legislation has, to date, been written while *Cannabis sativa sp. r*emains within the remit of the Misuse of Drugs Act 1975 (MODA).

This was aptly described as a "regulatory attitude" by one stakeholder. Although regulations do permit the hemp industry, the specter of MODA bears down on how officials administer the hemp regulations and this creates barriers to industry growth. Stakeholders held concerns of 'regulatory creep' whereby Ministry decision-making and interpretation would extend past the gambit of the legislation as written. For example, 2020 ministerial decisions around annual licensing renewals, and recent discretion exercised to impose annual THC testing on cultivators growing varieties approved as low THC by the same ministry. Increased transparency in the

[2] This is briefly described in Appendix one, and summarized in the bullet points in the Research Outline.

industry would make a significant contribution to increased stakeholder confidence and Ministry license to regulate.

## 3. Ensuring a value-added market can develop

Stakeholders appear divided on this issue. Some see hemp seed already as a commoditized crop with little opportunity for value add. Others see significant value-add opportunities and view the development of a value-added market for New Zealand as essential to the viability of hemp in New Zealand.

There are countless examples of a commodity approach in established New Zealand agriculture products. It is easy to see why New Zealand tends to take this approach as we able to produce far more than can be absorbed by domestic consumption. However, New Zealand's land mass is not large enough to be able to serve the larger volumes required to compete within international commodity markets. The effects of previous commodity-based approaches to New Zealand agricultural products are the focus for the negative environmental and economic outcomes the rural sector is grappling with today.

For those who see industrial hemp as a commodity already, these stakeholders primarily come from the existing arable industry. They have incorporated hemp into their businesses alongside other commodity crops whereby seed stock is purchased from overseas variety owners and propagated (that is, multiplied) in New Zealand and then returned to the overseas buyer. They are keen to see processes and systems established that support hemp seed be treated alongside these commodity crops, presumably for ease of integration with the current business model.

Other stakeholders put importance on a value-add hemp market being created. They state that New Zealand would not have the capacity to compete on the volume basis that a commodity crop requires, and that current world prices for hemp seed as a commodity are already too low to be financially viable to New Zealand growers.

This point helps identify two hemp markets – seeds for cropping for food and fibre production, and seed for propagation – and the role of value-add may need to be identified differently in each case.

In terms of similarity between both the production and propagation markets, competitive markets (of which New Zealand agriculture and agricultural products are) require liquidity that is based upon strong flows of information. In order to establish a strong value position for the hemp industry, greater flows of information are required.

In terms of potential differences, seed propagation may be able to develop a value-add premium if the surety of varietal integrity can be assured through robust transparency processes. Put simply – can New Zealand attract a premium on hemp seed if we can demonstrate that our seeds are of higher quality, through assured genetic integrity? This is achieved to a degree in

other vegetable seed markets New Zealand currently successfully participates in internationally, through New Zealand's existing seed certification system. Seed certification, as it exists in New Zealand currently under MPI, is a voluntary process to protect the integrity and genetic purity of a seed variety. It is described in more detail under the 'grower' section below.

In terms of the production market, stakeholders see opportunities to develop strong value-add. New Zealand has successfully developed other value-add, non-commodity crops from emerging agricultural and horticultural markets: Apples, Hops and Manuka Honey. Each have established a market-based (value-added) export industry, via different pathways. In the case of the apple market government backing and industry development have enabled the apple industry to established a system of licensing New Zealand-developed apple varieties. This establishes value-add at the genetic level, which not only earns New Zealand royalties from overseas growing of these varieties, but also enables the supply chain to charge a premium by selling these superior New Zealand-only varieties. The hop industry has followed a similar path.

Alternatively, the manuka honey market has been developed as a high-value market where New Zealand honey is sold as the most expensive in the world[xxiii]. In contrast to apples, New Zealand manuka honey has value added at the processing and manufacturing ends of the supply chain, into health food and natural medical supplies. In order to protect this premium market position, the New Zealand government is investing in initiatives to improve the robustness of the active ingredient that underpins the unique value-add position, UMF, via testing, standards, labeling and IP rights[xxiv]. The wine industry is another example of the successful creation of a New Zealand value-added industry[xxv] that is a relevant example for hemp to follow[xxvi]

*"The success of NZ wine rests upon a strategy that could be followed by other small producers which are inevitably price-takers in world markets, namely that of specialisation in a high value-added product through brand recognition for distinctive quality[xxvii]"*

For contrasting example, there is concern that the New Zealand dairy has primarily been built as a commodity market (recent value-add initiatives notwithstanding) that over time has produced unfavorable economic outcomes for New Zealand farmers and the national economy, and represents a 'lost opportunity' to the New Zealand agricultural sector and economy at large [xxviii]. While each of these examples offer relevant contribution, there are also some aspects of the hemp industry that makes it a unique crop for the barriers and opportunities to scale and secure value-add creation and capture. These are described across the supply chain, in Part II, below.

### The environmental value-add

The environmental attributes – both known and anticipated – are a key aspect of hemp's value to both growers and customers alike[xxix]. A central pillar of hemp's value-add proposition will be its positive environmental impact, so this must be transparently communicated from grower through to consumer.

New Zealand-specific research is still in its infancy, and although overseas research indicates that hemp is likely to have a range of environmental impacts superior to current land uses and crops, the true environmental balance of hemp is still being quantified in literature [xxx]. Nevertheless, the environmental benefits of hemp are already widely discussed in the marketing and advertising of hemp and hemp products including lower water use and drought resistance,

low requirement for pesticide and herbicide inputs, bioremediation properties, carbon sequestration, and soil structure and composition improvements for other crops[xxxi]. Should these benefits be demonstrated clearly, then New Zealand's existing reputation internationally of high quality in terms of the environment could amplify New Zealand hemp's value positioning and act as a significant point of difference in the international market.

Capturing the environmental impacts of their hemp crops is therefore key to growers' success.

Stakeholders interviewed here widely referenced these environmental benefits as motivation towards hemp. Several are planting hemp in order to benefit other crops they grow, including horticultural crops, or to prepare the soil after degrading land uses such as pine plantations. Even so, they all state the need for their own trails to be completed before they can be confident that these benefits do occur at a level that justifies future hemp cultivation. For example, the winery Mt Base has received funding to conduct trials to assess the purported environmental benefits that hemp planting may have within wineries, particular regarding impact on grape yields and on chemical input management[xxxii]. Mt Base reports significant interest from other wineries also interested in these potential outcomes for wineries.

Put simply, for hemp to exist as a value-added product, consumers must have access to transparent and trustworthy information regarding the environmental impact of hemp.

This connects to worldwide trends across industries and sectors where consumers are more aware of environmental impacts and increasingly want information about the environmental credentials of the products they buy. As these environmentally-based consumer choices increase with younger generations, communicating hemps environmental attributes will be central to the value-add proposition that hemp presents. Perceived environmental attributes are also a driving force behind farmers' motivation to enter the hemp industry. These points are discussed in more detail below, in the relevant supply chain subsections.

# PART II: TRANSPARENCY AND COMPLIANCE ACROSS THE SUPPLY CHAIN

The New Zealand hemp supply chain currently contains a lot a potential, optimism and pending interest, but can be currently described as only loosely cohesive. Many stakeholders interviewed during this research occupy several positions in this chain. Positions frequently overlap and rarely do two stakeholders hold the exact same position and this is one reason the Hemp supply chain is complex. The other is because there are several possible pathways from raw material to retail product. Some stakeholders conduct all stages themselves and don't engage with other stakeholders; some involve brokers and/or merchants in the process; yet others deal directly with the next stage in the supply chain. This means that most stakeholders are in a somewhat unique in the position and so have different information handling requirement to one another. This makes the supply chain challenging to map, but most importantly it is difficult to ascertain the standard information transfer processes and areas of transparency and compliance common across the board.

