
**Development of an Industrial Hemp Strategy
for the Province of New Brunswick**

FINAL REPORT

Presented to:
New Brunswick Department of Agriculture, Aquaculture and Fisheries

By:

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EXECUTIVE SUMMARY

The mandate of this project is to outline concrete opportunities for the development of the hemp crop in New Brunswick based on its core assets, established industries, potential partnerships and synergies that define New Brunswick's unique opportunities in a global marketplace.

Market Situation

The first part of the report presents a market scan of the international situation for industrial hemp. In Canada, industrial hemp production has grown steadily since the mid 2000's. In 2017, area in hemp cultivation and production reached a record of nearly 56,657 ha. Most of the production is concentrated in three provinces: Alberta, Manitoba and Saskatchewan respectively producing 32 %, 21 % and 42 % of the country's hemp. In 2018, the value of Canadian exports of hemp products was \$87.5 million compared to a peak of \$147.3 million in 2016 and included grain, oil and cake. This drop is mainly because the South Korean market has replaced Canadian products by Chinese products and an emerging production in some US states.

In the USA, from 1999 onward, a handful of U.S. states have authorized the production of industrial hemp. Until last December, the product had been rendered illegal by federal law for inter-state commerce. The Farm Bill adopted in December 2018 is changing this situation by allowing cannabis varieties with low THC (less than 0.3%) to be treated like any other crop. The United States is currently the largest importer of hemp goods in the world. The hemp market generated over \$820 million in sales in the U.S. in 2017, up from \$680 million in 2016, and is expected to expand to \$1.9 billion by 2022. Current CBD consumers purchase highly concentrated tinctures, edibles and vaporizers with CBD even if the FDA still considers these illegal. The new Farm Bill opens the floodgates to domestic production, economic stimulus, job creation, and opportunities for international trade.

In Europe, hemp cultivation area reached 46,700 ha in 2017 and France is by far Europe's biggest producer with just under 17,000 ha in 2016. The production of grain in France in 2016 was 11,500 tonnes (44% animal feed, 12% oil and 43% food). The fibre production was 25,000 tonnes (57% pulp & paper, 14% bio-composites, 26% insulation and 3% technical textiles). Shivs/hurds (or hemp wood) production was 43,000 tonnes (45% horse bedding, 19% garden mulch, 18% other animal bedding, 16% construction, and 2% others) About a dozen companies are processing hemp for food and many are processing fibre in their facilities for a wide variety of applications like automotive and bio-composites.

China is the largest producer of industrial hemp in the world. Their development plan is to grow 1.3 million ha to produce 2 million tons of fibre to supply the country's textile mills. They have some 500 patents granted on various aspects which is well over half of all patents for hemp worldwide. Australia is entering the market with medicinal cannabis products authorized in November 2016 and production of industrial hemp for food has been legal since September 2017. India is now starting to explore a hemp revival.



EXECUTIVE SUMMARY (cont)

State of the Industry in Canada

In Western Canada, six companies are processing hemp for the food market. The largest one being Manitoba Harvest with sales of US\$56 million and recently acquired by Tilray a major Canadian cannabis company. In fibre processing, various projects have been studied or launched but with very limited success. The main processing facility being the Vegreville pilot plant in Alberta and Emerson Plant Distributors in Manitoba making animal bedding material. In other provinces, there are three established processors in the food sector and they are located in Québec (Aliments Trigone, La Minoterie des Anciens, Neptune Wellness Solutions) and two fibre processors (Nature Fibres and Agrofibrés).

There are about twenty companies and individual breeders in hemp genetics. Research is needed to improve quality and the CBD content. In addition, obtaining intellectual property is essential to maintain a competitive advantage.

Because the production areas has been limited compared to major crops, the equipment sector has not developed to provide specialized machinery for harvesting and post harvesting. This will change with the fast growing expansion of production areas in the US.

In New Brunswick, in 2017, fourteen producers planted a total of 203 hectares of industrial hemp but crop yields in 2017 were extremely variable due to dry conditions and less than optimal crop management. In the fall of 2018, Health Canada changed the regulations and it is now possible to harvest and utilize the entire hemp plant. Consequently, many companies are planning to grow industrial hemp for the extraction of cannabidiol (CBD) from the hemp flower.

Currently, in New Brunswick, five companies or organizations have expressed interest in industrial hemp and four licensed cannabis producers already in place could be part of the hemp sector.

A strong R&D network with at least nine major centres, five key academic institutions, government bodies and three support organizations (ONB, BIONB and ACOA), contribute to the development of the New Brunswick hemp industry. A variety of funding programs and the regulatory and policy framework from Health Canada and the Canadian Food Inspection Agency (CFIA) complete the support.

New Brunswick has several important opportunities to use hemp products as ingredients or as a component with the presence of five major industrial sectors. These sectors are the food and beverages industry; the aquaculture industry with two players in feed supply; the poultry sector for feed providing CFIA approval; the forestry sector where hemp fibre finds various applications and the potato industry where hemp could become a rotation crop if technical and agricultural feasibility confirms that option.

Strengths, Weaknesses, Opportunities and Threats

As outlined in the preceding paragraph, New Brunswick has the advantage of several important strengths: an attractive business environment and the involvement of different support organizations; five hemp processors already in place; a network of about a dozen research centres active in cannabis; four cannabis companies and five major industrial sectors with potential to use every part of the hemp plant. As a result, considerable expertise has developed in hemp cultivation and use. All of this gives New Brunswick a substantial competitive advantage, which should not be lost.



EXECUTIVE SUMMARY (cont)

Strengths, Weaknesses, Opportunities and Threats

The main weaknesses are a still fragile and limited value chain structure; the need for more research on evaluation and development of seed varieties; the lengthy Health Canada regulatory process and the limited number of registered pesticides. In addition, the lack of a quality assurance program, specifications and standards are a constraint to the development of the fibre markets. Also, because the industry is very new it has limited historical background on business and marketing experience and has no provincial industry association. New Brunswick has several market opportunities: a strong demand for CBD in the short and medium terms; an established market for grains and hemp oil and a growing fibre market (but at a slow pace in North America). Future quality standards for fibre will give New Brunswick a competitive edge on export markets due to its port infrastructure. The private and public R&D network can develop genetics and intellectual property protection allowing companies to offer customized products and obtain a market advantage in an emerging industry. All the components to organize an efficient and balanced value chain are in place and this will facilitate the development of new high quality fibres, an organic line of products and create unique branding for the sector to compete internationally. The development of the hemp industry needs to consider and address threats such as the impact of Government regulations on CBD in each market, the access to the US market under the new US Farm Bill and the trade regulations between Canada and the US. The competition on genetics will be intense by start-ups and by multinationals. CBD prices will drop because of increased production but that may not happen before the horizon 2023 -2028. Industrial fibre products will be competing with other natural fibers. Lastly, hemp will have to live with the confusion in public perception about hemp vs marijuana and anticipate how to adapt to climate changes. All the above leads to the definition of a vision, a mission and a proposed strategy.

Vision

To build a new industry based on the high value segments of industrial hemp and contribute to the growth of the New Brunswick economy in the 21st century.

Mission

To develop a vibrant ecosystem around industrial hemp by encouraging collaborations and creating synergies between the growers, the processors, the R&D network, the supporting agencies, the companies that use hemp as ingredients in their products and the public.

Proposed Strategy (2019-2023)

The first step to define the proposed strategy was to rank the potential of nine product categories according to two criteria: competitive advantages of New Brunswick and market opportunities evaluated at present and expected for 2023. This ranking identified five “top drivers”: CBD, high purity CBD, high quality fibre, seeds/genetics, and organic grains. Strategies 1 and 2 are targeting the development of these drivers. The secondary products (grain, fibre, shivs and new cannabinoids) have a potential for additional revenues and two complementary strategies will guide their development as well as provide continued support to the top driver products. These four strategies will be achieved through a set of eight actions shown hereafter, each action being composed of a bundle of activities programmed over the five-year plan period.



EXECUTIVE SUMMARY (cont)

Proposed Strategy (2019-2023) (cont)

Strategy 1: Organize the Industrial Hemp Industry

Action 1: Build the Foundations of the New Brunswick Hemp Industry Cluster with inclusion of First Nations

Action 2: Create an Hemp Industry Development Fund with Focus on the Top Drivers Including Intellectual Property (IP) Protection

Strategy 2: Support the Viability of a Core Group of Processors

Action 3: Provide Technical Assistance to Growers for Development of the Top Drivers Including Training for Food Safety and Good Agricultural Collection Practices (GACP)

Action 4: Secure Markets for the Top Five Drivers Including Monitoring Competitive Market Intelligence

Strategy 3: Maximize the Use of the Whole Plant

Action 5: Develop an Integrated R&D Program on Fibre for Industrial Uses

Action 6: Evaluate the Feasibility for a Pilot Plant for Fibre Decortication

Action 7: Encourage Cooperation and Initiatives to Minimize Hemp Waste

Strategy 4: Maximize the Economic Benefits for the Province

Action 8: Promote Adoption of Hemp-based Products by New Brunswick Businesses Including Branding of the New Brunswick Hemp Cluster

The proposed strategy provides two (2) timetables for the activities, the first one targeting primarily the “top drivers” while the second one is more for the secondary products. The programming of each activity is considered either as intense or based on ad-hoc needs and presented on a quarter by quarter timeline. It also takes into consideration the timing of the growing and harvesting seasons, trade shows, etc. The implementation of the proposed strategy will allow New Brunswick to maintain the present substantial competitive advantage and build a branding of expertise in high quality hemp products.



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INTRODUCTION

Note:

Validity of data: The hemp industry is moving at a high speed and market data in this study were valid during the first quarter of 2019

Mandate Description

The mandate was to propose a strategy outlining concrete opportunities for development of the hemp crop in New Brunswick as related to its core assets, established industries, potential partnerships and synergies defining New Brunswick's unique opportunities in a global marketplace. For New Brunswick, being limited in size and scale, the identification of high-value, technology-based opportunities not common to the traditional commodity market has to be considered of primary interest.

Methodology

Desk Research

The data were collected from government websites and publications, articles from specialized publications, press releases, company Websites, etc.

Consultations and interviews

- Officers from the government of New Brunswick;
- Farmers;
- Directors of the key associations;
- Directors of research centers, universities and education institutions;
- Opinion leader identified in the course of the mandate.



Terminology and Definitions

Hemp seeds: Seed of pedigree status (variety) approved by Health Canada and used for planting.

CBD: Cannabidiol (CBD) is an active compound and one of at least 113 cannabinoids produced by the cannabis plant. It is primarily extracted from the hemp plant. It is used to treat several health conditions such as insomnia, anxiety and pain.

Hemp : *Cannabis* plant and any part of that plant, including the stalk, flower and grain/seed and all derivatives, extracts, cannabinoids, isomers, acids, salts, salts of isomers with no more than 0.3% tetrahydrocannabinol (THC) on a dry weight basis (approved by Health Canada).

Hemp Grain: Harvested hemp grain, whole or processed used as food, feed, ingredient or for the production of cosmetics (not used for planting).

THC: Tetrahydrocannabinol (THC) is the best known cannabinoid produced by the cannabis plant and recognized for its psychoactive property.

Bast Fibre: The fibrous part of the hemp stalk used for the production of ropes, paper, biocomposites, textiles and insulation.

Hurds/Shivs: The woody inner portion of the hemp stalk, broken into pieces and separated from the fibre used for the production of hempcrete, and particle boards or used as bedding material and absorbents.

License: A blanket authorization for cultivation of industrial hemp issued by Health Canada to a specific site where more than one regulated activity may be conducted.

Processor: Organization, company or individual making a transformative change to the hemp plant or hemp plant part following harvest.

Quality: the hemp product meets the established specifications for identity, purity, strength, and composition, and limits on contaminants, and has been manufactured, packaged, labeled, and held under conditions to prevent adulteration.



Section I

MARKET SCAN



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Part 1

Review of the Production or Cultivation of Hemp

In Canada

In the USA

In Europe

In Other Parts of the World

1. Objective and Methodology

Objective :

- To scan the markets in order to identify current trends of the production of and market for hemp-based products globally with an emphasis on value adding, export opportunities, and the development of associated technologies.

Methodology:

The report is structured in two parts:

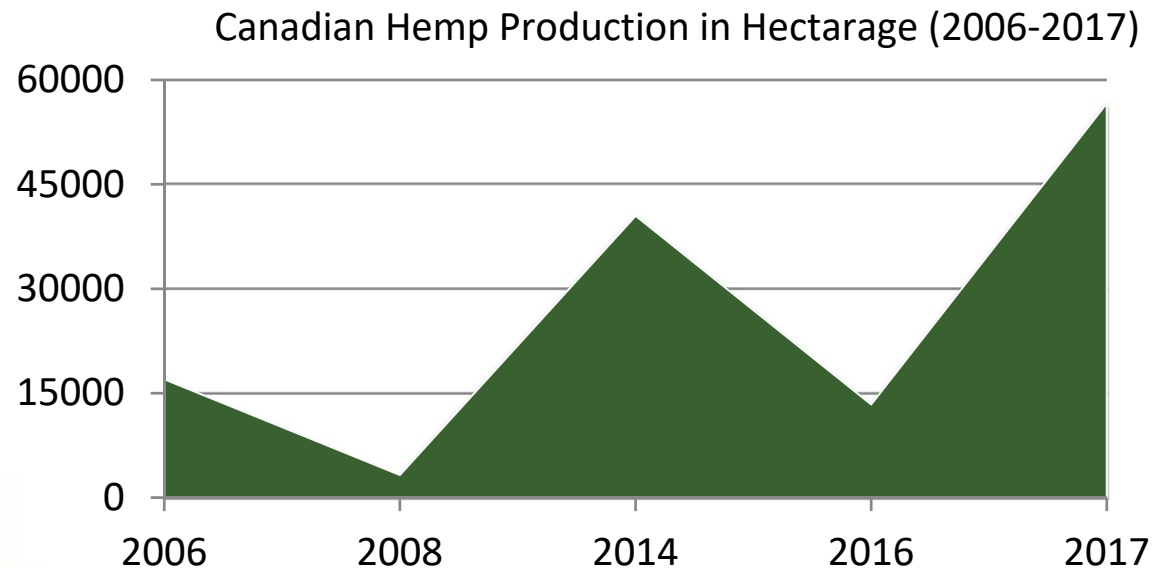
- Part 1: Review of the production or cultivation of hemp
- Part 2: Analysis of the different markets by end-use

The data was collected from government reports, specialized publications, industrial associations, company's websites, etc.

2. Production of Hemp in Canada

2.1 Overview of Current Situation

- Industrial Hemp production in Canada has grown steadily since the mid 2000's.
- In Canada, hectarage has varied a lot since the authorization of its production in 1998.
- In 2006, 16,997 hectares were planted. The number fell to about 3,237.5 hectares in 2008, rising again to a 40,469 hectares in 2014.
- In 2016, the production fell to 13,355 hectares. In 2017, hectarage in hemp cultivation and production rose sharply—reaching a record of nearly 56,657. The downturns were partly due to over production and changes in the export markets.



Source: Hemp an as Agricultural Commodity, Congressional Research Service, June 2018
<https://hempsupporter.com/wp-content/uploads/2018/07/Congressional-Research-Service-Hemp-as-an-Agricultural-Commodity.pdf>



2. Production of Hemp in Canada

2.2 Situation by Surface by Province

- Most of Canada's production is concentrated in three provinces : Alberta, Manitoba and Saskatchewan respectively producing 32 % , 21 % and 42 % of the country's hemp.
- Alberta has nearly doubled its hemp hectarage between 2015 and 2017 while Manitoba has increased by 50%.

Canadian Industrial Hemp surface by province in 2017

Provinces	Hectares	
	2015	2017
Alberta	9,940	18,083
British-Columbia	71	80
Manitoba	8,079	12,085
New-Brunswick	7	203
Nova Scotia	35	78
Ontario	284	474
Prince-Edward-Island	4	52
Quebec	506	2,038
Saskatchewan	15,335	22,760
Total	34,262	55,854

Source: Health Canada <https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/producing-selling-hemp/about-hemp-canada-hemp-industry/statistics-reports-factsheets-hemp.html>



2. Production of Hemp in Canada

2.3 Licenses by Province

- Licenses are issued by Health Canada and the numbers will increase rapidly in the future.
- A license is required to possess, cultivate, sell/provide, process, produce a derivative, import and/or export industrial hemp. It is issued to a specific site where more than one regulated activity may be conducted. A license holder may be granted licenses for multiple activities at multiple sites.

