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Hemp Seed

Capability Roadmap

Accessing the right capability to succeed in hemp seed derived food, beverage, dietary supplements and nutraceuticals or body care & cosmetics

This roadmap will help you navigate this rapidly evolving industry – identifying the capability required for any business, whether you are focused or vertically integrated.

Providing information and guidance all the way from seed to market.

Enter

Acknowledgements

If you have any feedback or questions about this document, or have contributions to suggest please email us at roadmaps@callaghaninnovation.govt.nz

Version 2.0

Develop your Strategy. Right from the start.

Developing a successful business strategy, R&D, IP strategy and regulatory and market access strategy should be the start point. They are core to establishing a hemp seed derived product business and should be continually revisited as you grow.

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Disclaimer

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R&D/IP STRATEGY

This capability refers to a range of activities to identify, create and manage intellectual property (IP) through developing and implementing your IP STRATEGY to gain a competitive advantage in the market place, enabling you to grow your business.

Your IP strategy should answer questions around what to do about IP, including determining what IP you have, how to protect and how to leverage it. It does not have to be expensive and should identify cost effective solutions.

It's particularly relevant if you are investing in new product development, commercializing a new product or innovation, exporting, accessing capital or if selling your business. However, it is also important when dealing with confidential information, when hiring staff, or when outsourcing or licensing.

It is important that you have processes for identifying the IP you create and a strategy for protecting and capitalising on it. It keeps your commercial goals to the fore and provides a framework for when you are deciding on what IP rights to secure and where to spend your money.

WHAT IS NEEDED

- **DEVELOP IP STRATEGY**
- **LEVERAGE IP**
- **MANAGE AND PROTECT IP**

DEVELOP IP STRATEGY

Identify sources of IP, which can occur at a number of points along the value chain:

- Unique genetics/breeds/cultivars
- Cultivation methods (I.e. organic)
- Processing technologies
- Product development
- Branding, trademarks, copyrights

Specify confidential information with economic value. Trade secrets include confidential processes, customer information, business strategies, and secret recipes.

Understand your IP environment, particularly for patents and if exporting including territory, timing and scope.

Evaluate your company's freedom to operate (FTO) in the initial phase of your product development and systematically prior to launching a new product.

ASK YOURSELF

- Do I have a business strategy in place?
- What impact does this have on my IP strategy?
- Have I identified the different sources of IP?
- Have I conducted an FTO analysis?

ACCESS CAPABILITY

- IP SERVICE PROVIDERS
- CALLAGHAN INNOVATION
  INNOVATION IP PROGRAMME

LEVERAGE IP

Evaluate and implement best way to protect your identified IP.

Registration gives you certain exclusive rights over your brand or innovation, completed through a national IP office like the Intellectual Property Office of New Zealand (IPONZ). Includes:

- Registered trademarks ®
- Patents
- Plant variety rights (PVRs): exclusive right to produce for sale and to sell propagating material of the variety.

Unregistered IP still offers legal protection and can also protect secret information. It includes:

- Unregistered trademarks ™
- Trade secrets (i.e. recipes and customer databases)
- Confidential information: Secrecy agreements and Copyright ©

Leverage your protected IP through enforcing IP rights or through licensing in/out. It's also important you consider your options at an early stage to minimize the risk of you infringing on another company's rights.

ASK YOURSELF

- Do I recognise when important IP is being created?
- How do I protect my IP?
- Can our business capture IP?

ACCESS CAPABILITY

- BUSINESS.GOVT.NZ
- INTELLECTUAL PROPERTY OFFICE OF NZ
- IP SERVICE PROVIDERS
- CALLAGHAN INNOVATION
  INNOVATION IP PROGRAMME

MANAGE AND PROTECT IP

Put systems in place to manage your IP

Tools and support:

- Develop an IP checklist or asset register
- IP management systems: tracking patent due dates, workflows, manage legal requirements etc.

Manage confidential information:

- Add confidentiality clauses when hiring staff or contractors, especially given potential for IP loss through staff
- Insert legal clauses in documents including nondisclosure agreements (NDAs) and confidentiality agreements when out-sourcing work or licensing or distributing your products/services.

IP should be reviewed routinely as one of your managed risks.

ASK YOURSELF

- What systems do we have in place to track our IP?
- How well are we managing IP issues when drafting and negotiating agreements?
- Are we actively managing the risk of IP loss?

ACCESS CAPABILITY

- BUSINESS.GOVT.NZ
- IP CHECKLIST
- IP SERVICE PROVIDERS
- CALLAGHAN INNOVATION
  INNOVATION IP PROGRAMME

REGULATORY & MARKET ACCESS STRATEGY

This is a REGULATORY and MARKET ACCESS capability which encompasses activities across the entire value chain for hemp seed derived products. Key activity is focused on meeting licensing requirements, required in order to grow, trade in, or process industrial hemp as an agricultural crop.

As a food product there are also a number of New Zealand Food Safety requirements that must be met.

Dietary Supplements have their own set of regulations that must be complied with. Cosmetics and body care are also regulated by product class specific regulations.

International regulations for products often differ to NZ regulations. A regulatory strategic plan is key to international market success.

This capability extends to activities to improve market access for hemp seeds to be grown, manufactured and sold as food, beverage or body care products, both in NZ and overseas.

WHAT IS NEEDED

- LOCAL MARKET
- INTERNATIONAL MARKETS
- MARKET ACCESS

LOCAL MARKET

You need to be licenced to grow, trade in, or process industrial hemp with applicants meeting a responsible persons test.

You should have a secure site. Ideally more than 5 km from a residential development, or considered safe.

You can only grow an approved cultivar with less than 0.35% THC. This requires laboratory testing confirmation.

You will need to keep records of all hemp transactions on a register which are readily accessible, retrievable, and secure from tampering. This includes seed, cultivation and harvest registers, also included as part of annual reporting. There are potential software available to help hemp seed traceability.

You must also meet New Zealand Food Safety requirements.

ASK YOURSELF

- Have I got a licensed activity?
- What are my security arrangements?
- Have I established registers for my activities?

ACCESS CAPABILITY

MINISTRY FOR PRIMARY INDUSTRIES

MINISTRY OF HEALTH
INDUSTRIAL HEMP LICENSING

CONSULTANTS FOR LICENSING APPLICATIONS

INTERNATIONAL MARKETS

You do not need a licence from Medicines Control if you are exporting hulled, non-viable hemp seeds and hemp seed food products.