Themes emerged from stakeholders that were common across the supply chain, however. For example, a desire for improved capacity to scale the industry and mechanisms to provide the scalability the industry needs to survive. Also, a recognition that consumers increasingly require more information about products, particularly around product integrity and the sustainability impacts (environmental and social) from production and the supply chain. Stakeholders felt this was especially important for potential hemp consumers because of the health and environmental attributes hemp attracts consumers with. The other side of this issue was also raised: the need to educate consumers and others in the manufacturing, distribution and retail portions of the supply chain around the benefits on offer from hemp. The following sections describe the current experiences according to stakeholder type, highlighting the differences in terms of licensing, compliance, transparency and growth at each stage of this emerging supply chain

> Consumer education is seen as essential to reassure investors that consumer demand would support the investment the supply chain needs for the industry to scale

# Primary Producers and Cultivators

## Growers

This research identified three types of growers and the importance of understanding the distinction between them, divided by the manner in which they enter the market. This is an important distinction to make because the needs of each group are unique and their experience of industry barriers are primarily determined by how they enter the market. Each bring a different lens to transparency and market opportunities. Market entry and industry barriers are rendered more complex, and pros and cons of industry traceability will vary across these groups.

All Grower types require a General Licence from the Ministry of Health to cultivate hemp, renewed annually

This license comes with the requirement to submit the following forms offline to MoH: General License Application, Annual Report and Registers (Seed, Cultivation and Harvest) and Application to Renewal of MoH License. All Grower types must ensure any party they trade with is also holds a General License. Each party must track the license number of the party they trade or contract with. This provision includes any contractors involved in harvesting, transport, drying or processing. Once the seed has become a food ingredient such as meal, hulled seed, protein or oil it no-longer requires a license to move along the supply chain to manufacturing, retail and distribution.

The barriers, opportunities and wider perspectives on market opportunities vary according to each Grower type: arable, mixed-use augmenting, and hemp enthusiast.

### *1. Arable:*

These growers are existing members of the arable industry and are well positioned to grow hemp. Indeed, many have already been participating in the industry as contract growers for a number of seasons (I.e. contract to a seed merchant, who acts for the seed owner, to grow a certain volume of seed for a fixed price with the seed merchant undertaking the harvesting, transporting and drying required). Many of these arable growers are seed propagating – that is, growing seed imported from oversees in order to multiple the volume of seed and return it to its overseas owner.

These growers typically view entry and compliance as on par with other crops for human consumption. They see the current seed propagation market as already commodified, and would like smoother transactions with MoH so that the small margins available are not absorbed entirely by compliance costs. For this reason, they would like to see regulations transferred to MPI so that the crop can be 'just another crop' in their system without MoH as an additional agency complicating their already comparatively streamlined systems of compliance with MPI.

Other than this, these growers did not seem overly obstructed by the industry as it currently operates, with their primary complaint being the lack of understanding and knowledge from others both inside and outside the agricultural sector. This lack of

understanding results in a prevalence of incorrect information and results in arable growers spending time addressing enquiries about hemp cultivation. Some expressed frustration with some of the other types of growers who, due to their lack of arable experience, criticize the nature of the current hemp industry or have unrealistic expectations of hemp. They see this as a failure to understand the nature of arable cultivation, rather than any issue specific to hemp per say - a result of not having any prior experience through which to appropriately interact with arable crops.

This could be described as an attitude of: *"it's an arable crop, so let the arable growers get on with it and stop making it more complicated than it needs to be".*

Growers of this type spoken to for this research were choosing hemp as a crop to diversify farm income and placed less emphasis on environmental or other novelty factors. These growers typically have established software, document management and IT systems that can easily include information to track hemp crops. These growers also have access to planting, harvesting and storage machinery and infrastructure and are less likely to find this a barrier to entry. They do, however, face a similar barrier to the other grower types in finding the transport, drying and processing capacity because any contractors must hold hemp licenses and seeds must be transported to a drying facility within 3 hours of harvesting. These two constraints are unique to hemp, and are a barrier all types of grower may face.

Lastly, arable growers are current users of the New Zealand Seed Certification program in New Zealand which is the national system of plant genetic verification, transparency and tracing. Arable growers tend to support hemp seeds being brought into this system. Seed Certification is discussed under the section on Breeders, below.

### 2. Mixed Use Augmenting

These growers are currently primary producers with an established agricultural or horticultural farming operation and are looking to hemp as an axillary (minor or supplementary) crop. This includes growers who are livestock farming (sheep, beef or dairy) and are interested in hemp's ability to improve soil conditions and nutrient balances, or be a low-input, short rotation, environmentally favorable cash crop that will allow them to operationalize marginal or otherwise unproductive land. Some Mixed-use farmers also want to grow hemp to improve the environmental profile of their operations,

use hemp for its purported phytoremediation or carbon sequestration properties, or to prepare or 'clean up' soils to improve the yield of other crops. These latter crops are particularly attractive to foresters and viticulturists looking to improve the yield of grapes, or the yield of crops planted in post-forestry depleted soils.

Mixed-use growers are usually excited about the novel properties of hemp, such as novel food and fibre end use products, or the sustainability and/or environmental profile of hemp.

Transparency of environmental impacts – both for their own use, and to share with their customers and consumers – will be of significant value to them. It will be a key aspect of attracting them to the industry and keeping them there.

The primary concern of Mixed-use growers is to access commercially viable returns from their hemp. These growers are aware of the returns and profitability of their other land uses and hemp is more or less in competition and this can represent a barrier to the hemp industry.

While a barrier to some of the growers from other growing types, it is the Mixed-use Augmenting growers who most strongly experience the industry barrier caused by the prohibition of feeding animals hemp products. Legally, this prohibition is established in the Agricultural Compounds and Veterinary Medicines (Exemptions and Prohibited Substances) Regulations 2011 (ACVM) that restrict production, sale and use in New Zealand[xxxiii]. Politically, the regulators of ACVM are concerned that in absence of this prohibition, overseas markets may reject New Zealand exports if there were to detect cannabis-based compounds (THC and CBDs) in meat and dairy products, which would cause long-term damage to the viability of trade relationships essential to the New Zealand economy[xxxiv].

Hemp seed shells or hemp stalks and other biomass also have further utilisation potential[xxxv]. These options are, for the most part, blocked due to the animal feed prohibition which means post-harvest biomass cannot be used as animal feed[xxxvi] (despite retaining significant nutritional properties for animals) and there are some concerns over post-harvest cut-in or disk-in (returning biomass to the soil) for areas where paddock history is retained for 5 years.[xxxvii] Outside of direct animal consumption, there are conversations occurring within the industry as to the use of post-harvest biomass being used as animal bedding and bale, and retail garden compost or ground cover[xxxviii].

If growers could use post-harvest hemp biomass as a beneficial product, this not only reduces the current waste disposal costs, but could also reduce the need for additional inputs to be brought on farm

The use of post-harvest biomass, including for animal use, would be more significant to Mixed-use augmenting growers compared to arable farmers because they have existing operations on their property that they would like to use the hemp biomass in. Therefore, the ability to use post-harvest biomass in other production streams would have a significant impact on the financial viability of hemp for Mixed-use augmenting famers.

Lastly, these growers will be able to maintain economic returns from hemp if they can access market-based prices for their harvested hemp seeds. This means that they are able to charge prices for hemp seed in line with the demand for hemp in the open market, as opposed to receiving a contract-based price for hemp seed. It is currently very difficult for hemp growers to access hemp seed buyers on an open market and it is difficult for growers to access a buyer for their seeds currently. These growers are highly aware that their ability to access viable market-based prices is dependent on a consumer demand being high, and this requires market and consumer education. More on this is discussed in the Retail and Distribution section, below.

### *3. Hemp Enthusiasts*

These growers are highly interested in the agricultural and product opportunities from hemp and cannabis. Most are highly motivated by the environmental and human health aspects of hemp and recent legalization and popular media coverage is a significant catalyst for this. Because of this, hemp is attracting those who are new to crop production and agriculture, extremely new entrants to New Zealand primary production systems. These growers not only seek information regarding hemp, but also seek access to information about commercial agriculture and food production generally. This is an important difference to the other types of hemp growers, who already have these types of knowledge and experience.

> Anecdotal evidence from stakeholder interviews indicates that there are a high number of people interested in the potential and benefits of hemp but without sufficient experience in agriculture or commercial enterprise engage with the hemp industry.