Canadian Industrial Hemp Licenses by Province in 2017

Provinces	Total Licences and Registries	Licenses and Registries for Cultivation	
			% of total licenses
Alberta	480	325	68%
British-Columbia	31	14	45%
Manitoba	379	235	62%
New-Brunswick	33	23	70%
Nova Scotia	6	3	50%
Ontario	83	48	58%
Prince-Edward-Island	14	7	50%
Quebec	286	230	80%
Saskatchewan	518	351	68%
Total	1830	1236	68%

Source: Health Canada <https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/producing-selling-hemp/about-hemp-canada-hemp-industry/statistics-reports-factsheets-hemp.html>



2. Production of Hemp in Canada

2.4 Variety of Cultivars by Province

- In Canada, there are more than 21 cultivars approved for cultivation.
- In 2017, of the 55,854 hectares in production throughout the country, 80% of that area is shared by the top 5 most popular cultivars.

Top 5 Approved Cultivars in Canada

Cultivars	Hectares
FINOLA	18,216
X-59 (Hemp Nut)	10,082
Katani	8,991
Piccolo	4,294
Grandi	3,687
Total (5 cultivars)	45,270

Cultivars selected for production in New Brunswick

Cultivars	Hectares
Anka	173.18
GranMa	24.29
FINOLA	4.04
CFX-1	0.71
CFX-2	0.71
CRS-1	0.4
Total	203.33

Information on selected companies involved in the production of hemp, indoor or outdoor is presented in Part 3 of the report.

2. Production of Hemp in Canada

2.5 Production Cost

In 2018, a Task Force from the University of Washington made a comparison of operating costs to grow hemp in Alberta and Manitoba.

Operating Costs	Manitoba, General (US \$/acre)	Alberta, Irrigated (US \$/acre)	Alberta, Non- Irrigated (US \$/acre)
Seed, Treatment, Fertilizer	\$75.39	\$122.15	\$114.27
Fuel / Utilities	\$13.28	\$5.56	\$15.08
Machinery Operating	\$7.94	\$11.11	\$17.46
Crop Insurance	\$24.54	N/A	N/A
Hail Insurance	\$8.00	N/A	N/A
Other Costs	\$6.15	\$80.17	\$23.02
Land Taxes	\$11.91	N/A	N/A
Labor	\$23.81	\$19.05	\$8.73
Other Variable + Capital Costs	\$51.34 (land investment costs)	\$227.81	\$90.49
Interest on Operating	\$4.51	N/A	N/A
Machinery Investment	\$14.89	N/A	N/A
Machinery Depreciation	\$36.28	\$53.18	\$57.95
Total Production Costs	\$278.04	\$519.03	\$327.00

Source: Task Force report (U. of Washington): A Review of Hemp as a Sustainable Agricultural Commodity, 2018



2. Production of Hemp in Canada

2.5 Production Cost (cont)

A research study from Cornell University studied the economics of production for industrial hemp in 2017 and compare 7 different locations

These tables in 2.5 provide some economic data of selected states or provinces.

Location	Use [§]	Yield per acre (lbs)	Avg price per lb	Production costs	Gross profit margin (gross returns-production costs)	Note
Alberta, Canada ⁵	Seed on dryland : irrigated, respectively.	1,074 : 1,679	\$0.74 for both	\$409/acre, or, \$0.38/lb : \$574/acre, or, \$0.34/lb	\$396/acre, or, \$0.37/lb : \$748/acre, or, \$0.45/lb	NOTE: Figures are in Canadian dollars. Production data collected from 10 farms in 2015. Numbers are weighted averages. Author's note significant variation between individual farms.
Manitoba, Canada ⁵	Seed	575	\$0.68	\$392.61/ac	(\$1.61)/ac	NOTE: Figures are in Canadian dollars
Ontario, Canada ⁷	Not stated	1,100 : 800	\$0.60 : \$0.88	\$487/ac : \$377/ac	\$173/ac : \$327/ac	NOTE: Figures are in Canadian dollars. Figures represent conventional : organic respectively. Date of source is unknown. Yield and avg price/lb were reported in tons and converted to lbs by authors of this white paper. Conversion of 2,000 lbs/tn used.
Kentucky ⁸	Seed : fiber respectively	1,000 : 4 ton/dry matter/acre	\$0.68/lb : \$0.065/lb			Data was verbally provided through phone interview with Dr. David Williams, University of Kentucky. No published reports were identified.
Vermont ⁹	Not clearly stated	812				Noted great variance in yields, dependent on planting dates. Earlier plantings resulted in higher yields. Four planting dates between 5/26/16-6/17/16, with respective yield range of 1,850-552 lbs/ac.
Eaton, NY ¹⁰	Seed	850				Hurds were sold to a NYS based building materials company. Took avg based on stated yield of 800-900 lbs/acre
North Dakota	Grain : fiber respectively	1,110 : 5,134 ¹¹	\$1.00 (all grain product went to oil seed company) ¹³	\$366/ac (avg of 4 farms in 2016) ¹²	\$733/ac (avg of 3 farms in 2016) ¹²	Yield results are for Canadian and Finland industrial hemp cultivars. Note significant variance between cultivars. Also evaluated, but not listed in this table, were French and Australian cultivars. 2015 data reported in averages. Price/lb, production costs and gross profit margin are from a separate source than yield data.

2. Production of Hemp in Canada

2.6 Trade Situation and Trends

- Over the last five years, exports of hemp products almost doubled compared to 2014 but with a significant drop compared to the 2016 peak mainly because of a shift on the South Korean market to Chinese products.
- Hemp seeds are the main component of these exports and represent 2/3 of total exports in 2018.

Value of Hemp Exports from Canada (\$Can) 2014-2018

Product	HS code	2014	2015	2016	2017	2018
Hemp Seeds , whether or not broken	12079910	\$32,483,037	\$72,373,115	\$124,577,837	\$64,679,707	\$57,104,585
Hemp oil and its fractions, whether or not refined but not chemically mod	15159020	\$3,769,000	\$6,559,118	\$8,116,326	\$11,348,933	\$16,359,309
Oil-cake & other solid residues, of hemp seed, whether or not ground or pelleted	23069010	\$11,565,775	\$23,521,679	\$14,453,272	\$17,467,065	\$14,290,229
True hemp fibre (Cannabis sativa L.), raw or retted	53021000	\$5,231	\$8,989	\$18,135	\$351,641	\$3,829
True hemp fibre, otherwise processed but not spun; tow and waste of true hemp	53029000	\$92,199	\$127,950	\$119,251	\$164,616	\$81,011
True Hemp Yarn	53082000	\$9,011	\$6,323	\$2,886	\$2,683	\$11,257
TOTAL		\$47,924,253	\$102,597,174	\$147,287,707	\$94,014,719	\$87,550,220

2. Production of Hemp in Canada

2.6 Trade Situation and Trends (cont)

- Canadian hemp exports are primarily seeds, oil and oil-cake.
- The U.S. imports of hemp seeds were USM\$ 39.9 in 2017 and USM\$ 36.6 for 2018 (Jan-Oct)

Hts Num (value in 1000 US Dollars)		Year 2017	Ytd 2017	Ytd 2018
Hemp seeds, whether or not broken	1207.99.0320	39,875.8	32,856.78	36,613.26
True hemp, raw or processed but not spun; tow and waste of true hemp, true hemp, raw or retted	5302.10.0000	6.53	6.53	2.93

Source Dataweb.usitc.gov

- These import values (if converted in Canadian dollars) indicates that most the US imports were from Canada.
- With the adoption of the Farm Bill in December 2018, it can be anticipated that US production will increase rapidly and will replace some of the Canadian imports.
- For true hemp the primary destination is Germany exports with over 90 % of the \$351,641 exported in 2017.
- Alberta, British-Columbia, Ontario and Quebec were the only four provinces to export True Hemp products in 2017 with Alberta exporting close to 90 % of the country's total True Hemp destined for exportation.

2. Production of Hemp in Canada

2.7 Perspectives for Hemp Production in Canada

- Based on the review of various sources some perspectives can be identified.
- The export market for hemp seeds, oil and oil cake to the US will probably decrease over the coming years.
- China has started to export hemp seeds to the US and therefore increasing the competition for Canadian suppliers.
- Finding new export markets to compensate the losses in the US market will take time and efforts but Canada has a significant experience in international markets with pulses which could contribute to the opening of new opportunities.
- The fast growing demand for CBD will increase the demand for indoor production and will see a shift in cultivars grown outside.
- The demand for fiber will not be able to absorb the increased supply due to the limited number of economically viable industrial markets.
- The situation for hemp is evolving rapidly and the trade will change.

3. Production of Hemp in the USA

3.1 Overview of Present Situation

- From 1999 onward, a handful of U.S. states have authorized the production of industrial hemp. Until now, the product had been rendered illegal by federal law.
- Still, as many as 11 states have seen hemp production, many of them in the recent years in anticipation of legislative changes.
- The Farm Bill adopted in December 2018 is changing this profile by allowing cannabis varieties with low THC (less than 0.3%) to be treated like any other crop.
- The United States is currently the largest importer of hemp goods in the world. The hemp market generated over \$820 million in sales in the U.S. in 2017, up from \$680 million in 2016, and is expected to expand to \$1.9 billion by 2022. Current CBD consumers purchase highly concentrated tinctures, edibles and vaporizers with CBD even if the FDA still considers illegal.
- Just below 10,000 acres of hemp were cultivated in the U.S. under agricultural pilot and other programs in 2016, and that number more than doubled to just below 26,000 acres in 2017.
- Using available data for 2018, the Hemp Industries Association estimates there is an increase of 1,200 licensed U.S. hemp farmers operating on over 40,000 acres, along with hundreds of processors across the nation.
- The new Farm Bill opens the floodgates to domestic production, economic stimulus, job creation, and opportunities for international trade.

Source: Hemp Industry Daily . 2018 *Farm Bill: What's next for Hemp?* . 2018. https://hempindustrydaily.com/wp-content/uploads/2019/01/hemp_industry_daily_farm_bill_report_2019.pdf

<https://www.thehia.org/HIAhemppressreleases/6968011>



3. Production of Hemp in the USA

3.2 Situation by States

State	Hectarage in 2016	Hectarage in 2017
Colorado	2,396	4,002
Hawaii	0,3	0
Kentucky	1,022	1,295
Maine	0,3	12
Minnesota	20	487
Montana	0	219
Nevada	87	176
New York	12	809
North Carolina	0	864
North Dakota	28	1,222
Oregon	202	1,214
Pennsylvania	0	14
Tennessee	91	53
Vermont	73	121
Virginia	15	31
Washington	0	75
West Virginia	4	12
Total	3,953	10,610

Source: Hemp Industry Daily . 2018 *Farm Bill: What's next for Hemp ?* . 2018.
https://hempindustrydaily.com/wp-content/uploads/2019/01/hemp_industry_daily_farm_bill_report_2019.pdf



3. Production of Hemp in the USA

3.2 Situation by States (cont)

- **Colorado**

Colorado started production of hemp in 2012 and has now the biggest number of licensed growers in the U.S. with 386, cultivating a total of 4,873 outdoor hectares and 218 322 square meters in greenhouses.

Products allowed: Flower, Seed, Fibre

- **Kentucky**

With 209 licensed growers and 43 licensed processors for a 5,180 hectares licensed cultivation space, Kentucky aims to replace its Tobacco industry with hemp. Hemp production in Kentucky was authorized in 2013 and is supported by the Tobacco Masters Settlement Fund.

Products allowed: Flower, Seed, Fibre

- **Minnesota**

With 35 licensed growers, hemp production in Minnesota has grown from 16 hectares in 2016 to 487 hectares in 2017.

Products allowed: not specified

- **Oregon**

Oregon began licensing hemp growers in 2015 . The state now has 233 licensed growers, 170 licensed processors and 119 licensed seed producers. That being said, they only possess 1,1416 hectares of licensed cultivation space.

Products allowed: CBD extraction, Seed, Fibre

3. Production of Hemp in the USA

3.2 Situation by States (cont)

- **North Dakota**

North Dakota legalized Hemp production in 1999 and licensed its first private growers in 2016. North Dakota now possesses 35 licensed growers and one licensed processor for a total licensed cultivation space of 1,256 hectares. The government helps growers acquire certified seeds from Canada.

Products allowed: Seed, Fibre

- **New York**

New York has 21 licensed growers and 7 licensed processors for 809 hectares of licensed cultivation space. The state authorized hemp growing in 2015 and removed a 10-grower limit in 2017.

Products allowed: CBD extraction, Seed , Greens, Fibre

- **North Carolina**

Hemp aims to replace the tobacco industry and to carry on the textile industry. NC has 97 licensed growers and 19 licensed processors for 781 hectares of outdoors space and 14 771 square meters of indoor greenhouse space.

Products allowed: CBD extraction, Seed , Fibre

- **Tennessee**

Tennessee has a small production compared to other states considering that only 20% of its 290 outdoor licensed hectares where cultivated by its 79 licensed growers .

Products allowed : CBD extraction, Seed, Fibre

3. Production of Hemp in the USA

3.2 Situation by States (cont)

- **Vermont**

Since authorizing hemp growing in 2013, laws surrounding production and licensing in Vermont has become very loose. Their 90 licensed growers have access to quality seed producers like Canada and Europe. That said, they only have 227 outdoor hectares of cultivation space.

Products allowed : not specified

- **Nevada**

Nevada authorized hemp production in 2016. It now possesses 23 licensed growers cultivating 198 outdoor acres and 1,595 square meters greenhouse space.

Products allowed: Flower, Seed, Fibre

- **Pennsylvania, Arkansas, South Carolina, Virginia, Washington State and Wisconsin** are expected to invest in hemp production programs, be it for industrial hemp or CBD extraction/flower production.

- **California**

Although the state of California does not issue licenses, 68,000 growers have been registered to local authorities. Still, California is expected to move forward with hemp production and claims to be the U.S. biggest grower

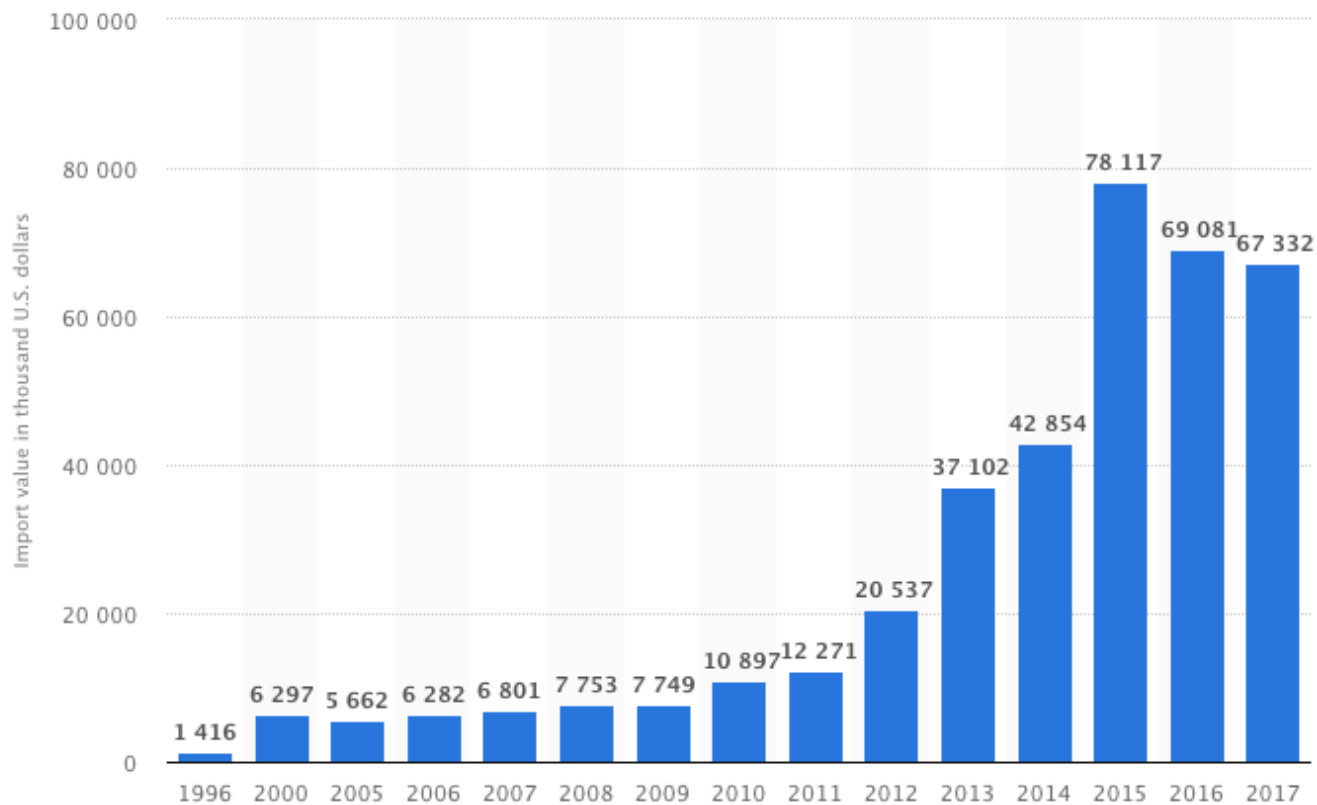
The California Industrial Hemp Farming Act signed in 2017 authorized the production of industrial Hemp.