Whatever type of hemp seed or hemp seed food product you are exporting, you must also meet New Zealand Food Safety requirements.

You will need to meet the regulatory requirements for any country you intend to export hemp seed derived products to.

Important to understand the legal & regulatory framework in each export market to determine the market opportunity. For example there is harmonisation across Australia and NZ in Food standards if you intend to export a hemp food product. However there is no harmonization for Dietary Supplements between Australia and NZ. Cosmetics and body care must adhere to country specific regulations also.

ASK YOURSELF

- Do I understand the regulatory framework in each export market?

ACCESS CAPABILITY

- NEW ZEALAND FOOD SAFETY
- MINISTRY OF HEALTH
  INDUSTRIAL HEMP LICENSING
- BIOEQUITAS

MARKET ACCESS

You will need to identify what is required to get your hemp food product into the export market. It's important to get advice on the rules and regulations in international markets. This extends to assessing food safety and biosecurity requirements for your export market.

You will need to get clearance for anything you're exporting from New Zealand.

You need to identify the market arrangement and whether there is a free trade agreement in place. Also understand any tariffs that may be applicable depending on the market you are looking to export to.

ASK YOURSELF

- Do I know food safety and biosecurity requirements for my export market?

ACCESS CAPABILITY

- NZ TRADE & ENTERPRISE
- NZ CUSTOMS SERVICE
- NZ FOREIGN AFFAIRS & TRADE

BUSINESS STRATEGY

Your BUSINESS STRATEGY specifies your core business and sources of competitive advantage in order to create long term value.

You will need to decide on the best strategy to build your strategic advantage. This could be either:

- **Market or competition-based:** Outwards focused based on current and proposed fit in market
- **Business-centred:** Inwards focussed leveraging your assets, capabilities
- **Innovation-based:** Creating your own space by switching strategic focus inwards, outwards, or using a mix of the two.

The majority of industrial hemp (iHemp) companies in New Zealand will pursue a differentiation strategy through value-added activities. Given this, your strategy will need to focus on those activities where you potentially have a competitive advantage, e.g. developing IP around brands and formulations, unique technologies and building share of distribution channels.

And once you've developed your business strategy, keep it up to date and review in the face of new opportunities.

WHAT IS NEEDED

- MARKET VALIDATION
- BUSINESS STRATEGY
- PEOPLE
- PHYSICAL RESOURCES
- EARLY INVESTMENT STRATEGY
- FINANCIAL AND INVESTMENT STRATEGY

MARKET VALIDATION

You will need to develop an approach to screen, prioritise, and qualify new products or markets.

Conduct a market opportunity assessment: Use available secondary market information to develop in-depth understanding of potential markets, quantify the market opportunity and understand the competitive landscape and category trends. Accelerate learning by connecting with industry associations or government agencies who may have direct experience.

Talk to consumers and businesses in target market to understand their needs and determine the overall opportunity. This should include defining and sizing the market problem, your target audience and developing and testing your unique value proposition based on desired product features and claims.

ASK YOURSELF

- Am I qualifying new product opportunities?
- Am I talking to others with more market experience?
- Do I understand customers unmet needs?
- Am I validating product opportunities with consumers?

ACCESS CAPABILITY

- ICEHOUSE
  MARKET VALIDATION PROGRAMME
- NZ HEMP INDUSTRIES ASSOCIATION
- NZ TRADE & ENTERPRISE
- COSMETICS NZ

BUSINESS STRATEGY

Start by articulating your vision and mission to help set your direction: Describe what success looks like and what you want to achieve in a way you can break down and measure it.

Understand your situation through a proper assessment that includes environmental, competitive analysis and a SWOT. This will also inform your Go to Market approach.

Make sure to set a single business goal (or strategic objective). From this, you should also detail objectives to help you measure progress, set targets and plan projects that help you reach them.

Reflect your business strategy in your implementation plans (marketing, operations, resourcing).

Put measurements in place. Make sure that these link back to your overall strategy, allowing you track your progress.

ASK YOURSELF

- Do I have a vision and mission?
- Have I conducted a market assessment?
- What is my business goal?
- Do I have implementation plans?
- Have I got the right systems in place to track progress?

ACCESS CAPABILITY

- ECONOMIC DEVELOPMENT AGENCY
- BUSINESS.GOVT.NZ
- NZ TRADE & ENTERPRISE
- BANKS

PEOPLE

You will need to specify the people resources you will need to carry out the planned activity.

Determine the people skill sets that you need and whether or not to buy or acquire them. Consider the potential to bring in knowledge agents from related industries or more developed markets.

Ensure you have the right management capability in place including leadership, personnel training, health and safety, sales and business development. This includes planning for leadership changes, I.e. managing the transition from founder to CEO.

Ensure you have governance processes in place. This could also include an Advisory Board or Panel in the early phase to help guide the business particularly at a technical level.

Continually review your people resource and need to change as you grow and develop your business.

ASK YOURSELF

- Have I got a people resource plan in place?
- Do I have the right team and experience in place?
- What is the capability of my management team? Now and moving forward?
- Am I reviewing my people resource?

ACCESS CAPABILITY

- INSTITUTE OF DIRECTORS
- BUSINESS.GOVT.NZ
- HUMAN RESOURCES INSTITUTE OF NZ HRNZ
- APPOINT BETTER BOARDS

PHYSICAL RESOURCES

You will need to specify the physical resources you will need to carry out the planned activity. This includes raw materials, buildings and facilities, machinery, energy, and supplies.

Determine the capabilities you are developing and the physical resources required. This will also inform whether you invest in specific resources, or outsource. This also may be the opportunity to look at strategic partnership arrangements.

Review different technology platforms as a means to innovate and build capability including those that can be transferred from related industries (I.e. hops, forestry). Many of these will be identified through research and development programmes, likely to require specialised equipment and additional investment.

Evaluate the role of digital technologies including robotics and automation; traceability and communication to further develop capability.

ASK YOURSELF

- Have I got a physical resource plan in place?
- Do I need to invest or outsource?
- Are there specialised equipment required for technology platform?
- What digital technologies will help deliver my strategy?

ACCESS CAPABILITY

- TECH INCUBATORS
- BUSINESS.GOVT.NZ
- CALLAGHAN INNOVATION GETTING STARTED

EARLY INVESTMENT STRATEGY

Your early investment phase will in most cases focus on important R&D and IP activities to support Business Strategy and mitigate risk for investors in subsequent capital raises

Understand your R&D requirements to generate a proof of concept supporting a differentiated product and how you are going to fund initial activity. This could be from shareholders or from Grants etc.