A number of arable or mixed-use augmenting growers described being inundated with people highly enthusiastic about their potential to grow hemp, but without a sufficient level of knowledge to actually engage with any agricultural or commercial production, and by extension, hemp. They describe this as somewhat draining on their time and resources, and expressed some frustration at this situation.

As such, these types of growers – the hemp enthusiasts – tend to have high expectations of the industry's potential and high expectations of the ease of entry to the market, confusing ease of growing with ease of commercial

operations. They are likely to experience existing agricultural and primary production systems as a barrier to entry regarding their own hemp cultivation but this is due to lack of individual experience or resources, rather than specific to the hemp industry. Caution must be exercised to identify when a barrier to the hemp industry is perceived by a hemp enthusiast, in recognition that not all who seek to enter the hemp industry will be able to do so due to individual circumstances rather than widespread hemp industry deficiencies. In this matter, hemp must be viewed through the same lens as any other food or production crop and care must be taken to clearly separate these issues out when seeking to investigate barriers to market development regarding transparency.

A small but vocal number of hemp enthusiasts of this nature bring a political lens to their interest in hemp and object to existing barriers to entry regarding agriculture, in particular the existing political and economic structures of agriculture and food production, expressing frustration and dissatisfaction that these are applied to hemp on political or philosophical grounds. In line with this, many are strongly opposed to the current prohibition on hemp for animal use for this reason.

Overall, the majority of hemp enthusiasts are adjusting well to the new hemp market and industry developing in New Zealand, particularly those with established businesses operating over a number of years. These are more likely to be small-scale and wishing to benefit from repurposing post-harvest hemp material into further uses and this is a current barrier they experience.

## Seed Isolation and Certification

Each Grower type (also Breeders, described in the section below), face issues of transparency in seed isolation distances. Seed isolation refers to the need to cultivate wind pollenated seeds at a distance (i.e. in geographic isolation) from other plots of the same species otherwise cross pollination will occur and impact quality and/or yield. This is an issue that is currently well-managed in other New Zealand-grown wind-pollenated vegetable seeds such as red beet, through the MPI Seed Certification Isolation Distance System or SCIDS. This system is administered by AssureQuality on MPI's behalf. Stakeholders report this voluntary system has 100% compliance because all growers are heavily reliant on growing their seeds in geographic isolation and are intrinsically motivated to use the system without the need for regulatory oversight.

AssureQuality's SCIDS portal accommodates hemp as a crop category, and the benefits of assured seed isolation to hemp growers are demonstrable, yet there appears to be no systemic use of this system to maintain hemp seed isolation distances.

There are two main barriers to the use of the SCIDS by the hemp industry. The first is an issue of awareness. As SCIDS is a system from within the arable industry, any growers who are not connected to the arable industry (such as types 2. and 3., above) were not aware of the SCIDS system when they were interviewed for this research. There is strong interest, across many different stakeholder groups, to have the SCIDS system integrated into and used by the hemp

industry. Conversations are occurring to identify the best mechanism for this to happen, and any digital solution for the hemp industry will need to facilitate this integration.

Secondly, arable growers become registered in the SCIDS system as a component of receiving Certification of the seeds they are growing. Hemp seeds are not currently part of this program. Seed Certification is administered by Assure Quality on behalf of MPI and is a system of ensure varietal integrity, I.e. the variety harvested and sold is the same biological variety that was purchased and sown and no degradation in genetics occurred during the growing season.

One aspect of ensuring genetic quality is for the seeds to have been grown in isolation of other crops of the same species.

At this stage, there is no requirement or ability for hemp seeds to be certified in this system. Midlands reports that they have been using field auditing processes to verify the quality of the seeds they propagate (multiple for future planting rather than cultivating for food harvest) for overseas parties. They've been working with Assure Quality to achieve this, for several growing seasons.

Of course, there are pros and cons of Seed Certification and the additional transparency this would provide must be balance with additional compliance costs in an already compliance-based industry. It is therefore important to ensure Certified Seeds represent a value-add that returns a commensurate price premium along the supply chain.

The challenge unique to the certification and classification of hemp is the multiple end use products that can be made from a single crop. Any certification program would do well to accommodate a change of intended end use after the crop is planted. A grower with intention to grow hemp for food may, as a result of weather or bird-strike, choose to instead process or sell the crop into a fibre end use - effectively down-grading the certification standards necessary.

Establishing clear pathways in the certification framework will prevent crop losses and so limit the opportunity cost of allocating land use to hemp crops. By introducing digital solutions early in the journey of iHemp, these unique challenges are build into the design and allow for fluidity in the supply chain, and confidence for growers to adopt new crops.

## Agronomy and Environment

Each grower type has a similar relationship to the agronomy and environmental profiles of hemp: both are important, and everyone needs more information. The environmental profile was paramount to most growers interviewed either from the perspective of their own value set, or because they recognized it as an important value-add that hemp products could offer the marketplace that increasingly values sustainable, pro-environmental offerings. This is discussed in more detail in the Webtools Whitepaper "*Hemp and the environment – how much do we really know?*"

All Growers face similar agronomic barriers in New Zealand and all need to access the agronomic knowledge to achieve high hemp yields with minimal inputs (such as nutrients and irrigated water). The high number of beneficial chemical compounds (cannabinoids, phenols, terpenes, flavanols etc.) that cannabis plants produce, in multiple potential combinations, which also vary by genetic variety and growing conditions[xxxix] International agronomic research is available, but because hemp phenotype is highly dependent upon genotype and environmental conditions together, international information is not directly applicable to New Zealand. For an introduction to hemp agronomy from New Zealand, see "*Industrial Hemp and its Potential for New Zealand. A Report for the 1999 Kellogg Rural Leadership Course*[xl]"

Hemp varieties exhibit significant variations in terms of both yield and quality, and this is compounded by differences in growing conditions.

Wild varieties of hemp show propensity to tolerate a wide range of conditions, spurring great optimism for hemp's versatility but increasing yields to commercially viable levels has been a greater challenge requiring more specific water and nutrient needs[xli]. This means the gap is rather wide between the agronomical knowledge to grow hemp, and the agronomy required to make a commercially viable product in New Zealand so there is significant demand for agronomic research in New Zealand. Funding streams for such research are not currently clear. The small size of the hemp industry limits the current availability of money put into research from traditional sources such as levies. From this research, it appears that the hemp industry is unlikely to be able to fund this research internally.

## Breeders

Hemp breeders are those who develop, through breeding and research, specific strains of hemp variety. They differ from growers described above, as they do not sell the seeds for food or fibre production, but they may sell approved variety seed stock for General License holders to propagate (seeds must only be sold to General Hemp Licence holders). Hemp breeders must hold a specific Research and Breeding License, in addition to a general licence, and this licence permits them to cultivate both approved and un-approved (novel) varieties. Understanding and engaging in hemp seed variety breeding is a highly complex and specialised endeavor as breeding plants to a state in which they signify a different variety is unpredictable and resource-intense. One motivation for breeding plant varieties such as hemp is to develop a unique variety with commercially desirable attributes and then obtain plant variety rights to sell the variety exclusively, or licence its use.

As at March 2020, there are 17 Research and Breeding Licenses for Hemp in New Zealand[xlii]. This means there is a fairly small pool of New Zealand-bred hemp varieties and accessing these has not always been smooth, with word-of-mouth and personal recommendations used to find seed breeders. Increasing the number of seed breeders supplying New Zealand hemp varieties to New Zealand growers would help the domestic hemp market develop so there is great demand for high quality hemp seed breeders in New Zealand.

There are several barriers to breeding hemp in New Zealand. Firstly, hemp seed breeders are first required to obtain a General License for Hemp, and then progress to a Research and Breeding License. This is a multi-stage process that is time consuming and costly. Secondly, hemp seed breeders need access to testing facilities however until very recently these have been highly limited. Prior to 2020, only the government-owned ESR Laboratory has been allowed to conduct tests required for licensing requirements and, being a government entity, this presents two significant challenges. The first is that ESR also conducts forensic and medical testing and, understandably, this means that hemp testing can be frequently de-prioritised. This means hemp farmers frequently face delays and highly unpredictable timeframes for testing. Secondly, as ESR is a government laboratory, there is the perception that the testing it not done independently and the privacy of breeders' tests results is doubted. Finally, the monopoly that ESR enjoys over THC testing in New Zealand renders the price of testing very high and this is a significant dampener on the hemp breeding industry in New Zealand.