3. Production of Hemp in the USA

3.3 Trade Situation and Trends

The United States are the biggest importers of hemp products around the world with 67 million dollars worth of imports. However, trends show a decline in imports from previous years, mainly due to the emerging local industry for legal industrial hemp.

U.S. Total Hemp Imports 1996 - 2017



Source :Hemp an as Agricultural Commodity, Congressional Research Service, June 2018
<https://hempsupporter.com/wp-content/uploads/2018/07/Congressional-Research-Service-Hemp-as-an-Agricultural-Commodity.pdf>



3. Production of Hemp in the USA

3.3 Trade Situation and Trends (cont)

With the Farm Bill 2018, the level of imports will decrease in the future.

Hemp Imports by Products 1996 - 2017

	Units	1996	2000	2005	2010	2013	2014	2015	2016	2017
Hemp Seeds (HS 1207990320)	\$1000	—	—	271	5,125	26,942	29,326	54,191	51,018	42,897
Hemp Oil and Fractions (HS 1515908010)	\$1000	—	2,822	3,027	1,833	2,264	3,446	4,836	6,142	7,603
Hemp Seed Oilcake and Solids (HS 2306900130)	\$1000	—	—	—	2,369	6,279	8,159	16,281	8,620	11,494
True Hemp, raw/proc. net spun (HS 5302)	\$1000	100	577	228	94	78	114	292	690	780
True Hemp Yarn (HS 5308200000)	\$1000	25	640	904	296	482	909	1,497	1,867	2,739
True Hemp Woven Fabrics (HS 5311004010)	\$1000	1,291	2,258	1,232	1,180	1,057	900	1,020	744	1,819
Total		1,416	6,297	5,662	10,897	37,102	42,854	78,117	69,081	67,332

Source : Hemp as an Agricultural Commodity, Congressional Research Service, June 2018
<https://hempsupporter.com/wp-content/uploads/2018/07/Congressional-Research-Service-Hemp-as-an-Agricultural-Commodity.pdf>



3. Production of Hemp in the USA

3.4 Barriers to Growth Hemp in the USA

Based on a review of literature and industry sources some observations can be made:

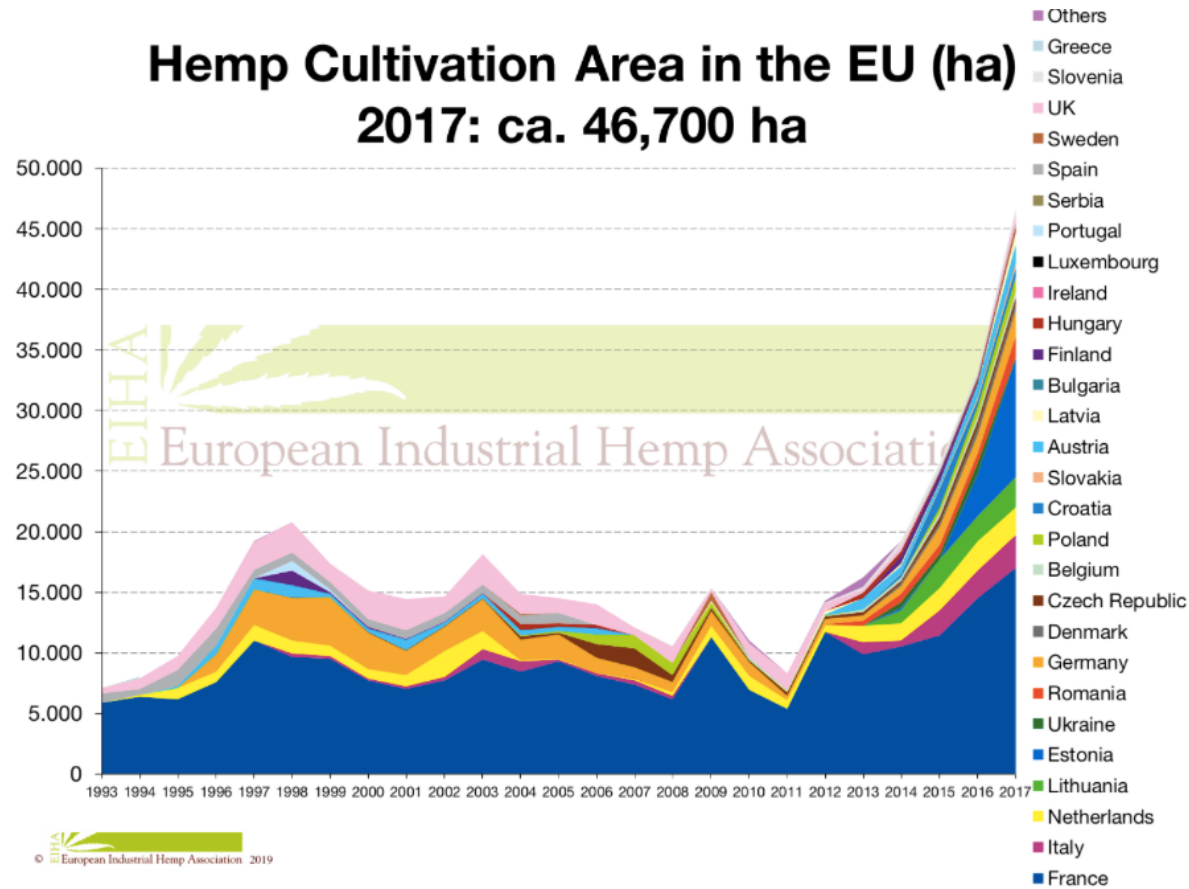
- The supply chain which is needed to be competitive with global markets is lacking.
- Specialized harvesting equipment for farming and for processing will be required.
- The legality to transport hemp between states is still forbidden and it will limit the exchange between producers and processors.
- There will be a strong demand for cultivars in the different states for a large variety of cultivation conditions (soil, water, fertilizers, etc.) to support the development of hemp farming.
- the Hemp production will increase rapidly for the medical and recreational markets and substitute the imports.



4. Production of Hemp in Europe

4.1 Situation by Country

In 2016 European hemp hectareage grew by 20,000 acres reaching 81,500 acres , a growth rate of 32% for European hemp cultivation. In 2017 , it reached 115 398 acres or 46,700 ha. France is by far Europe's biggest producer with just under 17,000 ha in 2016. Estonia has produced 3,500 in 2017. The Netherlands, Russia, Italy and Lithuania are following with nearly a 10th of France's production.



4. Production of Hemp in Europe

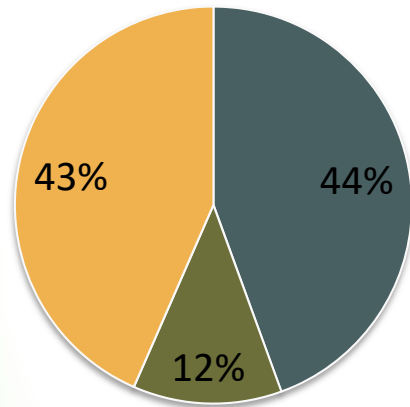
4.2 Overview of Hemp Production in Europe

European Hemp production reported in 2016 based on the 2013 harvest:

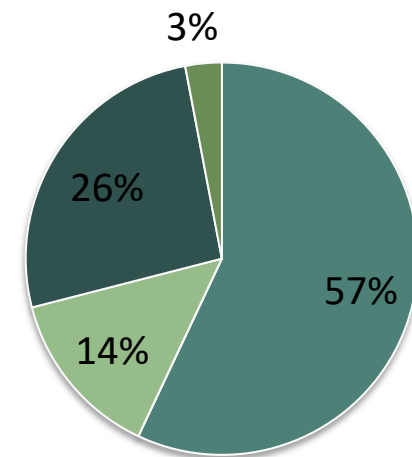
Total Seed Production: 11,500 metric tonnes

Total Fibre Production : 25,000 tonnes

■ As Feed ■ For Oil ■ As Food

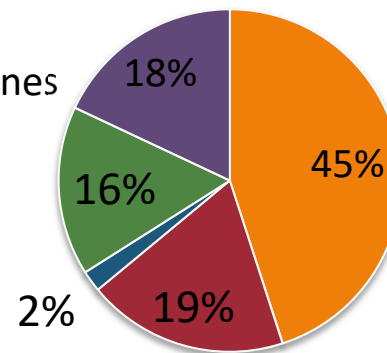


■ Pulp & Paper
■ Bio-composites
■ Insulation
■ Technical Textiles



Total Shiv Production: 43, 000 tonnes

■ Horse Bedding
■ Garden Mulch
■ Other
■ Construction



4. Production of Hemp in Europe

4.2 Overview of Hemp Production in Europe (cont)

From the last major survey in 2013 the production was as follows:

Products	Tonnes	
Cultivation	15,700	Cultivation reached 33,000 ha in 2016 and 46,700 ha in 2017 mainly for seeds
Hemp straw	85,000	Only processed in random non-aligned technical fibre
Fibre	25,000	Mainly used for speciality pulp and paper, insulation material and automotive bio-composites
Shivs	43,000	Horse bedding material and increased use with lime in construction
Dust	13,000	
Seeds and flowers	11,740	Plus 10,000 tonnes of seeds imported from China
Seeds	11,500	60% human food and 40% for animal feed (mainly for Koi Carp)
Flowers and leaves	240	Extraction of CBD for medical applications, food supplement and oil for food and beverages

Hemp is cultivated in Europe on non-organic farms without the use of any agrochemical products.

5. Production in Other Parts of The World

5.1 China

- China is considered to have the biggest hemp growing fields in the world. One province alone (Heilongjiang) has more than 30,000 hectares which is more than twice the area in Canada in 2016.
- Their development plan is to plant 1.3 million ha to produce 2 million tons of fiber to feed the country's textile mills.
- In recent years, China exported about 2 million meters of hemp textile annually primarily to nearby export markets: Japan, Korea, India and Australia.
- China is also developing other markets such as hemp oil-based cosmetics, hemp fiber-based composites for the auto and construction industries.
- Significant efforts are invested in research and development to refine production of fibers, develop more efficient machinery to replace hand sowing, harvesting and decortications.
- The cultivars and cultivation practices to maximize yields aims to improve hemp strains and seeds.
- Some 500 patents have been granted on various aspects: plants, processing, textile, food, oil, paper manufacturing, medicine, etc. This number of patents is well over half of all patents for hemp worldwide.

5. Production in the Rest of the World

5.2 Australia and India

Australia

- Medicinal cannabis products were authorized in November 2016 and production of industrial hemp for in food is legal since September 2017.
- Farmers are considering new crop as a potential for local and export markets but are at the trial stage in understanding the farming conditions (seeds, water, fertilization, etc.).

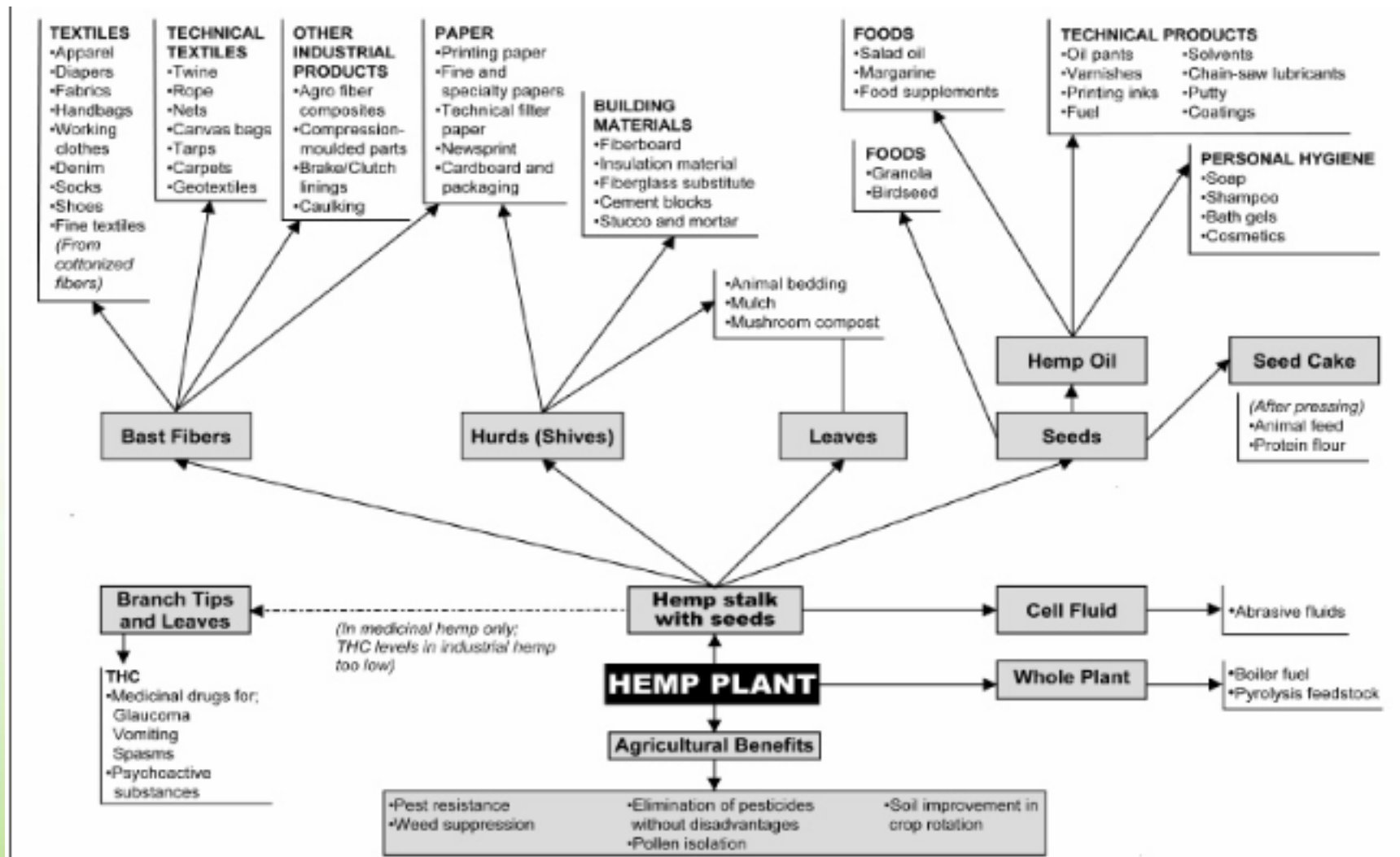
India

- Hemp has been banned for more than 50 years but the country is starting to explore a hemp revival.
- Research plans are underway to test 20 strains of medical cannabis and low THC varieties.