You need to articulate an R&D Programme and specify the activities you are going to undertake as grant funding can be an enabler for your IP and regulatory strategy without diluting equity at an early stage.

ASK YOURSELF

- How can you get capital outside of equity funding?
- How do I get access to early stage funding?
- Do I have a path to market?
- Am I able to co-fund?
- What is my R&D Programme and what can I afford?
- Have I identified key risks for early stage investors?

ACCESS CAPABILITY

- WASTE MINIMISATION FUND
- BIORESOURCE PROCESSING ALLIANCE
- CALLAGHAN INNOVATION GETTING STARTED
- AGMARDT
- SUSTAINABLE FOOD AND FIBRE FUTURES

FINANCIAL AND INVESTMENT STRATEGY

You will need to specify the financing needed to carry out your planned activity.

Understand the commercialisation process and the expected timeframe. Know your cash burn rate and whether you are likely to require external sources of capital or if you can use bootstrapping to get to first sale.

Determine your capital structure and financing required to deliver your business strategy. This will depend on the timing of investments and your approach to scaling the business.

Understand different options for capital, including how to access or raise capital if required.

If relevant consider strategic alliance such as joint venture or equity alliance. This can provide smart capital. i.e. financial resource with intellectual capital.

ASK YOURSELF

- What financing arrangement?
- What is my ideal capital structure?
- What is my timeframe to commercialisation?
- What is my cash burn rate?
- What investments are required to effectively scale?
- Do I understand how to access or raise capital?

ACCESS CAPABILITY

- CAPITAL EDUCATION PROGRAMME
- NZ TRADE & ENTERPRISE
- NZ GROWTH CAPITAL PARTNERS

PLANT BREEDING

The *Cannabis sativa* plant has a history spanning thousands of years across the globe with genetic diversity. Industrial hemp refers to those varieties that have a tetrahydrocannabinol (THC) content generally below 0.35 percent.

This is a licensed RESEARCH and BREEDING capability which includes procurement and breeding of specific cultivars and varieties as industrial hemp cultivars.

Cultivars need to be approved by gazettal before they are able to be used for growing, manufacturing and selling hemp seed as food. Approved industrial hemp cultivars in NZ are: *A1 Monopurp, Anka, Aotearoa 1, CFX-1, CFX-2, CRS-1, Fasamo, Fedora 17, Ferimon 12, Finola, Futura 75, Katani, Kompolti, Sirius, USO 31.*

Other important considerations are the role of breeding programmes and record keeping.

WHAT IS NEEDED

- **STARTING MATERIAL**
- **BREEDING PROGRAMMES**
- **LICENSING**

STARTING MATERIAL

You will need to select cultivar from seedstock that has been approved for industrial hemp in NZ for the purpose of cultivating hemp seeds.

These can be obtained from a licensed seedstock provider. You can also import whole seeds however this licenced activity also needs to meet MPI standards, which includes

- Source from a pest-free area and/or
- Treat the seeds using a hot water dip prior to shipment
- Ensuring seed is free from contamination

There are differences in access to seedstock across countries and there are international genetic libraries that can be accessed.

ASK YOURSELF

- Am I using an approved cultivar?
- Am I wanting to import seeds?

ACCESS CAPABILITY

- PLANT & FOOD RESEARCH
- MINISTRY FOR PRIMARY INDUSTRIES
- NZ HEMP INDUSTRIES ASSOCIATION
- MINISTRY OF HEALTH
  INDUSTRIAL HEMP LICENSING

BREEDING PROGRAMMES

Optimise performance for your growing location especially given the range of conditions across the country. Best economic returns are likely to be generated from acclimatised regional specific cultivars.

Well-designed breeding programmes start with a good understanding of positive traits that you're interested in developing to bring in new plant varieties. This should emphasise genetic stability and reproducibility.

Breeding tools include crossing, quantitative selection for genetic gain and genomic selection.

Data management and accurate record-keeping is important to understand relationship amongst plants (phenotypes and pedigrees), track the usable crosses you've made. Genetic software can help you manage this including quality of records, crossing plans, measurement of key traits.

ASK YOURSELF

- Is my breeding programme aligned with my business strategy?
- What breeding tools am I considering?
- What data management systems do I have?

ACCESS CAPABILITY

- PLANT & FOOD RESEARCH
- MINISTRY FOR PRIMARY INDUSTRIES
- ABACUS BIO

LICENSING

You will require a license for research and breeding for research purposes only. This will assess the suitability of specified cultivars and varieties of hemp.

Every licence holder who is authorised to possess hemp seeds and cultivate must keep a seed register, cultivation register and a harvest register. Copy of registers must be provided to the Authority on request.

This lists the amount by weight of the seeds supplied or procured; the cultivar or variety; the name of the person to whom those seeds were supplied or from whom they were procured.

ASK YOURSELF

- Do I have the right license for breeding?
- Do I have record keeping in place?

ACCESS CAPABILITY

MINISTRY OF HEALTH
INDUSTRIAL HEMP LICENSING

CULTIVATION

This is a licensed CULTIVATION capability encompassing the entire growth cycle for the low THC Cannabis sativa plant from start to harvest.

The purpose of cultivation activity is to harvest the seed. This is the only part of the plant allowed to be sold as food or used as an ingredient in food. Note that this is different from other overseas markets and jurisdictions which may allow for other parts of the plant (including extracted CBD) to be used in hemp seed derived products. This also means that after seed harvesting, secure destruction of the rest of the plant is required.

Activities considered to be part of cultivation are:

- seed for the purposes of growing
- growing
- harvesting

In addition, there are important considerations in relation to security (physical measures, operational procedures).

WHAT IS NEEDED

- **SITE SELECTION AND PREPARATION**
- **SOURCE MATERIAL**
- **GROWING**
- **HARVESTING**
- **LICENSING**

SITE SELECTION AND PREPARATION

Assess how site was previously utilised and if any remediation required prior to cultivating due to residues or toxicities. Hemp requires finely tilled soils rich in organic matter.

Look at the upfront costs given electricity may be required for irrigation, especially in drier regions, together with security costs.

Take a farm systems approach: Hemp can be an ideal rotation crop, helping break up and condition soil. Can be mixed in crop plantations. e.g. alongside grapes and pine plantations.

Your site should also ensure that all hemp can be stored in a building or container that is securely locked or guarded.

ASK YOURSELF

- Have I assessed previous site usage?
- Have I conducted soil testing?
- Have a considered up-front costs?
- Is my site secure?