For laboratories that wish to offer more hemp testing services to solve this problem, there are significant regulatory barriers. In order to test THC levels, a small amount of THC must be held on site as a chemical reference. Because THC remains a controlled substance (effectively an illegal drug) under MODA, laboratories must hold a Medicinal License and adhere to Pharmaceutical-grade standards, despite the testing being for the distinctly different food-grade industry.

As legislation has given THC an allowance between .35% and .5%, is it possible to test new varieties for which the actual THC level is unknown, without falling foul of the law. However, no allowance margin has been created for CBD, so it is not possible to test for CBD without triggering The Medicines Act. Many stakeholders from this study's interviews expressed the scientific impracticality of having this Act being triggered by the presence of a single molecule – a level much lower than even the margin of error for which testing procedures can achieve.

> Hemp breeders in New Zealand primarily need greater transparency in accessing a greater range of testing, and ease of access to the market to encourage more to enter the industry.

## Merchants and Brokers

As is the case in other arable industries, there are those who sell hemp seeds on behalf and who broker the sale and purchase of seeds – the Merchants and Brokers of the supply chain. Merchants sell contracts to grow seed for a fixed price at harvest time and for this service. Merchants must hold a General License, and ensure those they are buying from and sell to, also hold this license. Brokers facilitate the sale and purchase of seeds between seed supplier and grower, and this service does not require them to hold a General License as they do not take possession of any hemp products.

Some merchants purchase the rights to sell hemp seed from overseas seed IP owners, contract out the propagation of this seed to New Zealand growers for a fixed price per weight, and undertake the harvesting, drying and processing required before returning the multiplied seed to the overseas buyer.

Some brokers, such as NZ Hemp Brokers, offer brokerage of both importing and exporting hemp seeds. Others, such as Mainland Hemp, offer brokerage services, connecting New Zealand growers with full-service contracts to supply those who are manufacturing hemp products, including harvest and processing capabilities.

Tracking seed supply, quality and varietal integrity through the merchant and brokerage process will also become an important aspect of transparency in the supply chain.

Anecdotally, there are likely more informal brokerage and merchant services operating within the New Zealand supply chain, but without the formal channels of market exchange to make this transparently accessible across the board. Moves towards Seed Certification, discussed above, would involve merchants and brokers, as they would need access to information around the Certification status of the seeds they traded.

Lastly, growers need transparent access to brokerage and merchant services, and the ability to obtain market-based prices in a competitive environment. Some stakeholders expressed frustration or disappointment at the prices currently available where are determined by the overseas market that has become commoditized and put significant downward pressure of New Zealand farmers without the international economies of scale. Some stakeholders also appeared disconnected from other brokerage or merchant options that this research found to be on offer.

# Processing and manufacturing

Processing and Manufacturing can be divided into three pathways. Seed for processing and manufacturing may come via:

- Purchase from an independent 3rd party
- Growing for the manufacturer on contract.
- Growing by the processor or manufacture themselves (including both contracting the processing services, or undertaking these facilities in-house)

All stakeholders noted the fact that specialized processing and manufacturing infrastructure is largely missing in New Zealand as a significant barrier to the industry currently [xliii], which is a potential barrier for any emerging, novel or niche industry. A number of stakeholders described growers keen to plant hemp as a crop but failing to understand the post-cultivation needs, especially harvesting and first-stage processing, nor plan for this prior to planting. Anecdotally, there were reports of growers having planted the crop and then subsequently approaching potential buyers but without the harvesting and first-stage processing arranged, are unable to sell their crop. This is very damaging for market confidence among new-entrant hemp growers.

Hemp crops do have some unique processing requirements and this has been a limiting factor in overseas instances[xliv]. Particularly, hemp seeds require drying within 3 hours of harvesting so drying facilities must be locally to offer a viable supply chain. Also, harvesters, transporters and first-stage processers such as dryers, cleaners and hullers are required to hold a General License from MoH (as described above) for hemp cultivation with these post-cultivation activities specified on their license.

Finding local infrastructure is particularly important to hemp growers, more so than other agricultural crops. As a result, processing needs are much more locally distributed to support the industry scaling. And by creating regional capability to keep these specialist processes on New Zealand shores, tremendous value will be added widely to New Zealanders.

In terms of mechanical infrastructure, traditional combine harvesters can harvest seed but the stalk can be tough and present damage and maintenance problems[xlv]. Specialized harvesters are preferred[xlvi], and this is particularly important outside of traditional broadscale arable systems when hemp is grown as a companion plant in horticulture and viticulture systems. Dual-crop harvesting is also important – harvesting the crop for two end products concurrently: for hemp fire and for seed.

This is the leading edge of hemp harvesting in New Zealand currently and HempFarm (of NZ Hemp) grower group harvested approximately 480 ha of this in the 2019 season:

*"Harvesting the dual crop variety of hemp is arguably the most difficult, due not only to the sheer height of the plants (over 4 metres), but also it is the longest strongest natural fibre on the planet and it will bind around the inner workings of machinery and can bend steel* [xlvii]*"*

While dried hemp seed can be further processed in a manner similar to other seed products, processing hemp fibre requires specialised equipment. Hemp stalks can be split into fibre and hurd by a decorticating machine, a technology that has recently superseded the previous 'hammer mill' which produced inferior textile results[xlviii]. Specalised fibre processing equipment is required for hemp to enter the fabric and textile supply chain. Hurd can also then enter the building materials supply chain[xlix]. So, the recent initiative of NZ Yarn and NZ Hemp is significant development:

"*Under a partnership established late last year, Hemp NZ, which grows and processes hemp nationwide, has acquired a 15% interest in NZ Yarn, which produces wool yarn for the carpet industry. Hemp NZ is now about to commence installing the state-of-the-art hemp fibre processing equipment – the first of its kind in New Zealand – in a 3000m2 space at the NZ Yarn factory in Burnside. This will transform the NZ Yarn building from a wool yarn plant into a fully-fledged, modern fibre factory with leading-edge equipment purpose-built and engineered specifically for hemp processing, alongside its existing wool yarn spinning equipment*.[l]"

NZ Hemp says:

*"... We will be producing fibre and hurd and on-processing into eco-matting, wool/hemp yarns and more to supply industries... We believe that our [NZ-developed decorticating] machine is now capable of producing the strongest plant fiber on Earth[li]…. This will help place New Zealand at the forefront of hemp and natural fibre innovation globally.[lii]"*

Ultimately stakeholders drew a direct relationship between perceived consumer demand (and, by extension, political support) and increasing access to the financial investment that's needed in hemp processing and manufacturing infrastructure. The new Christchurch facility being pursued with optimism by established New Zealand agricultural companies serves to indicate tangible growth potential. However, this appears unlikely to be sufficient to address the localized needs of the wider hemp industry, nor individually support the scalability required within the industry particularly as independent growers are unlikely to access this Christchurch facility.

Creating regional capability to keep these specialist processes on New Zealand shores will add tremendous value to New Zealanders.

By leaning on the learnings of emerging industries that have gone before and even collaborating with them, there is a bright future for iHemp. Specific collaborations could include Dairy industry. For example with plant based milks - while the dairy industry has the processing and exporting expertise, the hemp industry has product-specific knowledge. Another example would be the fibre industry, building on the emerging capabilites descirbed above. The wool industry has experienced volitity over the last few decades and New Zealand is home to specialized capability acorss a range of regions and this could be brought together to work in conjunction with iHemp to create innovative products unique to New Zealand and with high value internationally to take to the global market.

# Retail and Distribution

Hemp that has been turned into an ingredient for a food (past primary processing) no-longer requires a licence, so hemp retailers and distributors do not require a licence from MoH. Some retail and distribution holders do, however, hold General Licences as they are involved at earlier components of the supply chain. Since the regulation changes in 2018, an increasing number of mainstream retailers such as pharmacies cafes, and supermarkets are now retailing hemp-seed based products such as seeds, proteins, oils, protein bars and snacks, and cosmetics and body products.