Part 2
Markets for Hemp-based Products
Identification of Hemp Products

6. Markets for Hemp-based Products

6.1 Identification of Hemp-based Products



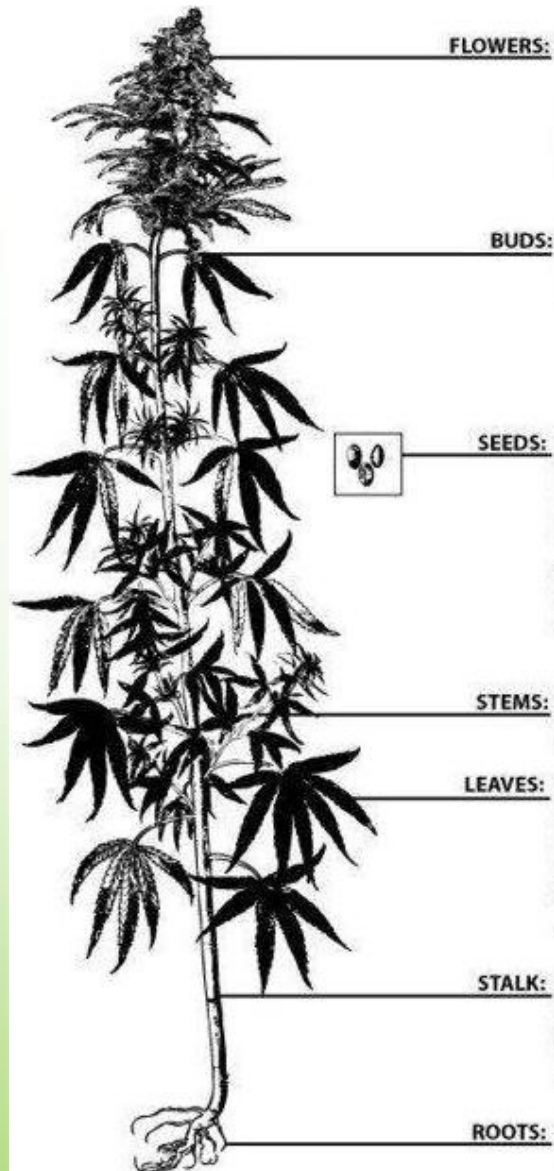
Source: Industrial Hemp Association of Tasmania, <http://www.ihat.org.au/>.

Nearly 25, 000 products are derived from industrial hemp.



6. Markets for Hemp-based Products

6.1 Identification of Hemp-based Products (cont)



The flowers : The flower produces trichrome glands that are responsible for the production of cannabinoids or cannabis.

The seeds : Seeds are rich in oils and proteins . Although hemp is not grown specifically for the purposes of oil production, seeds and oil are mainly used or transformed as foods, for human or animal consumption.

The stem/stalk : The principal products of hemp are derived from the stem which demonstrates two tissue zones: a central woody core responsible for the production of shivs, and an external epidermis, or fibrous bark . They are used as textiles, building materials, paper, animal bedding and more.

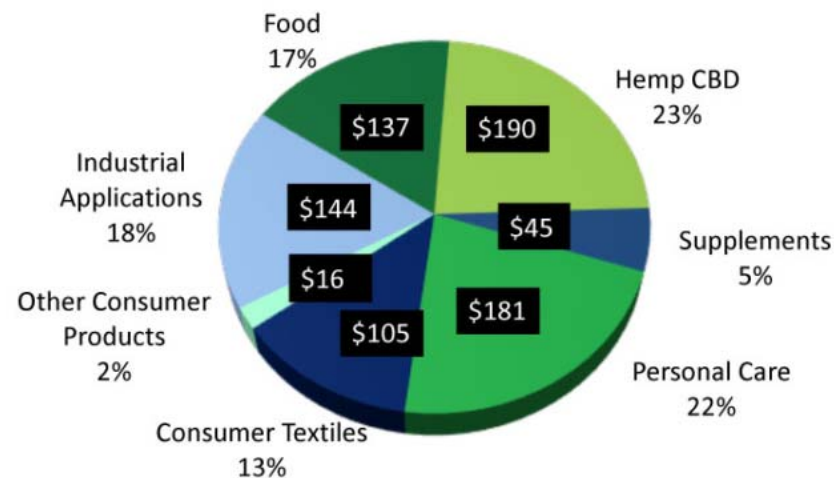
Sources: Leonhart Fuchs, "Das Kräuterbuch," 1543; Otto Wilhelm Thomé, "Flora von Deutschland, Österreich und der Schweiz," 1885; Flickr user Bob Doran shared with a Creative Commons attribution license; Kevin Bonsor for Discovery Health, "How Marijuana Works"

6. Markets for Hemp-based Products

6.2 Overview of the US Market in 2017

- In the US market only, total sales for hemp products (at retail prices) in 2017 were estimated at \$820 million,
- \$190 million were for Hemp-Derived CBD products,
- \$181 million were for personal care products and \$137 million were for hemp food products.
- Food sales were led by the Snack Food category and Industrial Product sales were led by the Automotive category.

\$820 Million U.S. Hemp-Based Product Sales by Category in 2017



Source: *Hemp Business Journal* estimates (\$mil., consumer sales)

6. Markets for Hemp-based Products

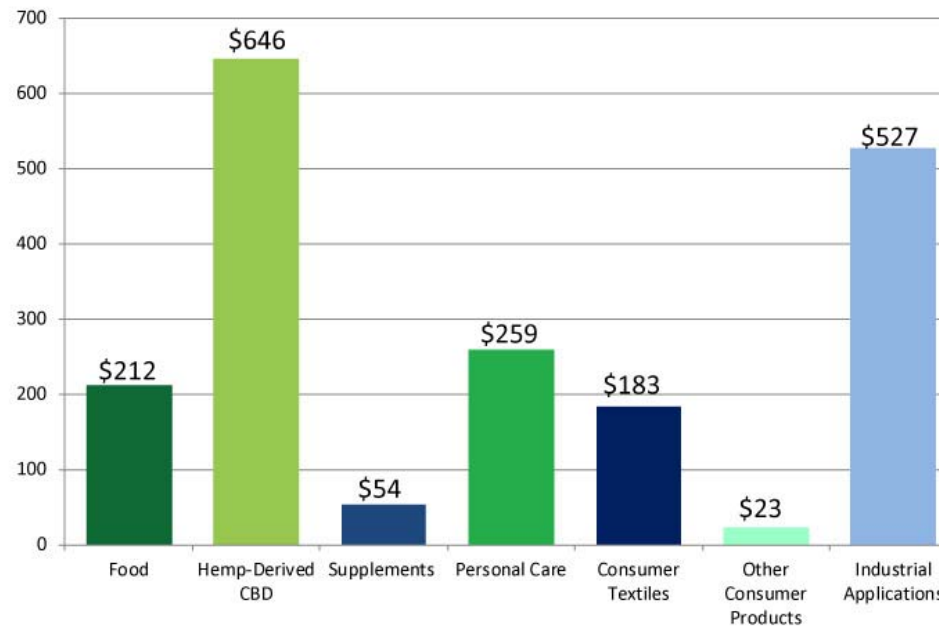
6.3 Overview of Future Trends in the USA

Based on *Hemp Business Journal*...

The U.S. hemp industry is poised to reach a \$1 billion dollar market in 2022:

- Hemp-derived CBD will grow from \$190mm to \$646mm or 240%;
- Food will grow from \$137mm to \$212mm or 55%;
- Personal care will grow from \$181mm to \$259mm or 43%;
- Industrial products will grow from \$144mm to \$524mm or 264%.

\$1.9 Billion U.S. Hemp-Based Product Sales by Category in 2022e



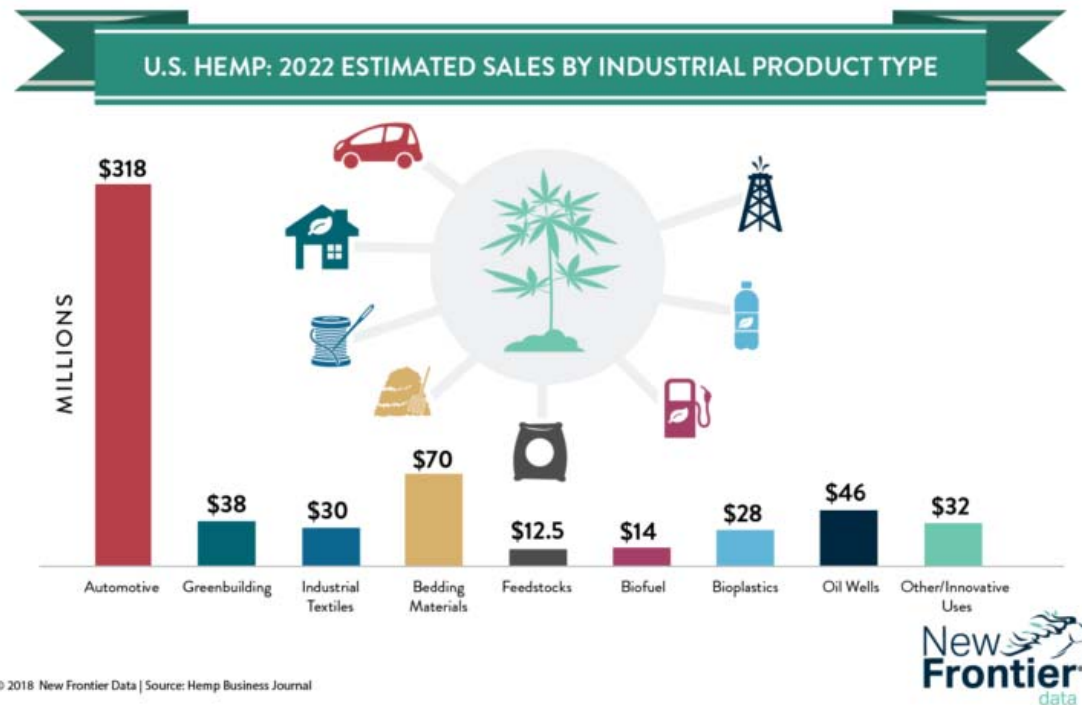
Source: *Hemp Business Journal* estimates (\$ mil., consumer sales)



6. Markets for Hemp-based Products

6.3 Overview of Future Trends in the USA (cont)

- According to Hemp Business Journal (HBJ), the potential for hemp in bioplastics is important because it is biodegradable, uses fewer resources to cultivate, and contains cellulose concentrations (65%-70%).
- While in 2017, HBJ estimated that hemp bioplastics would generate approximately \$7-10 million in sales by 2022. Now, in 2018, HBJ's revised estimates are now projecting hemp bioplastics as on track to reach \$28 million in three years.



6. Markets for Hemp-based Products

6.4 Food Uses and Markets

Uses

- In food, hemp is used because of a unique nutritional composition : a balanced fatty acid spectrum, Omega–3 and 6 and amino acids, including several higher fatty acids which some people may not generate in sufficient quantities . They also contain considerable amounts of vitamin E.
- In food, hemp can be used in many food and beverages such as snacks, smoothies, baked goods, nutritional bars, granolas and cookies.
- Hemp seeds can be added to salads, desserts, yogurts, cereals and bread.
- Oil is mainly used in skin care products for healing and massage. Other uses include paints, lubricants, fuel and plastics .
- The hemp cake (which is the remains of the seeds once it has been through the oil press) can be used as animal feed, processed into protein powder and/or flour, turned into plant fertilizer, in bait and much more.
- Protein Powder offers a vegan alternative to dairy based protein powders.

<https://hemptoday.net/hemp-food-surges-us-market/>

Hemp : Industrial Production and Uses . Chapter 16

Statista: Organic food market in Canada- Statistics & Facts

<http://eiha.org/media/2016/05/16-05-25-MultiHemp-poster-MC.pdf>



6. Markets for Hemp-based Products

6.4 Food Uses and Markets (cont)

Market Overview by Product and by Region

Product /Market	North America	Europe
Hemp (Shelled Hearts, Hemp Hearts)	All seeds were imported in 2017 for a value of US\$ 43 M	22,000 tonnes in 2016 Strong growth for CBD market
Hemp Seeds derivatives Dairy Alternatives : Hemp Milk	Limited volume	Limited volume
Hemp Protein Powder	Limited volume Imports of cake oil were US\$ 11.5 M in 2017, part of it being processed in powder	Limited volume
Hemp Flour	Probably limited volume	Limited volume
Hemp Oil	Imports in 2017 were US\$ 7.6 M. At retail market (worldwide) was US\$ 80.7M in 2017; forecast 2026: US\$ 1,254M	2 % of Europe Hemp production was directed towards hemp oil production.

6. Markets for Hemp-based Products

6.5 Body Care Products Markets

Uses

Products intended for this market range from:

- Vitamins and supplements
- Creams and Soaps
- Drops and essential oils

The interest for hemp in these products is the nutritional benefits and its Omega rich profile.

Markets

- In the US, in 2016, the market for body care products was estimated at US\$ 165M. Example is *The Body Shop* which offers a range of hemp products. However more mainstream names begin to chat about the benefits of the plant — Rihanna, Sarah Silverman, Whoopi Goldberg, Susan Sarandon and many more celebs are fans in skincare.
- In Europe, the body care products are a negligible part of the uses intended for conventional hemp. But with research and information towards CBD always increasing, a broader public is aware of the benefits of CBD and market will increase

6. Markets for Hemp-based Products

6.6 Medicinal and Recreational Markets

Uses

- **Dried Flower:** smokable marijuana products, also known as flower or bud product, represent the traditional source of revenue for industry operators, accounting for an estimated 30.9% of the industry's total revenue in 2018.
- **Concentrates :** Cannabis concentrates represent the largest product category for industry operators, and this segment includes any product created by an extraction process. Some of these products include : Hash, Butane Hash oil , Liquid concentrates for vaporization or even edibles. 50 % of the market's revenue in 2018.

Markets

The market for medicinal and health-oriented products and services in North America is experiencing an upward growing trend with projected growth of US\$281 billion from 2018-2022. CBD derived from cannabis is expected to take an important place in this market due to its therapeutic uses. Cannabis is expected to enter the food and drinks market as an alternative source of inhibition to alcohol.