ACCESS CAPABILITY

- **AGRESEARCH**
- **CONSULTANTS FOR LICENSING APPLICATIONS**
- **TESTING LABORATORIES**

SOURCE MATERIAL

You need to decide your cultivar type, either specialised for seed or for dual cropping. Specialised seeds crops are shorter and have heaviest yields and greatest returns.

Select cultivar from those approved for industrial hemp: *A1 Monopurp, Anka, Aotearoa 1, CFX-1, CFX-2, CRS-1, Fasamo, Fedora 17, Ferimon 12, Finola, Futura 75, Katani, Kompolti, Sirius, USO 31.*

Optimise performance for your growing location given no acclimatised seedstock specifically designed for New Zealand soil types.

You may want to conduct trials of approved cultivars with different properties. Taking factorial design approach to look at all variables; soil, season, field position.

Best economic returns likely to be generated from acclimatised regional specific cultivars.

ASK YOURSELF

- Am I using an approved cultivar?
- Have I optimised performance for growing location?

ACCESS CAPABILITY

- PLANT & FOOD RESEARCH
- MINISTRY OF HEALTH
  INDUSTRIAL HEMP LICENSING
- MINISTRY FOR PRIMARY INDUSTRIES
- NZ HEMP INDUSTRIES ASSOCIATION

GROWING

Establish high cultivation standards growing crops to ensure quality is managed. Growing should also consider yield optimisation, plant protection, and sustainable production issues.

Manage cultivation risks including contamination with pesticides, heavy metals, and hazardous moulds, bacteria and fungi.

Manage bird pressure which can significantly impact seed yields close to harvest. Assess potential for netting and horns, or other innovative approaches (i.e. drones).

Samples of hemp plants from each of the seed stocks and different environmental conditions should be taken about 2-3 weeks before plants are due to be harvested for laboratory testing to ensure THC content < 0.35%.

ASK YOURSELF

- What production planning processes do I have in place?
- Have I planned to manage bird pressure?
- Have I planned for THC testing?

ACCESS CAPABILITY

- PLANT & FOOD RESEARCH
- ESR

HARVESTING

Harvest for seed when at least 60% of the seed is ripe. This is usually 100 – 120 days after sowing, although this will vary by cultivar and location.

Harvesting requirements depend on whether you are harvesting dual-purpose crop or targeting fibre. Opportunity to innovate in this area.

Ensure you can deliver the crop to a processor or complete seed drying within 4 hours of harvesting to optimise quality of seed oil.

You will also need to record destruction of any hemp seeds and plants, with acceptable methods including composting, mulching or burning. Biomass not processed further can be directed to other value adding activities to minimise waste.

ASK YOURSELF

- Do I have the right harvester?
- What is my plan for destruction?

ACCESS CAPABILITY

BIORESOURCE PROCESSING ALLIANCE

LICENSING

You require an Industrial hemp general licence with 'cultivation' listed as an activity You also need to be registered under the Food Act with the Ministry of Primary Industries.

Growers can only sell whole hemp seeds to someone who holds an Industrial hemp general licence with 'procurement' or 'processing into specified hemp products' listed as an activity. Whole hemp seed is a class C drug. Dehulled hemp seeds are a hemp product and so do not require a license.

You must keep a seed register as licence holder who is authorised to possess hemp seeds. Every licence holder who is authorised to cultivate hemp must also keep a cultivation register and a harvest register. Copy of these must be provided to the Authority on request

ASK YOURSELF

- Do I have the right license?
- Am I aware of the license type of the business I am selling seed to?
- Do I have the required registers?

ACCESS CAPABILITY

- MINISTRY FOR PRIMARY INDUSTRIES
- MINISTRY OF HEALTH
  INDUSTRIAL HEMP LICENSING
- NEW ZEALAND FOOD SAFETY

PROCESSING CAPABILITY

PROCESSING refers to the activities required to prepare the seed in order to develop a food, beverage or body care product

This includes:

- Hulled seeds, or "hearts" which are suitable for retail sale once the outer shell of the seed is removed.
- Oil extracted from seeds as a product or ingredient
- Product extracted or made from milled (ground) seed or seed cake following oil extraction e.g. protein powder, hemp flour

Many of the processing technologies are well characterised although the selection will depend on the intended hemp seed derived product being developed.

During processing steps remaining biomass may be directed to additional value adding activity to minimise waste.

WHAT IS NEEDED

- **DEHULLING HEMP SEEDS**
- **HEMP SEED OIL EXTRACTION**
- **HEMP SEED PROTEIN POWDER**
- **LICENSING AND REGISTRATION**

DEHULLING HEMP SEEDS (HEARTS)

If you intend to use the hemp seed hearts, following harvest they need to be dried, graded and dehulled:

- **Seed dryers:** allow for fast drying at correct temperatures. Ensure seed drying process within 4 hours of harvesting to optimise quality of seed oil, either onsite or at a processing facility.
- **Seed grading:** makes it easy to sort hemp seed stock to isolate, for example, larger seeds for hemp hearts and smaller seeds for hemp oil.
- Seed shelling machine to remove the outer coat or hull so they are not able to germinate.

Hulled seeds may be further ground to a paste using a colloid mill. This concentrate can be used as a butter or reconstituted depending on the desired product.

ASK YOURSELF

- Have I decided how I am going to process hemp seeds?
- Do I have a specific hemp derived product in mind?

ACCESS CAPABILITY

NZ HEMP INDUSTRIES ASSOCIATION

HEMP SEED OIL EXTRACTION

Cold press: Hemp seeds to extract hemp seed oil using readily available technologies, similar to those used for other extractions (olive oil). Hemp oil is high in antioxidants and omega-3 and -6 fatty acid but contains no CBD, THC or other cannabinoids. It is not further refined.

Additional processing steps may be required to completely extract oil from the seed cake depending on intended use of processed material.

Potential to use new technology for complete oil extraction such as **Supercritical CO2 fluid extraction**. This uses high pressure and moderate heat to turn the CO2 supercritical.

High capital cost. This is an environmentally friendly process, and CO2 is a safe, clean, cheap and nontoxic solvent. The oil obtained is free of any solvent residues.

ASK YOURSELF

- Do I have a specific hemp derived product in mind?
- Have I investigated different extraction technologies?