These outlets join a handful of significant hemp-specific retailers with established e-commerce presence which retail a combination of New Zealand, overseas and own-branded hemp products. Some companies manufacture and sell direct-to-consumer under their own specialized brand or brands in the food and skincare ranges[liii]. No hemp retailers are currently selling NZ-made hemp textile products, but are selling hemp fabric products including clothing made from Chinese fabrics, or clothing and textiles sold by overseas companies.

Among this online presence hemp-specific bricks-and-mortar stores are not common (The Hemp Store[liv] in Auckland being a notable exception). The main barrier retail and distribution stakeholders reported was lack of consumer awareness and/or education that was currently suppressing demand. They were also concerned about lack of ability to clearly communicate the benefits of New Zealand hemp compared to overseas hemp and why New Zealand hemp was a premium value-added product. They were concerned about inferior overseas products 'flooding the market' and giving New Zealand consumers a poor experience with hemp and putting consumers off buying New Zealand hemp products altogether.


## Value positioning

Hemp's value position in the market is complex to describe, but each aspect of hemp's value is linked by a common need for clearer, stronger communication of quality.

Firstly, retail stakeholders describe that Hemp's regulatory history and its association with illicit cannabis use had led to hemp products marketed to a 'stereotypical cannabis' user profile. This includes rough-spun, home-grown, low-cost products. They argue instead, that hemp has the physical properties

to produce high quality, high-fished and commensurately high-value retail products, but potential consumers of such high-value products are excluded by current low-end hemp marketing.

A move towards high-value hemp product marketing is being seen in food and cosmetics, but this work remains to be done in important areas such as textiles and particularly in clothing.

A second quality issue is the prevalence of counterfeit or quality-uncontrolled hemp products. Stakeholders pointed to other consumer industries, for example olive oil, which experience significant issues around counterfeiting and poor-quality control damaging the product image and product experience with consumers. As a product already facing notable consumer awareness-building challenges, counterfeiting would have an outsized effect on hemp's ability to scale. Thirdly, consumer must also feel assured of product quality to the extent that they are willing to purchase products at a price point that it is economically viable for producers. Currently, the constricted supply of New Zealand hemp products mean they are priced well-above imported goods without clearly communicating any additional New Zealand value-add. Retailers say this is limiting repeat purchases and industry growth. If this current price-point was coupled with a poor-quality product, the negative effects of the emerging hemp industry would be significant. From some stakeholder's perception, this combination of price and quality assurance in New Zealand products is currently perceived to be detrimentally dampening the liquidity of the New Zealand hemp supply chain.

Overall, stakeholders strongly require that hemp products be produced to a high quality to ensure consumer confidence in this easily undermined consumer market. It is for these reasons that traceability and verification will be important to ensure the adequate value positioning of New Zealand hemp products required to see the domestic hemp industry reach scale. Currently these needs are not being met and issues with consumer confidence and imported good undercutting New Zealand products with inferior quality are of concern to stakeholders.

## International markets

Some hemp product manufacturers and retailers are selling to the USA, Australia and parts of Asia on a small scale. Arable farmers have, for a number of years, been propagating hemp for seed multiplication for the overseas market, making use of the New Zealand counter-season to the Northern Hemisphere. However there is currently little evidence that New Zealand seed producers are able to sell New Zealand seed competitively on the open global market outside of these fixed-price counter-season contracts, and are unable to match the current price point for hemp seed as a commodity (note discussions of value add, above).

By maintaining a high level of quality in the eco system, the over all value proposition of New Zealand iHemp to the world will remain high.

In New Zealand, no products that are currently illegal to sell in New Zealand may be cultivated for export. There is some appetite within the industry to test this under New Zealand common law however to date this has not been done.

In general, New Zealand hemp stakeholders expect New Zealand to be able to successfully market value-added hemp on the international stage, drawing on New Zealand's' existing

environmental and food production brand and capacity New Zealand already enjoys a very high standard of regard on the global stage and this should be maintained as hemp emerges from a cottage industry into a more mature industry. Yet no stakeholder spoken to in the course of this research could demonstrate this was currently the case and there appears to be a gap between the present situation and anticipated potential.

Given this description, there is significant room for the New Zealand hemp industry to improve this aspect of the market, not least through transparency to amplify New Zealand's' existing environmental and food production reputation.

## International opportunity for digital products in Hemp

The challenges faced by New Zealand are similar to the challenges faced by other countries who have also embarked upon the journey towards the iHemp industry. The regulatory frameworks that have been developed in countries around the world represent different approaches to iHemp and the mulitple possible perspectives on addressing the crop and its products as part of the Cannabis plant family.

Looking across some of New Zealand's key trading partners – Australia, UK, Europe, Canada and the USA – we see hemp industries in various stages of development and regulatory evolution.

Through our research we scanned international approaches to determine the growth of iHemp industries as well as differing regulatory frameworks to assess the market opportunity for some of the proposed digital tools.

While the history of legal hemp is longer in some locations, each of these countries have opened up their regulations in the last three years, removing restrictions and reducing illigality aspects. Each jurisdiction has a different level of THC tollerance, ranging from .5% to .2% tollerance or expressed in mg/KG allowances. Each location reports positive growth in the number of acres plated and value of the industies, with Canada considered to be leading this trend. Canada is the world's largest hemp seed exporter (primariliy to the USA), valued at $50m in 2018, the same year regulatory changes eased a number restrictions on cultivation as well as allowing importation of hemp products from countries with appropriate regulatory frameworks.

In the USA, the 2018 Farm Bill and 2019 amendments opened up the hemp industry on the Federal level, with allowances such as recreational cannabis and cannabidol extraction, and for States to establish their own regulations (with FDA Standards still applying) and open up interState trade. In Europe, cultivation of industrial hemp with under .2% dry weight THC is legal in all Member States. The issue at large currently is where the regulation of CBD and whole plant use (leaves and flowers) in food prodcuts should sit and where levels of CBD should be drawn[lvi]. This issue is seen as key to the commercial development of the hemp indutsry in Europe:

> "EIHA requests that European Union institutions rapidly adopt a policy strategy that would allow Europe to compete on the world stage that shows increasing competitive approaches from Asia, Canada and the US where of course the Hemp Farm Bill 2018 has recently been ratified permitting the whole use of the plant.[lv]"

This overview provides preliminary verification that digital tools built for New Zealand would have relevance for different geographical markets globally.

The growth in hemp and cannabis industries internationally has been astronomical over the last 5 years, with numerous investment market research reports being produced3. Predictions of growth from 2008 to 2018 were strong[lvii] and today, the production of industrial hemp is legal in more 30 countries around the globe. Growth rates for the global industrial hemp market range in expectations from high to very high - Persistence Market Research reports an expected growth rate in value 18% to 2020, with Global Market Insights offering an expectation of 5.6%, arriving at a value of over $270m by 2025. Both reports point to signficnat markets in Europe and Asia Pacific, and important growth project for North America[lviii].

*"In 2018, the industrial hemp maket was over $USD180 million in 2018, of which industrial hemp seed market demand was valued at about $USD70 million. By 2025, annual consumption of hemp seeds is projected to rise to over 185 kilo tons with gloabl industrial hemp fibers market size increasing to $USD120 million over that time[lix]."*

Key trends market commentary identifies as driving these growth projection include appropriate government legislation, rising awareness and demand spanning multiple sectors, product innovation such as in dairy and other animal protein alternatives, and consmer interest in recreational and health benefits[lx]. A related trend to watch, U.S., comentators are predicting that cannabis sales could reach immense heights in the next decade. From a $30 billion by 2025 estimate by New Frontier Data to a $100 billion by 2029 projection by Stifel Financial Corp. Visual Capitalist compares this to aa benchmark of $13.6 billion in 2020, these ambitious numbers are "backed by major industry trends.[lxi]"

The fact remains, this is the beginning of what looks to be a very large global market and global trade. Hemp has an opportunity that few industries have, which is a blank slate from which to start and introduce transparency and traceability into its supply chain, unencumbered by legacy infrastructure.