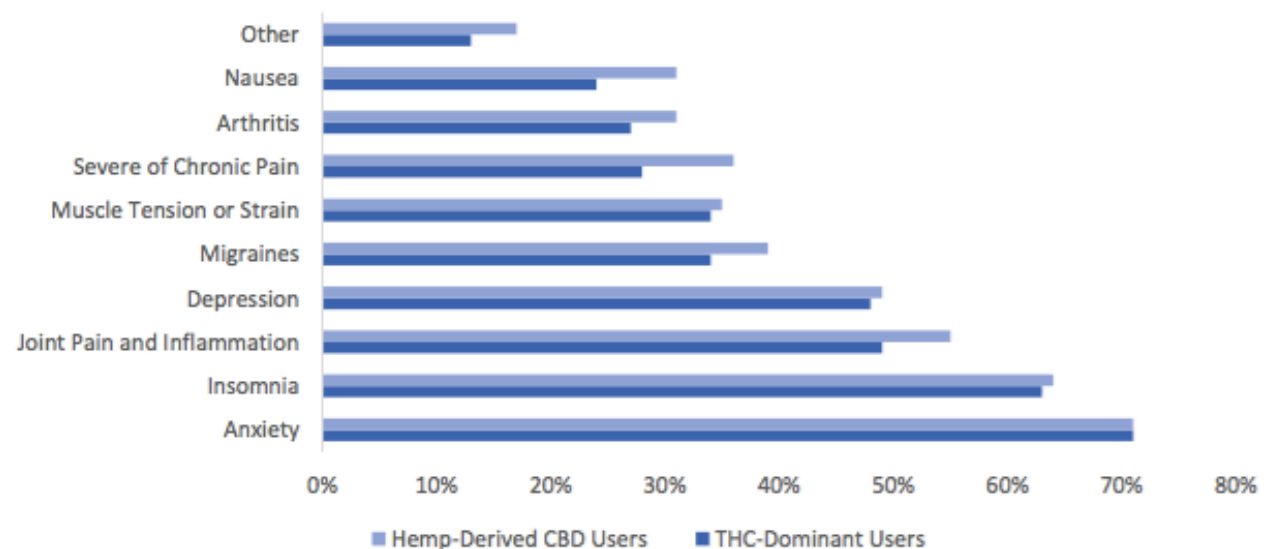
6. Markets for Hemp-based Products

6.6 Medicinal and Recreational Markets (cont)

Medicinal Uses for CBD and THC

- **Use as a therapeutic agent:** claimed to be a helpful treatment for nausea, vomiting, asthma, glaucoma, epilepsy, anorexia in AIDS patients and treatment for painful conditions.
- **Treatment of Neurological Pathology :** It is probably in neurology that cannabinoids are likely to prove most useful i.e. :
 - Multiple Sclerosis : Studies point to the treatment's efficacy in pain management, reducing spasticity, muscular rigidity and trembling,
 - Anorexia : THC exerts a powerful appetite stimulation. Ineffective for eating disorder but helpful for cancer or AIDS patients
 - Epilepsy
 - Parkinson's disease

Most common conditions to be treated with CBD



6. Markets for Hemp-based Products

6.6 Medicinal and Recreational Markets (cont)

Cannabis market growth in Canada

Year	Revenue million \$can	Growth %
2013	19.8	1,064.7
2014	45.1	127.8
2015	107.1	137.5
2016	256.9	139.9
2017	434.4	69.1
2018	916.6	111.0
2019	1,543.1	68.4
2020	2,384.7	54.5
2021	3,600.6	51.0
2022	5,330.4	48.0
2023	7,832.2	46.9
2024	11,477.6	46.5

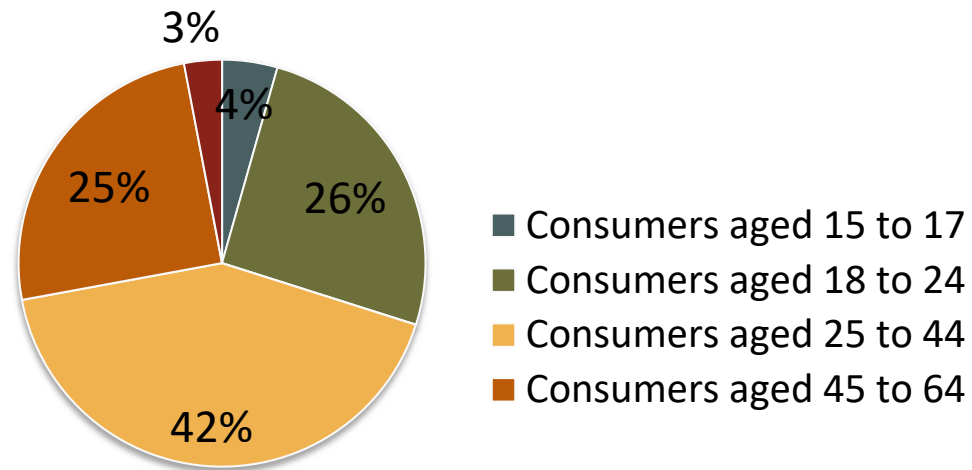
The legalization of the recreational cannabis market under the Cannabis Act opens the hemp industry to growth opportunities.

6. Markets for Hemp-based Products

6.6 Medicinal and Recreational Markets (cont)

Consumer profile in Canada

The market currently worth 916,6 million can\$



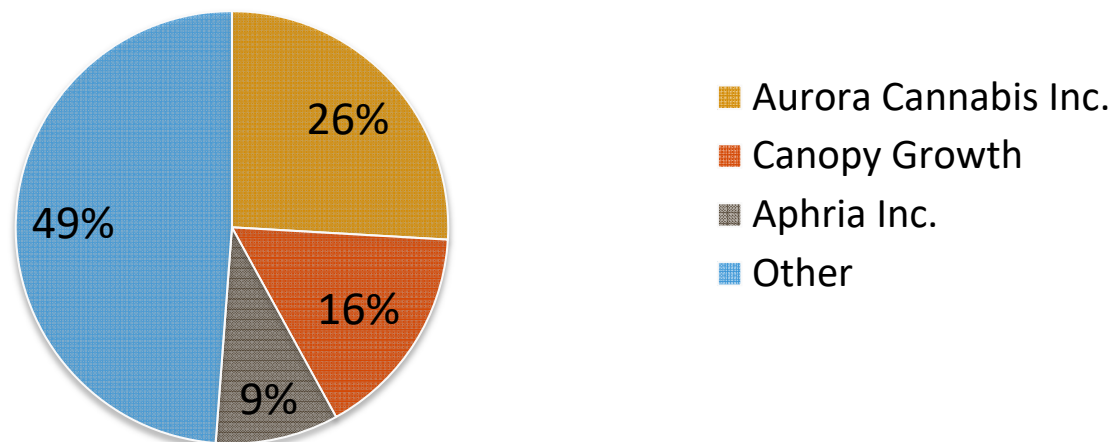
Trade Situation

The Cannabis Production industry in Canada does not participate in international trade. Under the Controlled Drug and Substances Act, medical marijuana cannot legally be transported across Canada's international borders. Some companies are certified to export medical cannabis products to particular markets such as Europe and Australia.

6. Markets for Hemp-based Products

6.6 Medicinal and Recreational Markets (cont)

The Canadian Market revolves around 3 major companies : Aurora, Canopy Growth and Aphria.



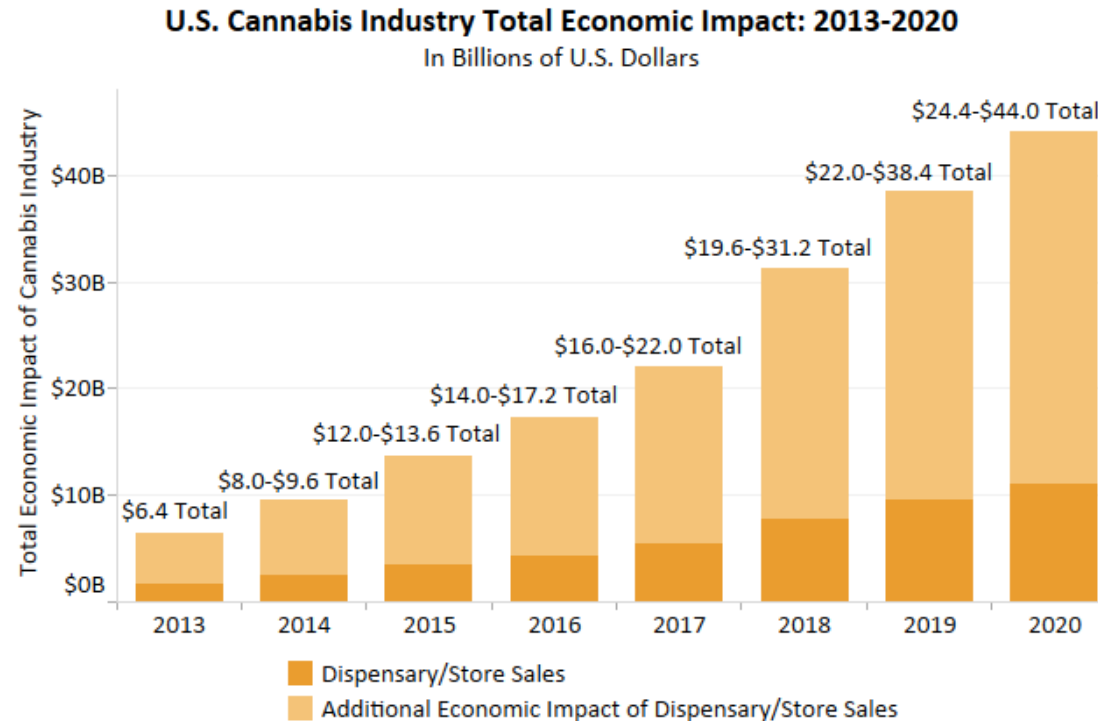
Canopy Growth announced in 2018 a \$40 million investment by Canopy Growth into the Company's Fredericton-based production, creating 136 new jobs in New-Brunswick over the next six years.

As of March 15th, 2019, Health Canada has licensed 159 organizations (license holders) which are cultivators, processors and sellers.

6. Markets for Hemp-based Products

6.6 Medicinal and Recreational Markets (cont)

As legalization of marijuana spreads around the U.S., the legal marijuana market is growing accordingly. The U.S. dispensary sales of legal cannabis grew 74 percent in 2014 to \$2.7 billion, up from \$1.5 billion in 2013.



Taking a look at the U.S. Cannabis industry is insightful, showing opportunities for product development and consumer behavior. That being said, strict law prohibit the importation of any kind of cannabinoid or CBD extract.

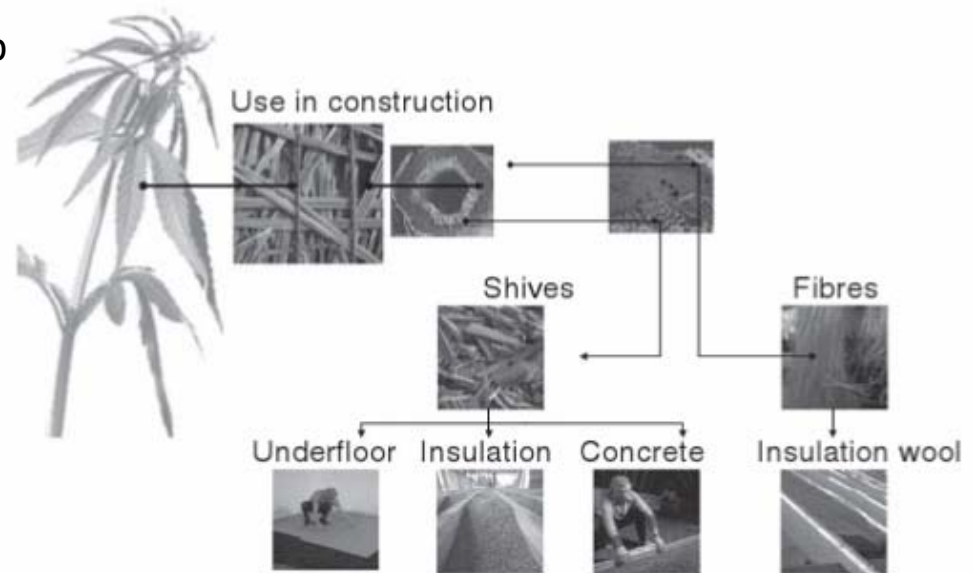
Source: https://www.huffingtonpost.ca/entry/marijuana-industry-fastest-growing_n_6540166?ec_carp=4953778044247489386
<https://mjbizdaily.com/exclusive-u-s-marijuana-industrys-economic-impact-hit-44b-2020/>



6. Markets for Hemp-based Products

6.7 Industrial Uses Overview

- Hemp can supply two co-products : (i) the bast fibres and (ii) the woody core of hemp stalk used to produce different construction material .
- Industrial Uses of Hemp are as follows :
 - Insulation,
 - Hempcrete,
 - Bio-composites,
 - Animal bedding ,
 - Textiles,
 - Paper.
- The European market is much more developed than in North America where the use of hemp as a construction material is more or less anecdotal.



6. Markets for Hemp-based Products

6.8 Construction Material Markets

Uses

- Hemp for use as a building material has two main functions:
 - Insulation : Composed mostly of hemp fibre (90%)
 - Hemp Concrete or Hempcrete : Hemp cements, are made by mixing core fibre with minerals such as lime and sand.

Markets

Hemp can be used for the production of bio-composites and polymers, constituted to up to 80 of hemp fibers. Bio-composites mainly find application in the Automotive industry in Europe. The interior applications are still a growing market and are used for door panels/inserts, trunk-liners, spare wheel covers, parcel trays, headliners, A-B-C columns and more.

High performance bedding material for horses and other animals like chickens is also a popular use for hemp shivs. Although their use for this purpose is not popular in North America, the European market shows interest in hemp shivs for this purpose. Hemp shivs can absorb moisture up to 4 times their dry weight.

6. Markets for Hemp-based Products

6.9 Paper Markets

This market is too small for hemp to be grown for this sole purpose.

Few mills produce hemp-based paper in the western world. In 2013, they were about ten. They produced various kind of paper such as :

- Cigarette paper
- Filter paper (technical and scientific)
- Tea bags, coffee filter
- Speciality non-woven
- Insulating papers
- Greaseproof papers
- Security papers
- Various types of art papers

The use of hemp in papermaking is mainly focused on cigarette paper production. The whole hemp production is devoted to this use, as the whole hemp plant can be considered for pulp production, generating long and short fibres, taking away opportunity for by-product synergy. Cigarette paper making is more popular in Europe than in North American. The use of hemp for paper making is still small scale, making it a less viable option for production.

6. Markets for Hemp-based Products

6.10 Textile Markets

Hemp fibres have been used in making textiles.

Organic hemp fibres can be associated with a niche market of sustainable textiles. This market is too small for hemp to be grown for this sole purpose.

The textile market is mainly in China.

6. Markets for Hemp-based Products

6.11 Prices for Seed in the U.S and Canada

- Conventional hemp seed prices generally ranged from \$0.68 to \$1.00 per pound in 2017.
- In the Spring of 2018, prices have dropped significantly to \$0.50 to \$0.55 due to a surplus in production. This surplus is due to a high demand from South Korea in 2015 and 2016. But in 2017, South Korea changed for China which undercut the Canadian prices.
- Organic hemp seed prices ranged from \$1.80 to \$2 per pound in 2017. Hemp crops were largely grow for the purpose of reaching the Food and Drinks market making the seeds a valuable commodity.

Average Hemp Seed Prices From Large American and Canadian Producers, 2017

Province	State Price (US \$/lb)
Alberta	\$0.74/lb
Manitoba	\$0.68/lb
North Dakota	\$1.00/lb
Kentucky	\$0.68/lb

Source: Task Force report (U. of Washington): A Review of Hemp as a Sustainable Agricultural Commodity, 2018

Source: <https://www.producer.com/2018/06/hempseed-oversupply-pulls-down-prices/>
<https://www.agcanada.com/daily/hemp-acres-prices-down-for-2018>



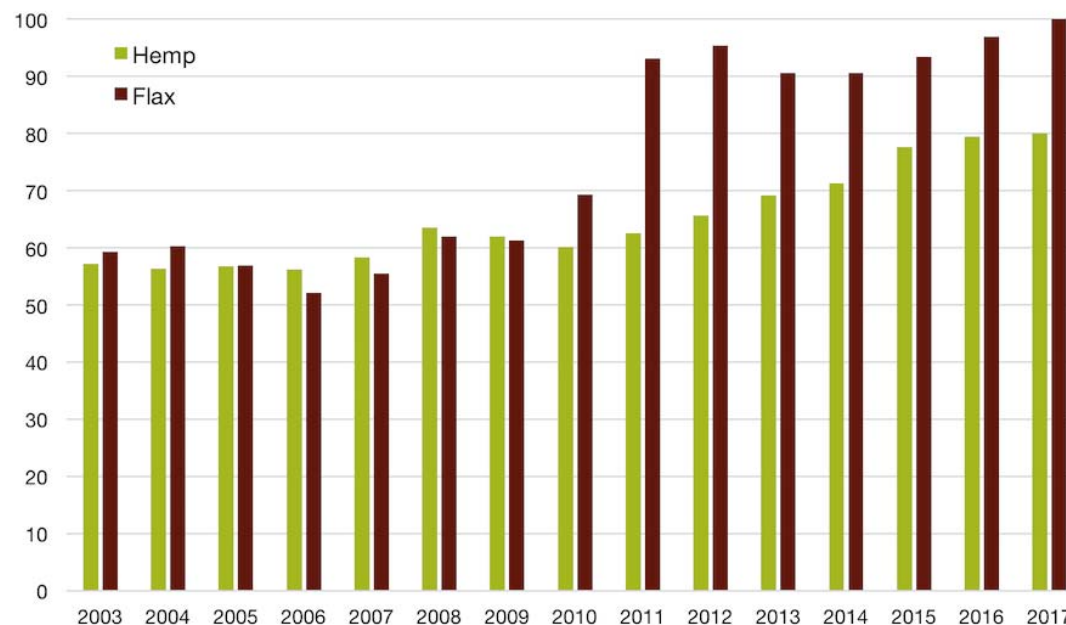
6. Markets for Hemp-based Products

6.12 Prices for Fibre in Europe

In 2017, the price range for hemp fibres started from about 50 Eurocent/kg (0.75 can\$/kg) for the cigarette paper industry to around 75 Eurocent/kg (1.15 can\$/kg) for automotive and insulation.