ACCESS CAPABILITY

- NZ HEMP INDUSTRIES ASSOCIATION
- CALLAGHAN INNOVATION

HEMP SEED PROTEIN POWDER

Extract protein from the seed cake created following oil extraction. Ideally oil extraction should be as complete as possible to reduce risk of rancidity and improve taste profile and this may be possible with new technologies.

Mill (grind) the seed cake to a flour. This can be sifted to generate powders that contain different protein concentrations (approximately 20-50%) depending on the screen used.

Its also possible to separate the seed cake into fractions rich in mainly shell or mainly fine powder. The shell has high fibre with low levels of protein but, the powder very high levels of protein. If complete oil extraction also done powder fraction may contain protein of up to 60–70%.

ASK YOURSELF

- What level of protein do I require?
- Do I have a specific hemp derived product in mind

ACCESS CAPABILITY

- NZ HEMP INDUSTRIES ASSOCIATION
- CALLAGHAN INNOVATION

LICENSING AND REGISTRATION

If you are processing unhulled hemp seeds you must have a general licence issued by Medicines Control with **processing into specified hemp products** listed as an activity. This also requires you to record all transactions in the seed register.

If you are processing hulled hemp seeds or your activities start with hemp seed food products (e.g. hemp oil, hemp powder) you do not need a licence.

You will need to be registered under the Food Act.

ASK YOURSELF

- Do I have the required license for processing?
- Have I registered under the Food Act?

ACCESS CAPABILITY

- MINISTRY FOR PRIMARY INDUSTRIES
- MINISTRY OF HEALTH
  INDUSTRIAL HEMP LICENSING
- NEW ZEALAND FOOD SAFETY

PRODUCT DEVELOPMENT

This is the PRODUCT DEVELOPMENT capability including those activities required to develop a hemp seed derived product. Can be graded for human, animal (subject to ACVM approval) or industrial use. This roadmap concentrates on use as a food, beverage, dietary supplement or cosmetic and body care product for sale. This involves bench scale formulation development, pilot plant manufacturing and providing proof of concept through test marketing.

Hemp seeds are extremely nutrient dense with 20-25% protein, 25-30% oil and 10-15% insoluble fibre. The protein content is second only to soybeans in plant-based protein sources, and hemp seeds are gluten free.

These features make hemp seeds an excellent nutrient source for those who cannot have gluten or who follow vegetarian, vegan, or plant based diets.

Given this nutritional profile there is an expanding range of products that could be developed, incorporating any of the following:

- **Hulled seeds "hearts":** Raw, cooked, or roasted. Ground paste can be used as butter or reconstituted into milk
- **Hemp seed oil:** capsules, salad oil
- Hemp protein powder

There is also development of Body Care Products (cosmetics) using hemp seeds as an ingredient.

WHAT IS NEEDED

- CONCEPT DEVELOPMENT
- PRODUCT DEVELOPMENT – FOOD & BEVERAGE
- PRODUCT DEVELOPMENT – DIETARY SUPPLEMENTS
- PRODUCT DEVELOPMENT – BODY CARE (COSMETICS)
- PROCESS & PACKAGING DEVELOPMENT
- TEST MARKETING
- LICENSING & REGISTRATION

CONCEPT DEVELOPMENT

First develop your product concept which includes:

- your target product
- who is in the market
- the market opportunity, and
- unique value proposition

Determine product required. This will be based on the desired nutritional profile or health benefit and products claims being sought.

Your desired nutritional profile should support product claims which could include level of protein and composition, amount of insoluble and soluble fibre and your essential fatty acid composition.

For Dietary Supplements your ingredient list and dosage must support evidence based and compliant health benefit claims.

For cosmetics (body care) any health benefit claims must also be compliant and supported by evidence.

Assess feasibility in terms of market and your ability to scale.

ASK YOURSELF

- Who is in my target market?
- What is the market opportunity?

ACCESS CAPABILITY

- FOOD INNOVATION NETWORK
- CALLAGHAN INNOVATION
- FOODINC
- FOODHQ
- NATURAL HEALTH PRODUCTS NZ
- BIOEQUITAS
- COSMETICS NZ

PRODUCT DEVELOPMENT
FOOD AND BEVERAGE

Develop a prototype of your target food or beverage product. This will include the recipe, formulation, ingredients and claims. Your formulation should be designed to meet specified conditions.

Vary ingredients, processing parameters and packaging to find best option for target product. An experimental design will reduce prototypes that need to be developed. Specialised information technology is available for formulation management, nutrition calculation and data management.

Determine formulation requirements to obtain desired shelf life. This may include need for stabilisation, given hemp seed oil containing product has risk of rancidity You may also wish to conduct sensory research to assess flavour, texture and acceptability of different formulations.

Work with suitable provider who can provide a network of facilities, equipment and expertise.

ASK YOURSELF

- Have I developed a prototype?
- What specific processing equipment do I require?
- Do I require specific packaging?

ACCESS CAPABILITY

- FOOD INNOVATION NETWORK
- CALLAGHAN INNOVATION
- RIDDET INSTITUTE
- FOODHQ

PRODUCT DEVELOPMENT
DIETARY SUPPLEMENTS

Understand health benefit market segments.

Design a formulation based on the active ingredients and evidence for their health benefit function.

Evaluate format options such as capsules, tablets, powder or liquids.

Undertake a regulatory review for local and international market requirements.

Source and engage manufacturing capability and conduct trial and pilot stage where requried.

Design and source packaging.

Evaluate stability study requirements.

ASK YOURSELF

- What is the relevant health benefit market segment?
- Is the formulation and shelf life supported by evidence?
- What is the product/brand niche or competitive advantage?
- Is the formulation and manufacture compliant with the regulations in the intended market(s)?

ACCESS CAPABILITY

NATURAL HEALTH PRODUCTS NZ

BIOEQUITAS

PRODUCT DEVELOPMENT
BODY CARE (COSMETICS)

Develop a prototype of your target body care product containing hemp seed.

Select product category, which currently include shampoos and hair conditioners, lotions, massage oils, salves, soaps, skin crèmes, sunscreen, and lip balms.

Your prototype will include the recipe, formulation, ingredients and claims. Your formulation should be designed to meet specified conditions.

Ensure any health benefit claims are supported by evidence and compliant with the regulations.

Determine formulation requirements to obtain desired shelf life. This may include need for stabilisation, given hemp seed oil containing product has risk of rancidity

Work with suitable provider who can provide a network of facilities, equipment and expertise.

ASK YOURSELF

- Have I developed a prototype?
- What specific processing equipment do I require?
- Do I require specific packaging?