[3] For example, see retail by Transparency Market Research https://www.transparencymarketresearch.com/industrial-hemp-market.html; Business Wire, Berkshire Hathaway https://www.businesswire.com/news/home/20200110005221/en/Global-Industrial-Hemp-Market-Analysis-Trends-Forecast and Research and Markets https://www.researchandmarkets.com/tag/hemp?ac=true

# PART III: DIGITAL SOLUTIONS FOR HEMP AS AN EMERGING NICHE AGRICULTURAL INDUSTRY

## Digital Solution Requirements

There are many challenges and growth opportunities for the New Zealand hemp industry and several areas where digital tools can provide industry-building solutions to ensure the Hemp industry can successfully scale. Digitizing from day one will enable a thriving value-based and internationally-competitive New Zealand hemp industry with efficient and effective compliance, and value-add products that are transparent and traceable.

### Scale and Value

At the highest level, the most important task of a digital solution will be to ensure an NZ iHemp industry is established, and market prices are based on value. This means simultaneously, avoiding mechanisms by which a production-based (commodity) industry develops. Adopting a value-add approach will take courage from industry leaders in the beginning. It requires research and clear articulate to create a market for the value-added iHemp products that New Zealand will be able to create. It also requires digitization and the combination together of timing of technology capability and the re-emergence of iHemp as a product is ripe to accelerate the growth of the iHemp industry.

This means digital solutions must be designed to enable the hemp industry to increase both scale and innovation in order for the industry to survive. This includes supporting market participants to quickly and easily identify how to access the capability with the supply chain they need (such as seeds to purchase, or processing facilities), and also identify gaps in the consumer market or ecosystem that their business can fill. Understanding capacity and capability in the supply chain will also be important to support the new investment the supply chain needs, especially in the processing and manufacturing areas.

### Market Entry

An important feature of a digital solution will be to provide education and information to new entrants. As described above, the novelty of hemp has generated interest in industry participation among some who have no discernable prior experience regarding developed

markets' systems of agriculture or food production. Furthermore, the previously cottage-industry level of hemp production has led some to have expectations of how easy it should or would be to participate in the emerging hemp industry, which are out of proportion with ease of participation in other agricultural and food production industries. Some stakeholders have even suggested that information on market entry is deliberately not being made easier to access in order to create a certain barrier to entry that prevents ill-prepared or ill-equipped stakeholders from creating disruption and frustration to others, resulting in inefficiencies in the marketplace.

Individuals therefore need a digital solution to quickly identify if hemp growing is right for them. It's important to provide early stage screening of those who are interested and prevent those who are not well equipped to proceed down a pathway that will lead them to soak up resources by being frustrated with what are very standard mechanisms in agriculture and food production. This will likely be a challenge not unique to hemp. Emerging markets of the future will need digital solutions to manage understandable curiosity and enthusiasm for a novel product into effective production capacity.

### Data Insight and Communication

Digital solutions for the hemp industry will need to recognize and complement existing farm management software already established in the market. These are primarily focused at the grower and raw-product distributors (those dealing in the distribution of raw hemp products, before they are processed into hemp food ingredients). Because many hemp growers are already established growers in terms of arable or other agriculture and horticulture, they already have this software established in their business. Such software is currently farmer-focused, and farm management oriented, rather than transparency or value-add oriented. This software generally allows farmers to see and understand their own data, so any proposed additional solutions are best not to perform data capture functions. Existing software, however, is poorly equipped to translate this data into meaningful information to others that would support farmers to better communicate with their stakeholders and this is the gap for new digital solutions to address.

### Consumer Trends

Finally, digital solutions for New Zealand's emerging hemp industry will need to allow stakeholders to respond to trends towards information requirements consumers increasingly have around product integrity and sustainability impacts[lxii]. This point is important due to the role that consumer education and awareness has in unlocking and expanding consumer demand. To build upon this must be clearly translated into perceptions of strong consumer demand, as it is this perception that is required to foster investment in supply chain infrastructure.

## Next steps forward

What does the future hold for Hemp in New Zealand? There is a wide range of growers from across the agricultural sector, joined by entrepreneurs and small-scale cultivators, all highly enthusiastic to be part of developing New Zealand Hemp industry into a viable and productive part of New Zealand's economy. Stakeholders are keen to see the potential range of

This pathway forward calls for digital solutions that empower the industry.

product and end-use diversity become possible in New Zealand, from staple crop products to diversified value-adds.

Stakeholders are crying out for greater transparency so that everyone can see where the industry is headed, and make decisions to get it there with confidence. Many potential industry contributors are in the 'wait and see' mode and are concerned that if New Zealand producers aren't able to move soon, the global opportunties from hemp, and its cousin cannabis, will pass the New Zealand economy by.

Regulators are tasked with a new challenge – a product and crop new to the law, spread across two government Ministries with little precedent for join oversight of an industry. This is where standardised and consistent data – currently sitting behind manual, siloed and offline processes – will be one of the most signficant contributions digital transparency solutions will make. Regulatory responsibility for ensuring different aspects of safety, scalability and education regarding hemp rests across both MoH and MPI. The current lack of a standard data structure limits interoperability and current systems have largely adopted a paper-based process that slows the system with its labour requirements, but also opens the door to perceptions of inconsistency. For example, MOH only recently started to consider the data standards for interoperability in health industry data and this form of digital evolution is required urgently to keep pace with the drivers of economic development – technology, innovation and sustainability trends. Regulators can use greater transparency to more efficiently regulate industry licencing with trust and confidence from all parties, freeing the industry and its oversight to evolve side by side.

Digital solutions that give non-regulatory stakeholders constistent and standardised approaches to data right from the beginning of the supply chain will empower other parts of the supply chain too.

The most important part of this for hemp cultivators are digital solutions that connect primary producers with their customers, as customer trends and customer education are uniformly something hemp growers and breeders are aware of.

Proucers know that consumer demand (and the educational marketing that informs this demand) is the foundation upon which the long-term viabilty of their business depends. The industry must be able to tell consumers about Hemp's many envrionmental and human health attributes that society is increasingly recognising as the way forward. But stakeholders know this will only be effective if it's told in a trusted way and this cannot be achieved without information and transparency as the foundation.

Digital tools are needed for Hemp to rise to the challenges of 21st century agriculture both in New Zealand and world stage. Complex products like hemp, with signficant potential for highly diversitfied value chains and niche-targeted consumer demand, will increasingly depend on transparent data and information flows and for regulators to operate efficiently and productively in this new economic context. To begin with, these systems will use trasnparency as a base for streamlining the addition of new products into the regulatory framework as they come on-line.

The next steps in this digital development required are to digitise the licencing process and create the data standardisation and consistency that will allow the indsutry to scale. This includes real-time market-responsive updates to licencing and better integration with exsisting

quality assurance mechanisms available. Digital development will include solutions and tools that build a stronger industry community and and ecosystem of better connected stakeholders and supply-chains. Everyone from breeders to growers to processors, manfuacturers and retailers want to know who's doing what and be able to easily see other stakeholders in their marketplace to collaborate and grow the industry.

Creating digital solutions for the hemp industry prepares everyone for a future where verified information transfers up and down the supply chain easily.

This will ensure the industry has established a foundation for standard-setting integration with certification and IP protection processes. Further still, the integration of laboratory data, storage information and long-term tracking.

And for the final piece of the puzzle – the consumer. Digital knowledge bases with ease of access to consistent information from authorised contributors will unlock the potential in curious consumers, producers and everything needed in between. An ecosystem that provides for a fluid, collaborative New Zealand hemp indsutry is the way to make room in New Zealand agriculture for the inherent complexity of the product and possible end uses that continue to evolve.

Hemp presents a novel situation for the New Zealand agricultural sector to grapple with, yet hemp may carry important lessons as this sort of example is likely to become more common in the future.

Increasing development of biotechnology, gene editing and further genetic engineering, means it is likely that instances of biologically and legally novel agriculture will be a feature of future primary production for economies like New Zealand in the future.

Concerns over risks posed by novel substances can attract more attention simply as a result of their novelty and perceived lack of knowledge. Here, transparency is important when addressing problems faced through perceived versus actual risk from new compounds - transparency is required to keep this in proportion to the concern that is shown for substances and risks already well understood. This is an issue that will be faced by all novel products in the future of our agriculture, with hemp simply representing the first example of this. Therefore, the findings of this research will have much wider application than the hemp industry this study addresses. Findings are relevant across New Zealand agricultural sector, and as New Zealand seeks a leadership role in the future of agriculture internationally.