As for shivs and seeds, pricing information is not available for the European market. Chinese imports still have an downward impact on prices.

Yearly average prices of technical flax and hemp short fibres in €-cent/kg
(supply of 100 tonnes per year to factory gate in Central Europe)



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Section II

SITUATION ANALYSIS

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1. Objectives and Methodology

Objectives

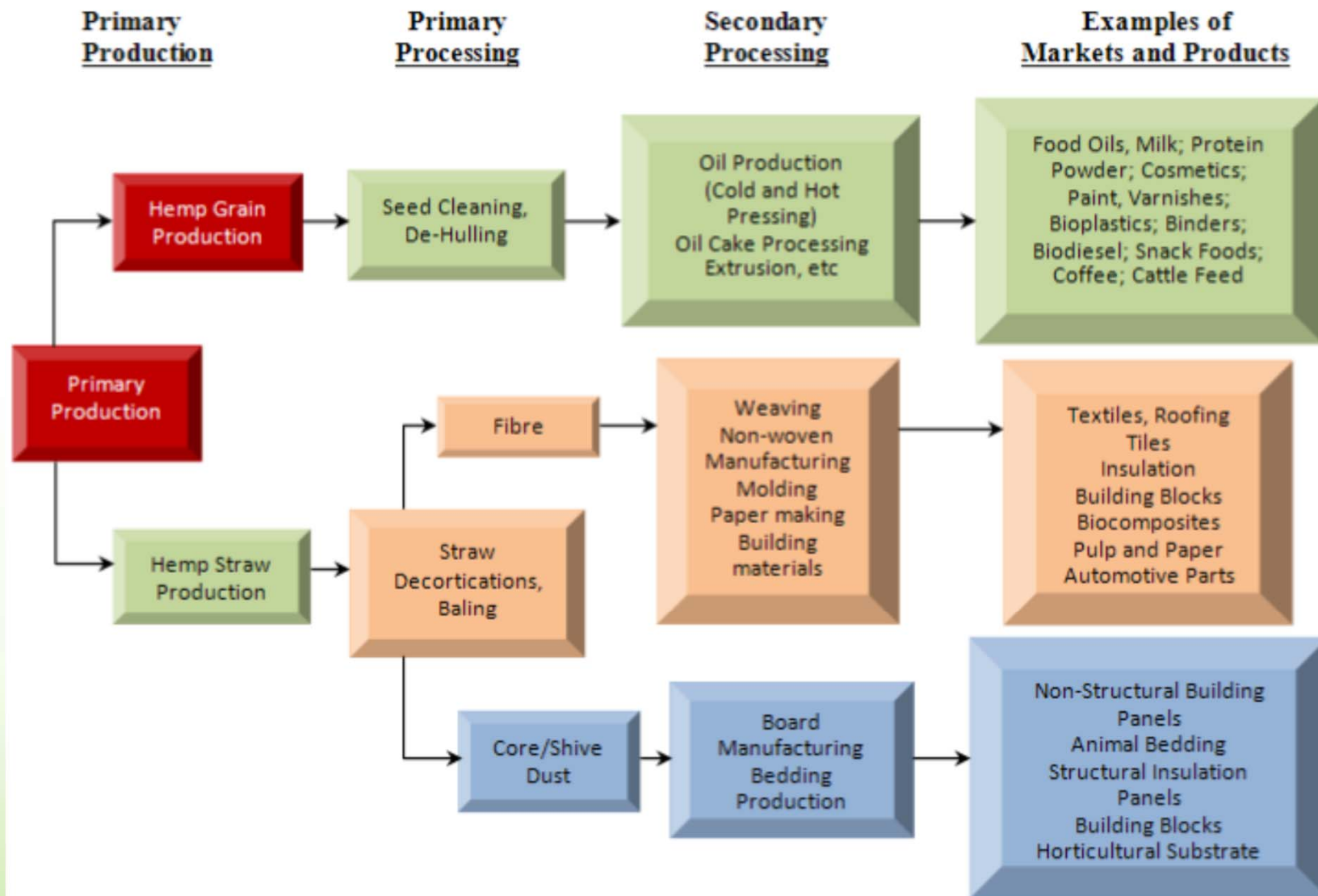
- To create a situational analysis for New Brunswick including opportunities and challenges based on the environment that currently exists in the province;
- To compare and to distinguish the business model in New Brunswick to other jurisdictions in Canada, the United States and Europe for the production of hemp products (grain, fibre, seed/genetics, cannabinoids etc.);
- To identify the opportunities for development that are both economically and practically feasible within the context of New Brunswick.

Methodology

- The situation of hemp production across Canada, in the USA and in Europe is covered in D4: Market Scan.
- The situation in New Brunswick is covered in D1: Asset Inventory.
- This deliverable covers the situation of the processing industry across Canada, the US and Europe.
- These three deliverables will serve as the primary source for the SWOT Analysis covered in Section IV.

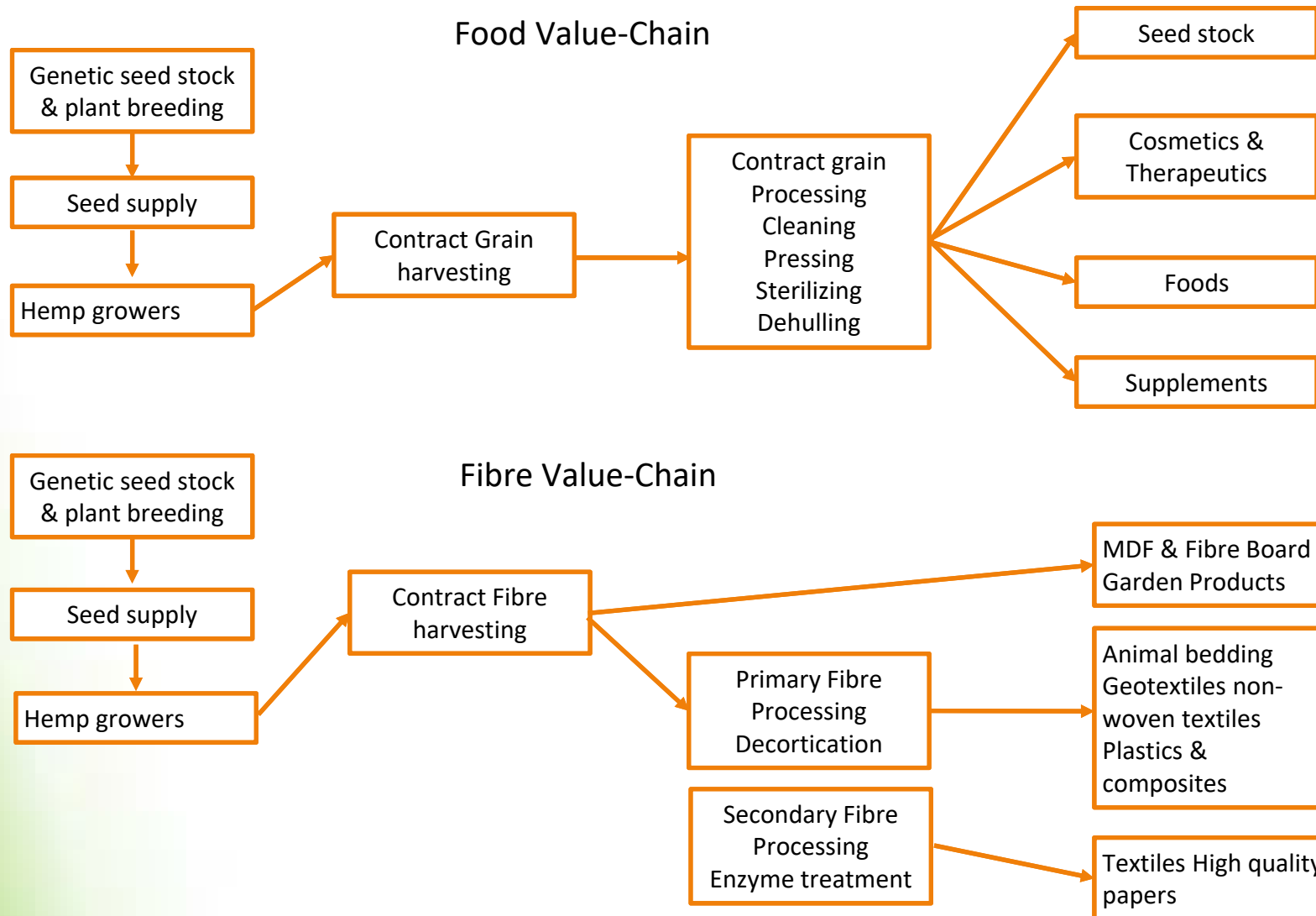
2. Hemp Food Processing Industry

2.1 Hemp Value-Chain in Canada - Overview



2. Hemp Food Processing Industry

2.11 Hemp Value-Chain for Food and Fibre In Canada - Overview



2. Hemp Food Processing Industry

2.2 In Canada

In 1998, the Canadian Government legislation allowed the planting and processing of industrial hemp, but it actually remains highly regulated and monitored by Health Canada. (limit of CBD /THC) thus, the processing to get the seeds for food is not new in Canada, particularly in Western Canada. Here is a review of the main companies by region.

Western Canada

[Hempco](#), Vancouver, BC

Hempco Food and Fiber Inc. has a 0.52 ha (56,000 sq. ft.) facility in Nisku AB which started in 2018 to produce a full line of conventional hemp products for food. It concluded a strategic partnership with Aurora Cannabis. With the loss of the Korean market in 2018, revenues went from \$6.5 million in 2017 to \$1.9 million (9months) in 2018. Its main markets are USA, Canada, Europe and Mexico. The company is not in the fibre sector but has plans to process fibre in the near future.

[The XY Hemp Corporation](#), Alberta

The Corporation has been created in 2014 to grow organic hemp and research industrial hemp fibre products. They started in Saskatchewan but were not too successful. In 2017, it decided to move to Northern Alberta looking for farming partners.

[Better Hemp Company](#), Le Portage, MB

Producer of hemp seeds, oil and protein.

2. Hemp Food Processing Industry

2.2 In Canada (cont)

Western Canada

[Manitoba Harvest](#), Winnipeg MB

Manitoba Harvest is the brand name of the company Fresh Hemp Food Ltd. In 2015, the company was acquired by an investment group (CODI). Manitoba Harvest's products, which are the fastest growing in the hemp food market and among the fastest growing in the natural foods industry, were carried in about 7,000 retail stores across the USA and Canada. The net revenue for 2014 was approximately C\$37.9 million and for 2017 US\$56 million. Manitoba Harvest is also a major exporter of bulk hemp seed for the food ingredient market.

In February 2019, Tilray acquired Manitoba Harvest for around \$420 million. Today the distribution reach 16,000 stores across the USA and Canada. The merger will add to the portfolio of natural foods, CBD food and wellness products. Tilray is based in Nanaimo BC, and present in Ontario, a marketing presence in USA and production centre under development in Portugal. Focus on medical marijuana.

2. Hemp Food Processing Industry

2.2 In Canada (cont)

Food ingredient Processors

Hemp seeds is also an ingredient in various manufactured food products. This provides opportunities for companies or secondary processing plants to make all kinds of new products. One of these companies with a well known line of cereals is Nature's Path.

[Nature's Path Foods](#), Richmond BC

It is a private, family-owned producer of certified organic foods. Originally known for its breakfast cereals, it now has a portfolio of more than 150 products some of them with hemp. All of its products are vegetarian, certified organic, and Non-GMO. Nature's Path employs 600 people at three factories (two in the USA and one in B.C.)

[Hemp Oil Canada](#), St-Agathe,Manitoba

Hemp Oil Canada was incorporated in 1998 and opened Canada's first hemp-exclusive seed processing facility. They have two state-of-the-art processing facilities in Manitoba. The line of products includes: hemp seed oil, hulled hemp seed, toasted and sterilized hemp seed, hemp flour, hemp protein powder, hemp coffee. Their sales were \$10 million in 2012.

2. Hemp Food Processing Industry

2.1 In Canada (cont)

Quebec

[Aliments Trigone](#), Saint-François-de-la-Rivière-du-Sud

Aliments Trigone has been in operation since 1984, processing and distributing organic gluten free grains products. The company is certified organic by Ecocert Canada.

[La Minoterie des Anciens](#), Sainte-Anne-des-Monts

La Minoterie des Anciens Inc. was established by Mrs. Denise Verreault, the local industrialist, in November of 2012. She was committed to reasserting the value of the agricultural lands of Gaspésie and Lower Saint Lawrence by means of certified organic production. Through this approach, the opening of a mill located close to farmers became essential. From that day forward, the business venture has succeeded in marketing high added-value products while offering fair price and lower transport costs to producers.

[Neptune Wellness Solutions](#), Laval

Originally Neptune was extracting oil from the krill. Recently, it switched to the cannabis sector. Neptune is licensed by Health Canada to process cannabis and specializes in the extraction, purification and formulation of unique value added and differentiated products. Their production plant is located in Sherbrooke and they offer a variety of marine oils, seed oils and specialty ingredients.

2. Hemp Food Processing Industry

2.3 In USA

The processing of industrial hemp in the USA is new and very limited but will expand rapidly. The 2018 Farm Bill is creating an explosion in demands for licenses to cultivate and process in many states.

Some companies already operating described here:

[Bluehen Botanicals](#), Knoxville, TN

Their industrial hemp processing facility is located in Knoxville, Tennessee. It had planned to be fully operational by the end of 2018. It will be the largest hemp biomass processing and extraction facility in Tennessee and one of the largest in the Southeast. They have a capacity of processing 900 kg (2,000 pounds) of hemp biomass per day.

They use an efficient and safe ethanol extraction process. In order to process large quantities of hemp biomass, the material is washed in sub-zero ethanol, dissolving the CBD within the plant into the ethanol, and the resulting product of the extraction process is CBD crude oil.

There are several steps that can then be taken to produce various CBD-based products.

Crude oil is sent through an evaporator to remove any residual ethanol and produces clean crude.

That product then goes through a short-path distillation process to separate out any remaining particles and produces 85% pure CBD oil. That distillate then goes to a crystallization chamber to produce isolate, a 99% pure CBD product in powder form.

2. Hemp Food Processing Industry

2.4 In Europe

Germany

[Hanf Farm](#)

Created in 1996, they have a full range of hemp products



[Laia's](#)

Their supply comes exclusively from their partner farmers in Germany, Lithuania, Estonia, Croatia, France, Belgium and Romania. Their line includes hemp hearts, hemp oil, and hemp protein powder



Austria

[Deep Nature Project,](#)

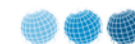
The company offer oil, hemp tea, hemp extract, supplements.



Ireland

[Celtic Wind Crops](#)

The company was setup in 2012 and offers a range of food and food supplements



2. Hemp Food Processing Industry

2.4 In Europe (cont)

France

There are several companies in France in the hemp industry. They are also producing other products than food and are described in the section about fibre processors (see page II-19). These companies are: La Chanvriere, Planete Chanvre, AgroChanvre, Gatichanvre and Eurochanvre.

Poland

[Hemp Poland](#)

HemPoland offers wholesale sale of hemp seeds and straw. They have non-processed straw, fibre adjusted to the needs of the client refined shives and seeds to produce food and cosmetics. They also provide shelled seeds, hemp flour, hemp protein and hemp bran.

Romania/Netherlands

[Hemp Flax](#)

HempFlax was founded in 1993 and has grown from 140 hectares of industrial hemp fibre in 1994 to 2500 hectares in 2017, and plan to cultivate no less than 3500 hectares in 2020.

There is a huge demand for high-quality professional hemp products. Cultivation takes place in the Netherlands, Germany and Romania with two factories located in Oude Pekela, Netherlands and Alba Iulia, Romania.

Italy

[South Hemp](#)

It is a commercial network of local producers spread around Italy commercialized under the brand name Squisito.

3. Hemp Fibre Processing Industry

3.1 In Canada

While the processing of seeds is relatively simple, working with fibres has been a more difficult process from harvesting to the preparation of the fibre. Again, like for the seeds, Western Canada is the leader with several initiatives described hereafter.

Western Canada

Clear Line, Winnipeg – This project was initiated with the Manitoba government and the Composite Innovation Centre to develop non-woven matting line. Did not go ahead.