ACCESS CAPABILITY

NATURAL HEALTH PRODUCTS NZ

COSMETICS NZ

PROCESS AND PACKAGING DEVELOPMENT

Determine necessary equipment, facilities and processes required to manufacture product. Assess technology feasibility including specific equipment and production processes. Consider capital investment required and technology path with changing scale.

Evaluate contract manufacturing as an option particularly for highly capital intense manufacturing such as Dietary Supplements where GMP may be a requirement.

Ensure requirements for ingredients supplier are clear and multiple sources have been identified.

Develop packaging including type and format. Consider presentation and display for sale, together with labelling options that comply with regulations. You may need to assess different packaging options, considering its impact on product shelf life by preventing oxidation and damage prevention during handling, transport and storage.

You will need pilot plant manufacture of sufficient product for test marketing, with processes adequate to deliver a high quality, safe product.

ASK YOURSELF

- Have I identified processes and equipment?
- Have I identified ingredients suppliers?
- Have I developed packaging?

ACCESS CAPABILITY

- FOOD INNOVATION NETWORK
- CALLAGHAN INNOVATION
- MCFOODIES
- FOODINC
- NATURAL HEALTH PRODUCTS NZ

TEST MARKETING

Test marketing should address formulation, processing and packaging for screened product.

Use the final formulation together with nutritional profile, on a % weight basis. Packaging should be close to final to assess for appeal and acceptance of format.

Your test marketing could be conducted as a consumer focus group, an in-home consumer use test, or market test working with a field expert at stores or directly with supermarkets. Consumers are asked to assess the like and dislikes of the product.

Analysis of test results will need to be interpreted to determine a commercialisation decision.

ASK YOURSELF

- Have I planned test marketing?

ACCESS CAPABILITY

- FOOD INNOVATION NETWORK
- COLMAR BRUNTON
- FUTURESCAPE
- PLANT & FOOD RESEARCH
- NIELSEN

LICENSING AND REGISTRATION

If you are developing hemp seed products from whole hemp seeds you must have a general licence issued by Medicines Control with processing into specified hemp products listed as an activity.

Make sure you are using approved cultivar low-THC hemp seeds and record all transactions in the seed register.

If developing a food or beverage product you need to be registered under the Food Act, with labelling that meets the requirements of the Food Standard.

Dietary Supplements manufacturing and labelling must comply with the Dietary Supplement legislation in NZ and the relevant regulations in export markets. Export markets often have more regulation for these products than NZ. Some export markets require individual product registrations and specify GMP manufacturing.

If you are developing a body care product refer to the **Cosmetic Products Group Standard**, which includes lists of chemicals whose use in cosmetics is restricted. You also need to meet labelling and packaging requirements.

ASK YOURSELF

- Do I have the appropriate license?
- Have I registered under the Food Act?

ACCESS CAPABILITY

- MINISTRY OF HEALTH
  INDUSTRIAL HEMP LICENSING
- MINISTRY FOR PRIMARY INDUSTRIES
- NEW ZEALAND FOOD SAFETY
- ENVIRONMENTAL PROTECTION AUTHORITY
- MINISTRY OF HEALTH
  REGULATORY CONSULTANTS

MANUFACTURING

This capability relates to key activities required to MANUFACTURE of a hemp seed derived product, either a food, beverage or body care product. This includes the decision whether you will manufacture and package the product yourself, or use a contract manufacturer.

There is a growing range of hemp seed based products that can be manufactured and whilst already well characterised, there is likely to be further product innovation with implications for manufacturing processes requiring specialised equipment.

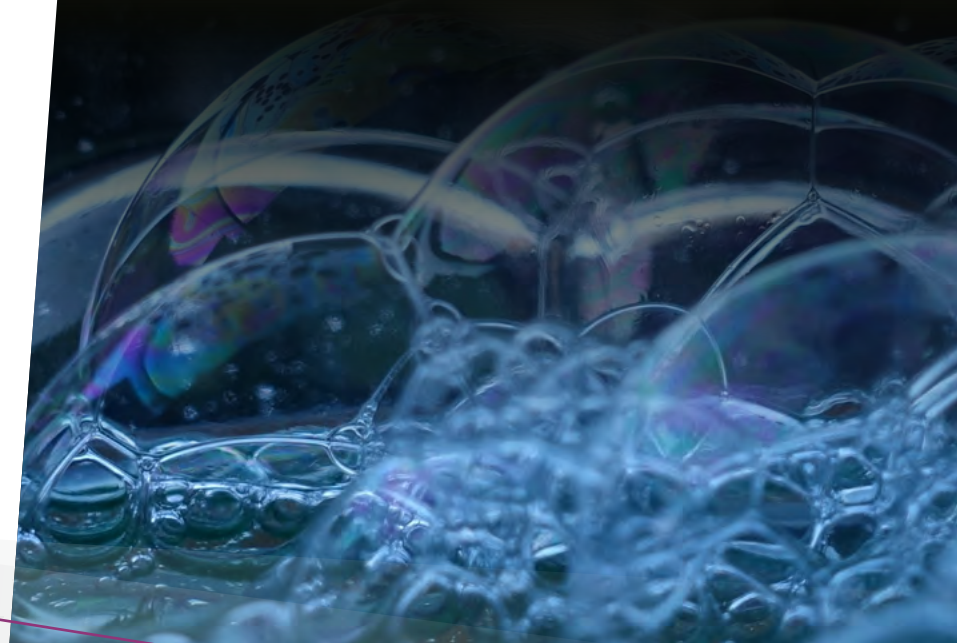
Manufactured products include:

- **Food and beverages:** milk, butter, cereal bars, spreads. breakfast cereals, baked goods (e.g. brownies, cookies), salad oils, sauces, seasoning, meat replacement products
- **Dietary Supplements:** capsules, tablets, powders, liquids, shots, elixirs, tinctures, drops, sachets and other oral controlled dosage products
- **Body care (cosmetics):** shampoos and hair conditioners, lotions, massage oils, soaps

Important considerations are the management of ingredients suppliers, packaging and quality management.

WHAT IS NEEDED

- FOOD AND BEVERAGE PRODUCT MANUFACTURING
- DIETARY SUPPLEMENTS PRODUCT MANUFACTURING
- BODY CARE PRODUCT MANUFACTURING
- LABELLING AND PACKAGING
- MANAGING QUALITY
- MANAGING QUALITY DIETARY SUPPLEMENTS
- LICENSING AND REGISTRATION



FOOD AND BEVERAGE PRODUCT MANUFACTURING

Determine whether you will manufacture product yourself or through contract manufacturer. If manufacturing consider capital investment in equipment or leasing options in line with your technology path to scale up.