# Research background

This research is the result of collaboration between the New Zealand Hemp Industries Association (NZHIA) and innovative digital solutions developer Webtools AgriTech Ltd. The NZHIA is increasingly aware of the compliance, information and data obligations that new or aspiring entrants to the hemp industry face in New Zealand. There is concern that the significant potential for the hemp industry will not be realized if the compliance and information requirements are not made more accessible, practical and streamlined.
Building industry confidence required to scale will require much greater transparency regarding compliance in the hemp supply chain. Being able to access practical digital support provides aspiring entrants the confidence and surety they require entering this compliance-based industry. It can also provide information needed by investors when they are considering making investments, and regulators with the confidence they needed to move towards industry-enabling regulation.

Transparency sits at the convergence of two important trends – the effects of digitisation and technology on agriculture, and increasingly informed, consciencious consumers' wanting more sophisticated health and envrionmental outcomes from their food and fibre production systems[lxiii]. From different directions, both these trends are pushing towards transparency as a fundamental part of food production and commerce in the future. Transparency is essentially about access and provision of information about what products are and how they are made. Often this term is used alongside traceability. Transparency and traceability both allow us to recognize the inherent value of unique lands and land uses and translate that to consumer value propositions in food products our agricultural systems produce. But there is an important distinction. Traceability is about being able to connect components and attributes of a product along stages of the products' life including previous stages and forms[lxiv]. Traceability is one aspect of transparency but does not in of itself cover the depth and breadth of information that is required at each stage, only the ability to connect information at one stage of the product life to the next. Therefore, the deeper issue is one of transparency: the depth of information than can be traced at each stage of a product's life.

Webtools identified that this was an issue where all stakeholders wanted greater transparency to build the industry upon, and that digital solutions may be able to help provide that transparency. Webtools also identified that the challenges facing the hemp industry will have wider applicability to other emerging niche industries in New Zealand and around the world, so any digital solutions that emerge align with New Zealand's interest in developing Agri-Tech tool that can be utilized in overseas market.

Following key legislative changes in 2006 and 2018[lxv],[lxvi] licenses to grow industrial hemp as a food crop for human consumption have been issued since 2018, reestablishing the ability to legally sell hemp seed and hemp seed oil for human consumption in New Zealand. In 2020, New Zealand's domestic hemp market is in a phase of exploration and growth[lxvii],[lxviii],[lxix],[lxx].

*Cannabis sativa sp.* remains in the Misuse of Drugs Act (MODA), and because New Zealand shares Food Standards jurisdiction with Australia where cannabis use is not yet legal (via the Food Standards Australia and New Zealand legal structure), so most aspects and components of the plant[lxxi] are regulated under medicine and drug laws. Cannabis therefore remains a

controlled substance not available for commercial use and licenses to grow industrial hemp are issued and controlled by the Ministry of Health[lxxii].

Legislative changes allowing food production from hemp seeds mean that food products or crops that come from *cannabis sativa sp*. (including industrial hemp) are also regulated under the suite of laws and legislation pertaining to all food and crops within the New Zealand, under the Ministry for Primary Industries (MPI) [lxxiii], [lxxiv].

Cannabis products for medicinal use as pharmaceutical products (via medial prescription) is regulated and administrated under the Misuse of Drugs (Medicinal Cannabis) Regulations 2019[lxxv]. Between this legislation entering into force and April 1st 2020 licenses have been issued by MoH only for research and development for medicinal cannabis cultivation. After 1st April 2020, the Medicinal Cannabis Agency was created and the Medicinal Cannabis scheme commenced, allowing the licensicng of cannabis cultivation for commercial production of medicinal products. Prior to this scheme access to medical cannabis in New Zealand was via imported products only, and domestic medicinal cannabis companies remained in Research and Development phases (including facilities building) only.

## Research Methodology

This research was conducted via extensive stakeholder interviews and supported by a desk-based review of the industry. In the first phase, desk-based research established the legal and regulatory framework of compliance and transparency for the following phases. This review of the legal and regulatory environment is attached in Appendix 1.

Secondly, stakeholders were interviewed based on their experience and perception of the barriers and opportunities within the hemp industry, with a particular focus on transparency and compliance. Stakeholders were selected with the support of the Hemp Industries Association, MPI's Hemp Liaison Group, and personal introduction and review of the New Zealand supply chain. All interview participants were voluntary.

Interview participants came from each area of the supply chain: growers, breeders, R&D, service providers, seed merchants, retailers, regulators and associated industry experts. Interviews were also conducted with stakeholders from the medicinal cannabis space, to understand the broader context of cannabis in New Zealand.

Findings in stakeholder interviews were cross-referenced and supported by desk-based research, and documents and information sources are listed as Endnotes to this report.

# Appendix

## Regulation and historical background for hemp and cannabis in New Zealand

### History: Prohibition and Repeal

Hemp as a crop has a long history in New Zealand [lxxvi]. Prior to hemp regulations in 2006, C*annabis sativa sp.* was as a controlled substance and could not be legally sold in New Zealand, as per the Misuse of Drugs Act (MODA) 1975. The Food (Safety) Regulations 2002[lxxvii] permitted very limited use in the form of hemp seed oil as a food or food additive, with some allowances for hemp as a fibre crop and protein for animal consumption only.

Since 1998, the New Zealand hemp industry has submitted applications for the recognition of industrial forms of hemp to be recognized more broadly as food and food crops, grown from C*annabis sativa sp.* plants and materials where THC levels were very low[lxxviii]. In 2006, the Misuse of Drugs (Industrial Hemp) Regulations (2006)[lxxix] amended this Act:

> *"to acknowledge that licenses for the cultivation, processing and distribution of industrial hemp as an agricultural crop could now be issued under the iHemp Regulations[lxxx]"*

This enabling legislation for the New Zealand hemp industry in the 2006 Regulations is referred to by Richard Barge of the New Zealand Hemp Industries Association as "World Class Legislation[lxxxi]" as it treats it as an agricultural product, not a drug. The regulations refer to the UN Resolution which recognizes that low THC is an industrial product. This enables hemp products to be legally produced in New Zealand as long as you comply with other regulations for that product – e.g. building regulations, food regulations, medicines regulations. It also means that other legislative instruments can restrict or prohibit certain uses of *Cannabis sativa sp.*

A major issue around regulatory decision-making since 2006 has been the treatment and distinction of cannabis plant material as food, specifically hemp seeds for human consumption. As such, by 2016, the focus of this lobbying had been refined to have hemp seeds specifically, and their products, recognized as a food.

> *"In 2003, Cabinet approved the recommendation to develop a regulatory scheme to control activities relating to industrial hemp. As at January 2017 the New Zealand Government hasn't yet approved it for human consumption. In March 2016 ministers asked FSANZ (Food Standards Australia and NZ) to prepare a proposal on how low-THC hemp could legally be designated as a food. A call for submissions was sent out in July 2016 for consideration by April 2017[lxxxii]."*

At this point in time, the New Zealand Hemp Industries Association (NZHIA) stated in their submission to the proposed regulatory changes:

> *"The industry accept that the hemp regulations are our guiding legislation, independent from MODA. Industrial hemp has been clearly defined as low THC, which differentiates us from other forms of*

*Cannabis. The iHemp Regulations permit licenses to be issued to grow low THC iHemp as an arable crop, not a controlled drug. This is in accordance with the UN Single Convention on Narcotic Drugs 1961, Article 28 Article 28 CONTROL OF CANNABIS 1. If a Party permits the cultivation of the cannabis plant for the production of cannabis or cannabis resin, it shall apply thereto the system of controls as provided in article 23 respecting the control of the opium poppy. 2. This Convention shall not apply to the cultivation of the cannabis plant exclusively for industrial purposes (fibre and seed) or horticultural purposes. 3. The Parties shall adopt such measures as may be necessary to prevent the misuse of, and illicit traffic in, the leaves of the cannabis plant[lxxxiii]."*

In November 2018, a group of legislative changes came into force[lxxxiv] which establish Industrial Hemp (iHemp) as a distinct product regulated as an agricultural crop for propagation seeds and seeds for food products (seeds, oils and seed-derived powders and proteins). Under these changes, hemp seeds and hemp seed products such as oils or hempseed powers were able to be grown, manufactured and sold as food for human consumption in New Zealand. This legislative change did not legalize the use of other parts of the *cannabis sativa* plant for food, such as leaves or flowers[lxxxv].