TTS Inc. Edmonton – a joint venture with the Town of Drayton Valley, and Weyerhaeuser, to establish a non-woven matting line in a refurbished plant. TTS has acquired the matting line equipment from a dormant plant in Vancouver and has been transported to the site. The project is still moving ahead, although opening date has not yet been announced.

In 2009, TTS announced a \$15-million bio-fibre commercial plant and spin-off company to manage it in Drayton Valley's Bio-Mile.

In 2010, TTS incorporated a subsidiary **Bio Composites Group Inc.** to start the plant. They are creating car panels out of natural fibres, like hemp, flax and wood. The lightweight panels are then shipped to the United States, where they are pressed then passed along the manufacturers. The panels have been tested in a few high-end cars, including BMW, Audi and Mercedes Benz, and in large trucks like Kenworth and Peterbilt.

They also develop erosion control mats with hemp. These grow mats made to fit the industry standard 10" x 20" trays or can be purchased in a roll 4 feet by 50 feet long.

It took years to get the business off the ground, but after \$12 million of their own private funding, \$4.5 million from Alberta Innovates Bio Solutions, and investment from Ottawa's Investments in Forest Industry Transformation initiative they started in 2015.

3. Hemp Fibre Processing Industry

3.1 In Canada (cont)

Western Canada

Cylab, Alberta - In 2014, a Chinese company, Cylab International was planning to invest \$32 million in a plant which will process hemp fibre into construction materials and animal bedding with biofuel as a by-product. But as it turns out, the varieties of hemp currently grown in the province fall short on a couple of fronts — fibre strength and length — and the two characteristics go hand in hand. The company was looking for a longer fibre format (200 to 300 millimeter) than the standard 70 to 80 millimetre length. Fibre strength is also critical: some companies are even testing hemp as an alternative to Kevlar in bulletproof vests. There is no record indicating that the project went ahead.

Schweitzer Mauduit (SM), Manitoba – SM has been a long term processor of flax straw into fibre for specialty papers such as cigarettes and fine papers, much of which is exported to France. They have been considering the processing of hemp.

ABDC, Vegreville – A cross-ministry partnership of Agriculture and Rural Development (ARD), Sustainable Resource Development (SRD) and Alberta Innovates Technology Futures (AITF)The ABDC has been involved in the research and development of hemp and hemp processing systems. The unit was commissioned by the Government of Alberta and was manufactured and assembled by Belgian company, Van Dommele (now known as Cretes). It can process one tonne of hemp or flax straw per hour into various grades of fibres that can be used for commercial bioproducts.

It has the largest biomass processing pilot plant fractionalization capacity in North America.

3. Hemp fibre Processing Industry

3.1 In Canada (cont)

Western Canada

Stemia, Alberta – Also in 2014 another plant called Stemia to process fibre was announced. There is no record indicating that the project went ahead.

[Naturally Advanced Technologies](#), Vancouver – This company has been promoting a “Crailar” technology over the past 8-10 years. This was developed jointly with the National Research Council Canada(NRC) and the AITF. They produce textile products, and for the most part have been using flax bast fibres. Much of their processing has been done in the US.

[Emerson Hemp Distributors](#), Emerson, Manitoba –The plant has been operating for several years, and has been selling hemp fibre and core into both the Canadian and US animal bedding and the green building materials markets. The plant can decorticate hemp straw at a rate of 1.5 to 2 tonnes per hour. With the financial backing of the Composite Innovation Centre (CIC) this hemp processing facility takes the by-product of hemp oil seed production (hemp straw) and through their system, currently produce two primary products; [Animal Bedding](#) and [BioNesting](#).

[Plains Industrial Hemp Processing](#), Gilbert, Manitoba – This plant was announced in 2010 and its construction took more than 6 years. It is owned by Chinese investors and the technology they plan to use is also from China. The plant is hoping to use straw hemp (as opposed to dual purpose hemp, which is the conventional practice). They had plans to handle 18,000 tonnes of hemp fibre per year. The brand name is Plains Hemp. Problem with the quality of fibre.

[Just Biofiber](#), AB, is manufacturing Just BioFiber Block, an interlocking wall system.

3. Hemp fibre Processing Industry

3.1 In Canada (cont)

Ontario

Stonehedge Bioresources

One initiative was announced in 2009: the creation of Stonehedge Bioresources by John Baker (long term industry expert also associated with 1812 in NB) as president and founder. The plant was to be located in Northumberland County. The partners for this new venture were Lime Technology Ltd from England and Eastern Lake Ontario Regional Innovation Network (ELORIN). Lime would invest \$1.5 million in the project. The processing capacity of the plant was 6.5 dry tonnes per hour representing an output for year one estimated at 36,300 to 45,400 tonnes of hemp derived from around 6900 ha (17,000 acres).

There is no indication that the project materialized.

In 2017, the hemp production was only 473 ha (1,170 acres) of hemp mainly in Eastern Ontario.

Quebec

Nature Fibres, Asbestos

A \$3 million investment in 2017 to manufacture construction material using hemp. The hemp is produced in Wotton 10 km from the plant on 100 ha (247 acres). Nature Fibres also produces insulation panels.

3. Hemp Fibre Processing Industry

3.1 In Canada (cont)

Quebec

Agrofibrés, Qc,

The company was created in 2017 by a group of investors (Agrocentre St-Pie investors, Agrocentre Vinisol, Agrocentre Lanaudière, Agrocentre St-Hyacinthe et Gestion KFY Inc.) with the acquisition of the equipment of Lanaupôles Fibres Inc. located in Lavaltrie. Agrofibrés will process hemp fibres.

The main production areas in 2018 for hemp in Quebec are:

Saguenay-Lac-Saint-Jean (265 ha / 655 acres),

Bas-Saint-Laurent (81 ha / 200 acres),

Chaudière-Appalaches (68 ha / 168 acres),

Lanaudière (27 ha / 67 acres),

Mauricie (9 ha / 22 acres and

Montérégie (6 ha / 15 acres).

The products from Agrofibrés are sold to industrial partners:

- Isofib a manufacturer of insulation panels.
- ArtCan manufactures boards for housing construction.
- In 2019, Eko-Terre is planning to manufacture fibre for clothing.

3. Hemp Fibre Processing Industry

3.2 In USA

The cultivation of hemp is young in the USA therefore processing plants are very new. However, with the 2018 Farm Bill, there is a growing interest to develop the hemp sector and processing plants will start to emerge in various states.

[Hemp Inc.](#) Spring Hope, NC

It owns the largest decortication plant in North America. It was an existing plant they move to Spring Hope, to their 6,503 sq m (70,000 sq ft) warehouse on 3.6 ha (9 acres). The plant was scheduled for completion in 2018. The plant is a line of Temafa automated equipment, designed to separate the fibre from the core of the hemp or kenaf plant through a process known as decortication. It automatically separates the fibre and core from the plant and processes it into material that can be made into other products.

[PureVision Technology](#), Ft Lupton, CO

PureVision Technology, Inc. has developed and patented the continuous countercurrent reactor (CCR) technology that rapidly converts non-food biomass such as corn stover, wheat straw, grasses, wood and hemp stalks into bio based products.

3. Hemp Fibre Processing Industry

3.3 In Europe

France

[La Chanvriere](#), Bar-sur-Aube – The oldest processor in France. It is a cooperative of farmers. They have created Fibres Recherche Developpement ([FRD](#)) in 2007 to increase the technology transfer between producers and processors.

[Planete Chanvre](#), Aulnoy - The plant started in 2011, process 7,000 tonnes per year and employ 14 persons. They process not only the seeds but the whole plant.

[AgroChanvre](#), Barenton, Basse Normandie – Association of approximately 60 growers.

[Gatichanvre](#), Essonne – Growers are partners in the company created in 2013. They employ 15 persons and process the whole plant. They have access to 650 ha (1,606 acres) with 75 growers. The new plant started in 2017 with an investment of approximately \$6 million. Their revenues are around \$1.2 million.

[Cavac biomatériaux](#), Sainte-Gemme-La-Plaine - Cavac Biomaterials is a subsidiary of agricultural cooperative based in "Vendée", Cavac. The company specializes in the industrial application of plant fibres such as hemp and flax.

[Eurochanvre](#), Franche-Comté – A cooperative, they process the whole plant.

These small size operations are business models of interest for New Brunswick.

3. Hemp Fibre Processing Industry

3.3 In Europe (cont)

Holland

[Hempflax](#), Zwolle, – Hempflax is a processor that contracts with growers in Holland and Germany. Their processed fibre goes to Germany to be further processed into insulation products and the automotive industry. They have processed hemp from 2,500 ha (6,178 acres) in 2017 and are producing for food as well as industrial applications and nutraceuticals.

[Dun Agro](#), Oude Pekela – They have developed a processing plant for animal bedding, fibre for paper and automotive industry.

Belgium

[Van Dommele](#) – This is a well established equipment manufacturer who makes a broad range of bio fibre processing equipment. One of their systems is being used in the pilot facility at ABDC Vegreville.

United Kingdom

[Hemcore](#), Essex – This company is reported to be the largest hemp processor with 3,000 ha (7,413 acres) of hemp. It was a partner with Lime Technology for the Stonehedge Bioresources project in Ontario.

Germany

[Badische](#) Naturfaseraufbereitung GmbH (BaFa)– This company processes 4,500 to 5,500 tonnes of hemp straw per year. The current sales are in the range of \$2.5 million Euro per year. They contract production from approximately 100 farmers.

4. Hemp Genetics

4.1 Seed Suppliers in Canada

According to CHTA, there are 7 companies in Canada that are involved in hemp plant breeding:

[Parkland Industrial Hemp Growers](#), Dauphin, MB

They currently offer two varieties: Canda and Joey (both dual purpose – grain/ fibre) but plan to add Angie (fibre-biomass), Nadine (dual purpose), Petera (fibre), Quida (fibre/biomass), Judy (grain) Debbie (dual purpose).

Phytogene Resources Inc, Orleans, ON

In partnership with [Natural Hemphasis](#) have developed the following registered varieties: ESTA-1, medium height, large seed variety bred for Eastern Canada and CanMa, early & short statured, developed for short-season areas.

[Hemp Genetics International Inc](#), Langley, BC

They provide CFX -1, CFX -2, CRS -1, SSNS-1 Fababean, and will soon add Picolo, Icolo and Katani.

[Hemp Oil Canada Inc](#), (Fresh Hemp Food) Ste-Agathe, MB

The company claims that they partner with leading seed breeders and have exclusive variety rights to the hemp food industry's proven performers.

[Alberta Innovates](#), Calgary, AB

This provincially funded corporation seems to have been involved in hemp seeds.

[Uniseeds](#), Cobden, ON

This seed company offers the following varieties: Anka, Férimon, USO 31.

4. Hemp Genetics

4.1 Seed Suppliers in Canada(cont)

Terramax Holdings Corp. Qu'Appelle, SK

This is an R&D centre that developed X-59 (Hemp-Nut) Hemp registered 2012, a medium height grain cultivar of industrial hemp with excellent yield potential.

Other companies active in seeds are:

O'Donohue, Kyle, Berwick, ON

Jardine, Bradley, Chance Harbour, NS

Fisher, Roderick Allan & Douglas James, Dauphin, MB

Witdouck, Dale, Iron Springs, AB

Pepneck, David, Vauxhall, AB

Tremblay, Rodrigue Et Michaud, Sebastien, La Dore, QC

Dallaire, Guillaume Et Jacques, Hebertville, QC

4. Hemp Genetics

4.1 Seed Suppliers in Canada (cont)

CBD Baker Inc., Belleville, ON

John Baker has been a Professional Agrologist for 40 years. His expertise in plant breeding, new crop development and product development has been applied in the food, natural health product and bio-pharmaceutical sectors. John has been responsible for placing over 12 new cultivars of industrial hemp on the Canadian and international OECD list of approved cultivars. These cultivars are grown across Canada, and in Northern / Central USA. Since 2005, Baker focused on the development and release of cultivars for the biopharma sector. The company CBD BAKER INC., is responsible for commercialization of this unique genetic material. John Baker is also the breeder for Parkland Industrial Hemp Growers (PIGH) of Dauphin Manitoba. A number of high performance food type cultivars are available from PIHG with superior fatty acid chemistry. Some of this material may come on stream by 2020. This material is of a different origin than the CBD Baker germplasm.

[Blue Sky Hemp Ventures Ltd.](#), Saskatoon, SK

Blue Sky Hemp Ventures Ltd. was founded in 2017 with the goal of large scale whole hemp plant utilization. Blue Sky expects to commission its first state of the art hemp seed processing facility in Saskatoon in summer 2018 followed by large scale CBD extraction and stalk processing in 2019.

4. Hemp Genetics

4.1 Seed Suppliers in Canada (cont)

[Dewar Seed Farm](#), Dauphin, MB

Dewar Seed Farms, a small plant set up to process hemp seed for retail and wholesale business on a farm homesteaded by his grandfather in Dauphin. Dewar Seed Farms is a recognized leader activating in the seeds and bulbs retail industry.

[Canadian Seed Growers Association](#), Ottawa, ON

Association of all Canadian seed growers

[Canadian Seed Institute](#), Ottawa, ON

The Canadian Seed Institute (CSI) delivers accreditation and monitoring programs for the Canadian seed industry. Recognized by the Canadian Food Inspection Agency, CSI has been given the mandate to be the single point of contact for all seed establishments, seed laboratories, operators and graders seeking registration, licensing or accreditation.

4. Hemp Genetics

4.2 Seed Suppliers in USA

North Carolina

There is about two dozen seed breeders in the state some are farmers and other are nurseries. Some examples:

[All Natural Things](#)

They claim that their genetics have been grown in 7 states and have tested out over 19% CBD in some greenhouse grows.

[Bio-Regen Coop](#)

This coop of farmers provide seeds purchased from experienced seeds producers of varieties like Berry Blossom, Chardonnay, Florence and Boxwine.

[Carolina Hemp Products Inc.](#)

The company produce a genetically engineered hybrid hemp plant that yields 1st quality “Organic” CBD oil.

[Chrysalis Earth Farm](#)

This organic farm supply high CBD low THC seeds.

[Cross Creek Hemp](#)

This company offers 10 varieties like Cherrywine, BaOX, Cherry Blossom, Sweetened, etc.

[Old Courthouse Nursery](#)

This nursery diversified in CBD seeds and are currently set up to produce BaOX, T1, Cherry B and Cherry Citrus.

[Triangle Hemp](#)

In 2018, they provided healthy female cuttings to 70 farm partners who planted more than 200 acres of production. In 2019, their capacity will double.

4. Hemp Genetics

4.2 Seed Suppliers in USA (cont)

Kentucky

Following the passage of the [2014 Farm Bill](#), Kentucky became the first state to create state sponsored industrial hemp pilot programs. These pilot programs were designed to test the agronomics of the crop, and what it could mean to farmers and processors who want to enter the industry.

According to HempToday (March 19 2019) more than 50,000 acres (20,234 ha) have been approved for Kentucky hemp fields in 2019, as the state's hemp farmers get moving in the new Farm Bill era. More than 1,000 Kentucky farmers received licenses to grow hemp this year, state officials said.

Two-hundred Kentucky farmers grew hemp on 6,700 (2,100 ha) acres in 2018, (up from 5,200 in 2017). This positions Kentucky in 3rd place after Montana and Colorado .

Main seeds suppliers:

Central Kentucky Solutions, Lexington , GenCanna Global USA, Winchester , NE Farms, Hawesville, Greenman Gardens,Robards , S&F Farms, Drakesboro, Halverson,McKee, Schiavi Seeds, Lexington, Hickman Seed & Grain Company, Clinton, Metcalf Landscaping, Madisonville, Mystery Farms, Frankfort.

4. Hemp Genetics

4.2 Seed Suppliers in USA (cont)

Colorado

Inn 2018, Colorado become Home to First U.S.-Bred Certified Hemp Seed.

The list of approved suppliers is below.