Ensure design, physical location and any activities being conducted in your business and food preparation areas allows you to make safe and suitable food. Includes anything you or your staff do to manage risk.

You need to manage ingredient quality, hygiene and clean down, suitability of the premises, documentation, training and full compliance with legal obligations.

ASK YOURSELF

- Will I be manufacturing product?
- Do I require specific equipment?
- Am I aware of the manufacturing standards?

ACCESS CAPABILITY

- FOOD INNOVATION NETWORK
- FOODINC
- FOOD CONSULTANTS

DIETARY SUPPLEMENTS PRODUCT MANUFACTURING

Determine whether you will manufacture product yourself or through contract manufacturer. If manufacturing consider capital investment in equipment or leasing options and any requirement for GMP licensed or compliance in line with your technology path to scale up.

You need to ensure that the product is manufactured to the appropriate standard given your intended market. Many international markets require product class specific Good Manufacturing Practice

(GMP) standards, in some case to a Licensed level and this may be required in order to access some international markets.

You need to manage ingredient quality, manufacturing to the required level of GMP, shelf life (stability studies) and a quality system in compliance with legal obligations.

ASK YOURSELF

- Will I be manufacturing product?
- Do I require specific equipment?
- Am I aware of the manufacturing standards?

ACCESS CAPABILITY

- NATURAL HEALTH PRODUCTS NZ
- BIOEQUITAS

BODY CARE PRODUCT MANUFACTURING

Determine whether you will manufacture product yourself or through contract manufacturer. If manufacturing consider capital investment in equipment or leasing options in line with your technology path to scale up.

You need to ensure that the product is manufactured to the appropriate standard given your intended market. There are some firms manufacturing to ISO or Good Manufacturing Practice (GMP) standard and this may be required in order to access some international markets.

You need to manage ingredient quality, hygiene and clean down, suitability of the premises, documentation, training and full compliance with legal obligations.

ASK YOURSELF

- Will I be manufacturing product?
- Do I require specific equipment?
- Am I aware of the manufacturing standards?

ACCESS CAPABILITY

- COSMETICS NZ
- MEDSAFE

LABELLING AND PACKAGING

You must ensure that labelling complies with regulations and this includes:

- **Foods:** declarations and any nutritional content and health claims.
- **Dietary Supplements:** labelling must comply with regulations and health claims and risk statements may be required.
- **Cosmetics (body care)** have their own set of labelling requirements and must also comply with health claim regulations

Ensure packaging solution confirmed in development can be implemented at scale and this may require further testing and specialised equipment. You need to work with your packaging supplier to ensure product meets market requirements.

You will need to ensure your packing lines provide accuracy together with format, dosage and configuration flexibility for different sizes and formats. This needs to be managed for quality.

Your shelf ready packaging or display packaging should be consistent with your distribution channel and trade requirements. This includes outers and cartons. You need to assess shelf life of product in final packaging. International markets may have specific labeling and shelf life evidence requirements for dietary supplements and cosmetics.

ASK YOURSELF

- Do I have compliant labelling?
- Have I confirmed packaging requirements with trade?
- What is my finished products shelf life?

ACCESS CAPABILITY

FOOD CONSULTANTS

- MCFOODIES
- FOOD INNOVATION NETWORK
- BIOEQUITAS
- ASA
- ANZA/TAPS

MANAGING QUALITY

Focus on quality as means to reduce defect rates and increase yield. This means ensuring that your product meets formulation specifications and ingredient accuracy prior to release.

You need to ensure process control through manufacturing and packaging steps for each production batch. There may be software available to help you.

Manage quality through your contracted relationship with ingredients suppliers through standards.

You will need to follow a food control plan for making and selling food. Need to be able to assess risks and food safety hazards.

Your Quality Assurance should be well documented.

ASK YOURSELF

- What process controls do I have?
- What standards are there with ingredients supplier?

ACCESS CAPABILITY

- FOODINC
- NEW ZEALAND FOOD SAFETY
- FOOD CONSULTANTS

MANAGING QUALITY DIETARY SUPPLEMENTS

Focus on quality as a critical component of product safety and efficacy. Ensuring a robust quality system is in place also means less ingredients and finished product are wasted due to manufacturing non-conformance. Raw materials and finished goods must meet specifications prior to manufacture and at batch release.

You need to ensure process control through manufacturing and packaging steps for each production batch. There may be software available to help you.

Manage quality from the outset through supplier and ingredient qualification and raw material testing.

International markets may have extensive requirements for GMP that are licensed and audited and extend from product design through to distribution and in-market complaints handling.

ASK YOURSELF

- What process controls do I have?
- What standards are there with ingredients supplier?

ACCESS CAPABILITY

- NATURAL HEALTH PRODUCTS NZ
- BIOEQUITAS

LICENSING AND REGISTRATION

If you are manufacturing whole hemp seeds you must have a general licence issued by Medicines Control with **processing into specified hemp products** listed as an activity.

You need to make sure you are using approved cultivar low-THC hemp seeds and record all transactions in the seed register.

For a food or beverage product you need to be registered under the Food Act and make sure the product labelling meets the requirements of the Food Standard whether you are manufacturing from whole or dehulled seeds. You also need to operate a food control plan.

Dietary Supplements manufacturing and labelling must comply with the Dietary Supplement legislation in NZ and the relevant regulations in export markets. Export markets often have more regulation for these products than NZ. Some export markets require individual product registrations and specify GMP manufacturing.

If you are developing a body care product refer to the **Cosmetic Products Group Standard**, which includes lists of chemicals whose use in cosmetics is restricted. You also need to meet labelling and packaging requirements.

ASK YOURSELF

- Do I require a license?
- Have I registered under the Food Act?

ACCESS CAPABILITY

- MINISTRY FOR PRIMARY INDUSTRIES
- NEW ZEALAND FOOD SAFETY
- MINISTRY OF HEALTH
  INDUSTRIAL HEMP LICENSING
- MEDSAFE

BRANDING, SALES AND MARKETING

The BRANDING, SALES and MARKETING capability relates to activities in order to brand, promote and sell your hemp seed derived product. This could be either in New Zealand or overseas, across a range of categories including:

- **Food and beverages:** snacks, beverages (including nutritional), savoury spreads, breakfast cereals, bakery, sauces and seasonings.
- **Dietary Supplements:** capsules, tablets, powders, liquids, shots, elixirs, tinctures, drops, sachets and other oral controlled dosage products.
- **Body care:** Skincare, hair products, soap and bath products, healthcare.