> *"On 28 April 2017, trans-Tasman Ministers approved a change to the Australia New Zealand Food Standards Code to allow the sale of hemp seed as a food for human consumption. Before this could happen, some amendments had to be made to the Misuse of Drugs (Industrial Hemp) Regulations 2006 and the Food Regulations 2015. The changes provide for: consistency between the Food Standards Code to allow low-tetrahydrocannabinol (THC) hemp seed as food and the Industrial Hemp Regulations; regulations under the Food Act 2014 to declare low-THC hemp seed to be a food [and]; greater flexibility around licensing to possess, cultivate, and trade in low-THC hemp.lxxxvi"*

## Present: Licenses and Substances

Currently, in 2020, the cultivation, production and sales of hemp seed and hemp seed products in New Zealand is governed by a group of legislation across both MoH [lxxxvii] and MPI [lxxxviii]. This means that New Zealand hemp growers and actors across the supply chain have been given two levels of regulatory compliance: that of a food supply chain product under MPI, and that of a product connected to the MODA and the MoH.

Hemp as a product has been compartmentalized as a result, with rules varying according to if it is grown for propagation seed, whole seed for food, hulled or unhulled, imported or grown in New Zealand, a seed product on its own such as hemp seed oil, powder, protein or flakes, or as an ingredient within another food product where hemp as one ingredient. It makes it a daunting task to understand the compliance requirements to supply hemp to the New Zealand consumer marketplace. This complexity is demonstrated, for example, in the document provided by the MoH, "*Guide to hemp seeds as food*[lxxxix]".

Firstly, growing hemp in New Zealand requires compliance with MODA 2006 and licencing under MoH. This framework establishes that the only part of the *cannabis sativa sp.* plant that may be used legally in New Zealand is the seed[xc], with allowable uses for hemp stalks as a fibre-producing product being developed. *Cannabis sativa sp.* remains under the jurisdiction of MoH as a plant listed as a controlled substance under MODA and the Medicines Act 1975 via the Misuse of Drugs (Industrial Hemp)

Amendment Regulations 2018 (LI 2018/217) which came into effect in December 2018[xci]. This amendment requires the Ministry of Health to issue General Licenses to grow hemp.

Licensing regulations apply for all those who grow, harvest, sell, process, transport or store seeds, and the activity the license-holder is engaged in is specified on their General License. *Cannabis sativa sp. v*arieties with THC levels beneath .35% meet the Act's definition of low-THC industrial hemp and are the only varieties that may be cultivation under a General License. Varieties demonstrated to meet this condition are listed on the Approved List of Cultivars administered by MOH. Food products made from seeds and fibre (or ingredients made from seed, such as hemp seed oil) do not require a license to distribute and sell, however, but may only be un-hulled so seeds cannot germinate[xcii]. *Cannabis sativa sp.* varieties with THC levels between .35% and .5% may be approved under Breeding and Research licenses, which means this plant material may be used for research and development purposes only, not for commercial food production.

No mention is made in this legislation of any specific flavonoids or tannins that may be present in *Cannabis sativa*, however cannabidiol (CBD) is regulated as a controlled substance and may only be accessed legally via medical prescription[xciii]. The Misuse of Drugs (Medicinal Cannabis) Amendment Act 2018, removed CBD as a class B1 controlled drug under the Misuse of Drugs Act 1975, and instead placed it under the Medicines Act 1981[xciv]. This means that any *cannabis sativa sp.* variety with any level of CBD may not be cultivated, sold or otherwise produced in New Zealand for food under a General License. Instead, a Medical Cannabis License is required. Trace amounts of CBD are permissible in hemp seeds to account for potential contact with flower-containing CBD during harvesting. But no flower or leaf-derived CBD may be extracted, proceed or sold in New Zealand[xcv]

> *"THC and CBD are present in these products as a 'natural contaminant', fortification of products with CBD is prohibited under the Food Standard. The Food Standard that allows the sale of hemp seeds and hemp seed food products does not permit health or nutrition claims to be made about the CBD content of these food.[xcvi]"*

There are also restrictions on CBD in New Zealand whereby the Agricultural Compounds and Veterinary Medicines (Exemptions and Prohibited Substances) Regulations 2011[19] reference the MODA and Medicines Act to restrict production, sale and use of CBD and cannabis in general, regarding use by animals in New Zealand[xcvii]

Secondly, low-THC is industrial hemp as a food and food crop has opened up important food markets for hemp growers in New Zealand, falling under MPI jurisdiction[xcviii]. However, this also means that participation in the hemp industry requires growers to engage with regulations and compliance requirements standard in other food production chains in New Zealand. Selling hemp seed as a food for human consumption requires registration and compliance with The Food Act[xcix]and related Food Standards Code[c]: registration of a business, subsequent verification, and establishment of a Food Control Plan[ci]. New Zealand as a laudable international reputation for quality produce and food production. Yet New Zealand producers must meet high compliance requirements to maintain this standard and the barriers to entry for new-entrants to food production can be high.

## Conclusion: Future projections

Not only is the regulatory and legal space of hemp and cannabis complex, but it is actively evolving. Stakeholders and participants all widely expect regulations to continue to change. MPI currently

convenes a Hemp Industry Liaison Group; an indication that this is an area where the regulatory-industry interaction is quite dynamic. As discussed under *Research Findings 2. Barriers to Regulatory Compliance (p.7-8)* of this report, there is active discussion around moving the regulation of hemp away from MoH, and placing it with MPI entirely.

In large part, this move is dependent on the Referendum on the proposed Cannabis Legalisation and Control Bill, due in September 2020[cii]. Although the current draft of the Billciii explicitly excludes any consideration of hemp directly, it also does not yet make explicit the Bill's relationship with the MODA. There is some conjecture this Bill may remove cannabis from the MODA entirely, and should this happen, there would be positive flow-on effects in terms of the attitudes of both society, consumers and regulators as to all uses of the cannabis plant, and this would extend to hemp.

Also, as at 1st April 2020 a Medicinal Cannabis Authority has been established:

> *"The Medicinal Cannabis Agency administers the Medicinal Cannabis Scheme and ensures medicinal cannabis products meet the minimum quality standard.[civ]"*

While hemp and cannabis remain distinctly different products and supply chains, the establishment of a Medicinal Cannabis Scheme is of particular interest to those in the hemp industry in how it addresses CBD, and what options it does or does not leave open for the interaction of the two supply chains in the future. The relationship between the hemp and cannabis supply chains is addressed in the Webtools Whitepaper: *"Hemp and Cannabis – Divergent products, convergent supply chains.[cv]"*

In the future there will continue to be questions asked over regulation changes to THC and CBD in adult-use substances, and in products for animal consumption and use. Also, the ability for New Zealand producers to export to markets currently not legal in New Zealand jurisdiction. The first of these is likely to be around CBD. Legalized but infrequently regulated in overseas markets, CBD is a featured product in many emerging cannabis product offerings and cannabis-based businesses is showing significant growth projection, and is typically attracting a higher price point[cvi].

## Further reading:

### *Hemp Regulations*

- MODA 2006 (aka iHemp Regulations) - http://legislation.govt.nz/regulation/public/2006/0163/latest/DLM389407.html
- Food Standards Code - https://www.legislation.gov.au/Details/F2017C01047
- Food Regulations 2015 (aka The Food Act) - http://legislation.govt.nz/regulation/public/2015/0310/latest/DLM6684211.html

### *Government Webpages*

- MPI on Hemp - https://www.mpi.govt.nz/growing-and-harvesting/plant-products/hemp-seeds-as-food/
- MoH On Hemp - https://www.health.govt.nz/our-work/regulation-health-and-disability-system/medicines-control/industrial-hemp-0/hemp-seed-food
- Australian Legislative Register - https://www.legislation.gov.au/
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