Given the high global production of hemp seed it's likely that margins will be concentrated with those who add value through developing unique products and brands, create proprietary technology, as well as managing key distribution and retail channels to increase market share.

Your product needs to be formulated to uniquely deliver claimed benefits. Decisions on distribution, pricing and level of marketing and promotional activity will ultimately depend on your target market and the changing competitive and category landscape.

WHAT IS NEEDED

- **PRODUCT AND CATEGORY STRATEGY**
- **PROMOTIONAL STRATEGY**
- **REGISTRATION**

PRODUCT AND BRAND STRATEGY

Determine the products and categories you plan to focus your development on, based on your unique value proposition.

Build claims support for your product or category. These could be based on ingredient quality or nutritional aspects of the product (fatty acid composition, protein %), growing method (e.g. organic). There are also a number of category claims that could be made including GMO free, low allergen, vegan. For export markets it will also extend to benefits attributable to the NZ brand and image, including environment and food safety record.

For dietary supplements and body care (cosmetics) health benefit claims can be made provided they are supported by appropriate evidence and are not therapeutic in nature.

Plan how you will innovate and grow over time. This could be from a single product to product range, or multiple products across a range of categories, all meeting distinct consumer or business needs.

Develop your category strategy, which is especially important in retail markets where taking a category management approach can improve shelf position. This should be reinforced in your approach to pricing.

ASK YOURSELF

- What categories and formats am I developing in?
- Do I have a brand strategy?

ACCESS CAPABILITY

- MARKETING ASSOCIATION
- NZ TRADE & ENTERPRISE
- ASA
- ANZA/TAPS

PROMOTIONAL STRATEGY

Your labelling, promotional material and information should emphasise your unique value proposition and claims.

Consider a compelling brand story – especially founder stories as means to reinforce.

Select appropriate media to communicate the benefits of your product or range, increasing using social media. Determine promotional goals, timing, investment and any linked price promotional activity.

You should evaluate how consumers can sample your product through supported trade promotions. This could be through sampling, in store or at a local market. If the finished product is an ingredient this may include cooking demonstration in use.

ASK YOURSELF

- Do I have a promotional strategy?
- What promotional activity am I planning?

ACCESS CAPABILITY

- MARKETING ASSOCIATION
- ASA
- ANZA/TAPS

REGISTRATION

You need to be registered under the Food Act and are only able to sell seeds for retail sale that are hulled and unable to grow.

Your labelling must meet the requirements of the Food Standard. Importantly health claims and nutrition content claims cannot be made about CBD and the cannabis leaf cannot be included on product labelling. It is your responsibility to ensure this happens. This applies to Food and Beverages, Dietary Supplements and Cosmetics (bodycare).

Your promotional materials and information must meet the same requirements, with the same rules also applying to advertising materials or web-content and any social media platforms, influencers and testimonials.

ASK YOURSELF

- Have I registered under the Food Act?
- Is labelling, promotional materials and information compliant?

ACCESS CAPABILITY

- MINISTRY FOR PRIMARY INDUSTRIES
- NEW ZEALAND FOOD SAFETY
- ASA
- ANZA/TAPS

DISTRIBUTION AND RETAIL

The DISTRIBUTION and RETAIL capability relates to activities in order to distribute your hemp seed food product or ingredient for use in food, beverage or body care product. This could be either in New Zealand or overseas, across a range of categories including:

- **Food and beverages:** snacks, beverages (including nutritional), savoury spreads, breakfast cereals, bakery, sauces and seasonings.
- **Dietary Supplements:** capsules, tablets, powders, liquids, shots, elixirs, tinctures, drops, sachets and other oral controlled dosage products
- **Bodycare (Cosmetics):** Skincare, hair products, soap and bath products, healthcare.

A clear distribution strategy includes channel selection and managing channel relationships to increase market share.

WHAT IS NEEDED

- LOCAL MARKET DISTRIBUTION
- INTERNATIONAL MARKET DISTRIBUTION
- REGISTRATION

LOCAL MARKET DISTRIBUTION

Develop and implement your distribution strategies in market, being aware of important channel trends. Consider grocery, specialist stores and online channel sales. For Dietary Supplements and Cosmetics (body care) also consider pharmacy and health food stores and cosmetics stores - both independent and chains.

Establish and maintain relationships with retail trade partners. Includes shelf positioning and trade support activity to support product and category growth.

Evaluate potential for online sales through own brand or corporate website. Alternatively distribute through established e-commerce platforms as an alternative entry point.

ASK YOURSELF

- Do I have a distribution strategy?
- What channel relationships do I have?
- Have I evaluated online channel?

INTERNATIONAL MARKET DISTRIBUTION

You need to know MARKET ACCESS considerations Develop and implement your distribution and pricing strategies in export market, being aware of important channel trends.

Assess retail channel development in target markets given widespread hemp product availability in other developed countries such as Canada, USA, United Kingdom and throughout Europe.

Evaluate emerging channel trends including internet retailing and specialist retailers which may be ideal for launch of new products. This also may reinforce consumer proposition that their hemp product will meet emerging trends, and will be more responsive to these new distribution channels.

Understand what different markets allow in terms of product, distribution, marketing and promotion.

Establish agreements with overseas distributors to support activities to import and distribute within target market. This could include a range of additional services to support your Go to Market activity.

Evaluate potential for distributing through e-commerce platforms which may offer a low risk, low investment mode of market entry.

ASK YOURSELF

- Do I have a distribution strategy?
- What channel relationships do I have?
- Have I evaluated online channel?

ACCESS CAPABILITY

NZ FOREIGN AFFAIRS & TRADE

NZ TRADE & ENTERPRISE

REGISTRATION

You need to be registered under the Food Act if you're transporting and/or storing hemp seed products or foods that contain any hemp seed.

You need to control and check temperature, humidity and ambient conditions.

You or your staff must be able to recall your food or drink, dietary supplement or cosmetic (body care) if there's a problem that makes it unsafe or unsuitable. This could be supplier-led due to an ingredient, input or product, or piece of equipment or packaging you use.

Or it could be led by you. Recall may be at trade level from distributed stores, or consumer level requiring public notification.

ASK YOURSELF

- Have I registered under the Food Act?

ACCESS CAPABILITY

NEW ZEALAND FOOD SAFETY