Variety	Breeding Company	Origin	Flowering	Use
2016				
CREA, the Italian Ministry of Agriculture, Italy				
Eletta Campana	Schiavi Seeds LLC (Lexington, KY) :	Italy	Dioecious	Fiber
Fibranova	Schiavi Seeds LLC (Lexington, KY) :	Italy	Dioecious	Fiber
Institute of Field & Vegetable Crops in Novi Sad, Serbia				
Helena	Schiavi Seeds LLC (Lexington, KY) :	Serbia	Monoecious	Grain
2017				
The Polish Institute of Natural Fibers, Poland				
Beniko	Schiavi Seeds LLC (Lexington, KY) :	Poland	Monoecious	Fiber
Tygra	Schiavi Seeds LLC (Lexington, KY) :	Poland	Monoecious	Dual use
The Polish Institute of Natural Fibers, Poland				
Bialobrzeskie	International Hemp Solutions/ Bija Seed (Denver,CO)	Poland	Monoecious	Fiber
New West Genetics (Ft. Collins, CO):				
Elite	New West Genetics (Ft. Collins, CO):	USA	Dioecious	Grain



4. Hemp Genetics

4.1 Seed Suppliers in Europe

[Hemp-it](#), Beaufort d'Anjou, France

Formerly, « Coopérative centrale des producteurs de semences de chanvre », is now called Hemp-It - a cooperative created by the National Union of Hemp Growers and is a breeder and producer of hemp seeds.

Their catalogue offers four categories of seeds:

- Seed or mixed oriented varieties (industrial) and Straw oriented varieties (industrial)
- USO 31, Férimon, Fédora 17, Felina 31, Futura 75, Dioica 88;
- Fibre oriented varieties (premium) and seed oriented varieties (premium):
- Santhica 27, Santhica 70, Fibror 79.

[GNIS](#),

Union of seed breeders all categories.

5. Cannabis Industry

5.1 In Canada

According to the latest list from Health Canada (February 2019), there are 152 companies with a license to cultivate, process and sell medical cannabis and non medical cannabis. Of that group, 69 companies are in the medical cannabis. Here is a short description of selected companies.

[Canopy Growth Corp](#), Smith Falls, ON

The company grows, produces and sells medical marijuana. It operates diverse brands and variety supported by over half million square feet of indoor and greenhouse marijuana production. It sells medical marijuana under various brand names including Tweed, Bedrocan, and Mettrum. A majority of the revenue is derived from the sale of medical marijuana by Tweed and Bedrocan in Canada. It has a workforce of 2 000 employees.

[Aurora Cannabis Inc.](#) Edmonton, AB

Is a Canada-based company engaged in the production and distribution of medical cannabis. The company is vertically integrated and horizontally diversified across every key segment of the value chain, from facility engineering and design to cannabis breeding and genetics research, cannabis, and hemp production, derivatives, home cultivation, wholesale and retail distribution. The company has a funded capacity of more than 500,000 kg per year as well as sales and operations in 22 countries worldwide. It has a workforce of 1 400 employees.

[Aphria Inc.](#), Leamington, ON

Aphria and its subsidiaries produce and sell medical marijuana. Its products include Capsules, Oral solutions, and Vaporizers. The company's operations are based in Leamington, Ontario. It is focused on producing and selling medical marijuana and its derivatives through retail sales and wholesale channels. It has a workforce of 300 employees.

5. Cannabis Industry

5.1 In Canada (cont)

Cronos Group, Toronto

It is a diversified and vertically integrated cannabis company. Its principal activities involve production and sale of Cronos Group owns an interest in Whistler Medical Marijuana Company (WMMC), a company licensed to produce and sell medical marijuana as well as cultivate cannabis oil. WMMC is certified organic by the Fraser Valley Organic Producers Association. NVOI Transaction Group, will announce its financial results and hold its Full Year and Fourth Quarter 2018 Earnings Conference Call on Tuesday, March 26, 2019 at 8:30 a.m. EDT. Senior management will be available for questions from the investment community after prepared remarks.

HEXO Corp, Gatineau. QC

Formerly The Hydropharmacy Corp it creates and distributes innovative, easy-to-use and easy-to-understand products to serve the Canadian cannabis market. The company serves adult-use market under the HEXO brand, while continuing to serve its medical cannabis clients through the well-known Hydropharmacy brand. It has a workforce of 220 employees. Medical cannabis is sold in jurisdictions, including Canada and Germany. It sells dried cannabis and cannabis oils under its medical cannabis brand Peace Naturals.

Cronos Group owns 100% of Peace Naturals, a company licensed to produce and sell medical marijuana as well as cultivate cannabis oil. Located in Simcoe County, Ontario, Peace Naturals has 38 ha (95 acres) of land.

Cronos Group owns 100% of Original BC (OGBC), a company that is currently licensed to cultivate and sell medical marijuana. OGBC is located on 31 acres of land in the heart of the Okanagan Valley, British Columbia.

5. Cannabis Industry

5.1 In Canada (cont)

[1933 Industries Inc.](#), Chilliwack, BC

Formerly Friday Night Inc., is a vertically integrated cannabis company with operations in the United States and Canada. Operating through three subsidiary companies, the company owns licensed medical and adult-use cannabis cultivation and production assets, proprietary hemp-based, CBD infused products, CBD extraction services and a specialized cannabis advisory firm supporting clients in security, intelligence and due diligence. It has a working force of 70 employees.

Other companies in the Atlantic Provinces

In Nova Scotia

- Highland Grow (subsidiary of Biome Grow) at Antigonish with 6,500 square feet and resides on 19 acres to supply Nova Scotia* - expansion to 100,000 square feet in 2019.
- Northumberland Hemp produce and process.
- Highland Hemp has 25 ha in Cape Breton.
- Aqualitas, Bedford, produce medical cannabis indoor with aquaponics method.
- Breathing Green Solutions, Wentworth, indoor production.
- Truro Herbal Company is planning to grow.
- Atlanticann Medical Inc., Lower Sackville.

In Newfoundland

- Back Home Medical Cannabis Corporation*(subsidiary of Biome Grow Inc.)Project to build 168 000 square feet for production.

In PEI

- Red Sands Craft Cannabis Co. (subsidiary of [Biome Grow](#))*
- ABC purchase of 200 ha+.

5. Cannabis Industry

5.1 In Canada (cont)

Four licensed facilities operating companies in New Brunswick:

[Organigram Holding Inc.](#), Moncton

A Canadian licensed producer of cannabis products since March 2014 . Organigram focuses on producing exceptional, indoor-grown cannabis for patients and adult recreational consumers, as well as developing global business partnerships. It has a working force of 133 employees.

[Tidal Health Solutions Ltd.](#) ,St Stephen

Its head office is Oakville, ON but the production facilities are in St-Stephen. It is a hospital-grade indoor growing facility applying the unique Dutch “Sea of Green” growing technique using Heliospectra LED system. This growing technique enables us to produce premium grade medical cannabis more efficiently and consistently. They recently acquired land and 4 buildings over 16.2 ha (40 acres), for expansion, efficiencies, operational flexibility, and the capacity to undertake a variety of growing and process techniques to drive progress in the medical cannabis industry.

5. Cannabis Industry

5.1 In Canada (cont)

Zenabis Ltd., Atholville

The company's head office is in Surrey BC. They have two production facilities: Delta, BC and Atholville NB. The latest is located on a 20-acre site, and is the largest indoor growing facility in Canada. It supports growing and finished product operations, research and development, extractions, new product development, and a call centre.

The building size is 35,303 sq m (380,000 sq. ft.) with a current cultivation space of 4,738 sq m (51,000 sq. ft.) opened since August 2017.

Canopy Growth Corp., Fredericton

Canopy Growth Corp. is one of the world's largest cannabis producers. In July 2018, they announced an investment of \$40-million in a new production facility. This project will create up to 136 jobs in Fredericton over the next six years.

To staff its new facility, the company will fill a variety of jobs, including lab supervisors, technologists, growers, post-harvest crews, quality assurance experts, maintenance crews and shipping and on-site retail staff.

5. Cannabis Industry

5.2 In USA

In a [Forbes](#) article last December, some predictions and issues were addressed for 2019:

- Biggest trends: new ways to invest, better testing and the continued explosion of CBD products.
- Will cannabis be taken off the Schedule 1 drug list?
- “We see a year of increased M&A and consolidation activity ahead for the USA cannabis market,” said Zuber from the law firm Zuber, Lawler & Del Duca.
- Sophisticated cannabis companies are pursuing IP protection strategies.
- It’s difficult for US-based cannabis companies to access traditional capital due to federal government banking restrictions, so access to Canadian exchanges enabled those companies to fund investment.
- Farms will race to scale up and efficiently grow high quality crops but distribution deals could be as important as square footage according to the Chief executive of Biome Grow.
- Innovation is taking off with CBD being added into beauty, pet, skin care, drinks, and fitness products.

5. Cannabis Industry

5.2 In USA (cont)

Some of the main companies reported by [Seeking Alpha](#), are:

- [MedMen enterprises](#): The company has a cash burn that is forcing it to sell off assets to pay for its expansions of losing businesses and is facing a lawsuit.
- [Green Thumb](#): The company has an attractive portfolio of cannabis licenses (production or sale) including the highly-coveted ones in New York and Florida.
- [Truelive](#): This company is the largest and most successful cannabis operator in Florida, where only medical cannabis is allowed. They operate 16 dispensaries and 468,000 square feet of cultivation facilities.
- [Charlotte's Web](#): The company sells its hemp-based CBD products to over 3,000 retail outlets and claims to hold 14% of the U.S. market.
- [iAnthus](#) recently made the acquisition of the U.S. assets of MPX Biocetical Corp.
- [Liberty Health Sciences](#): The company was previously associated with Aphria closely due to the cross-ownership and shared management.
- [Golden Leaf](#): its core business is located in Oregon.
- [Curaleaf](#): It has operations in 11 states including fast-growing presences in Florida, New York, and Massachusetts.



5. Cannabis Industry

5.3 In Europe

This section present some European companies active in CBD.

Austria

[Bioblum Hemp](#), Apetlon

BioBloom specializes in the production and sales of organically grown and carefully processed hemp flowers and products for the health sector containing their cannabinoid extracts.

Great Britain

[Dragon Fly](#), London

The company commercialize DragonflyCBD, based on a selection of Cannabis Sativa strains that are low in THC and high in CBD. They use specialist extraction techniques to reduce THC content to trace amounts.

[Harmony](#), London

Harmony's Product Department creates botanical-based cannabidiol (CBD) products for a wide range of applications, from e-liquids to food supplement and cosmetics. Their distribution covers a network of 2000+ European distributors and retailers. Their research department is developing cannabidiol-based medicine, pursuing the approval of the European Medicines Agency (European Union) and FDA (USA) for drugs with specific indications utilizing cannabidiol (CBD) as the active pharmaceutical ingredient. Harmony is based in Barcelona, Prague and London.

Ireland

[The Hemp Co.](#)

The company has a wide range of CBD products as well as other hemp derived products such as hemp foods, clothes made from hemp fibre, and health supplements derived from chemicals naturally occurring in the plant.



6. Equipment Manufacturers

Here is a selection of equipment manufacturer with knowledge of the hemp harvesting aspects:

Canada

[Canadian Industrial Hemp Corporation](#), Toronto, ON

The company is developing a new machine called “iHemp” qualified by the company as “a new paradigm of intelligent, automated iHemp stalk processing integrated with flexible, finished-product fabrication”. However, there is no indication that this machine is commercially available and/or with a track record of operation.

By 2019 year-end, CIHC plans to build its head office and its first greenfield operational 5,574 sq m (60,000 sq ft) facility on 121 ha (300 acres) of land. By 2022, CIHC plans to build 3 more plants in Canada and 2 in USA. At full production, each plant:

Operates 8 fully-automated production lines consisting of decortication, sorting, compounding, pelletizing, packaging and bagging;

Processes 50,000 tonnes of iHemp stalk into bast (25%), hurd (55%) and dust (20%);

Employs 77 staff (22 HQP);

Includes a possible co-generation plant (5 MW) with an energy storage system on-site.

[Canna Systems Canada](#), Toronto ON

CannaSystems provides decorticators, processing machinery and hemp farm equipment. Key systems for separating hemp stalk into fibre and core hurd for industrial applications.

[Chroma Global technologies](#), Vancouver, BC

Chroma Global Technologies is an innovator in chromatography extraction solutions with a proprietary process allowing for cost-effective hemp extraction at an industrial scale when compared to CO₂, Butane and other methods.

6. Equipment Manufacturers (cont)

United States

[Power Zone Agricultural](#), Colorado

Design and manufacture of harvesting, fibre extraction and processing equipment.

[Marco](#), Bennettsville, SC

In January 2017, MarCo was contacted about using the Powell 6027 burley tobacco harvester for harvesting Industrial CBD hemp, and subsequently sold several machines for the 2017 crop.

Europe

[Hanf Farm GmbH](#), Germany

The company is the developer of the Multi-Combine HC 3400 hemp harvester, a major technological step forward that can help hemp farmers realize the full promise of the plant on a massive scale. It has been involved in nearly all aspects of the hemp value chain since 1997.

[Henry's Hemp Harvester](#), Germany

In 2016, Heinrich Wieker founded 'Henry's Hempharvester', which develops machinery for the hemp harvest in small to medium scales. It is obvious that there is a huge gap in the development of hemp harvesting-technology, which lay idle for decades. Target is to supply organic hemp farms with an effective, affordable, easy to understand and maintain, and transportable machinery. Heinrich is holding the patent for a stripping technology that works with a pair of rollers to pull the hemp-stems and a pair of chains that hold back the buds while the stalks are pulled through the chains.

7. Government Support

The programs for funding are covered in D3: *Scan of funding programs*.

This section covers the services provided in Canada at the provincial government level outside New Brunswick to assist the hemp industry in its development.

British Columbia

There is no crop guide for hemp available.

Alberta

Agriculture and Forestry has published “Industrial Hemp Enterprise” in March 2017. This 28-pages document provide basic information for new comers.

Saskatchewan

The Ministry of Agriculture has published an 11-pages document called “Hemp Production in Saskatchewan” in February 2017.

Manitoba

Manitoba Agriculture has a [website](#) dedicated to industrial hemp production. This site is the most advance source of information not only for new comers in Manitoba but also in other provinces.

7. Government Support

Ontario

The Ministry of Agriculture, Food and Rural Affairs has a [webpage](#) with a fact sheet on hemp production last reviewed in August 2009.

Quebec

The Department of Agriculture lists several small articles on hemp production: one is about organic hemp in Eastern Quebec, another on industrial hemp –Facts Sheet, a 47-page PPT by a consulting group and a short presentation by the Department.

Nova Scotia

There is no crop guide for hemp available.

Prince-Edward-Island

A guide for Beginning Farmers on Prince-Edward-Island, 2016 provides general information but nothing specific to hemp.

Newfoundland and Labrador

Cannabis Compliance Inc. has a website covering cultivation but from the regulatory side and not about cultivation parameters and conditions.

8. Industry Associations

The main industry Associations across Canada are:

[Canadian Hemp Trade Alliance](#), Calgary

The CHTA is a national organization that promotes Canadian hemp and hemp products globally. Established in 2003, the Alliance represents those involved in Canada's hemp industry. Members include farmers, processors, manufacturers, researchers, entrepreneurs and marketers.

The site does not show the list of members.

On May 2018, global standards organization ASTM International and the Canadian Hemp Trade Alliance (CHTA) announced a Memorandum of Understanding to work together on standards for the cannabis industry.

Under the agreement, ASTM International's cannabis committee ([D37](#)) will coordinate standards development activities for global cannabis and hemp industries, while CHTA will participate in the process and provide technical expertise. In particular, CHTA will share insight into previously developed food standards and will contribute to the subcommittee on industrial hemp.

This announcement builds on ASTM International [signed an MOU](#) with the Europe-based International Cannabis and Cannabinoids Institute (ICCI).

ASTM International has previously signed similar agreements with the Foundation of Cannabis Unified Standards (FOCUS), the American Herbal Products Association (AHPA), and the American Trade Association of Cannabis and Hemp (ATACH).

8. Industry Associations (cont)

[Canadian Seed Growers' Association](#), Ottawa

This association covers all type of seeds including hemp seeds. Based in Ottawa, CSGA has provincial branches with one for the Maritime.

[Canadian Organic Growers](#)

They have some publication on hemp.



Section III

ASSET INVENTORY

Table of Contents – Asset Inventory

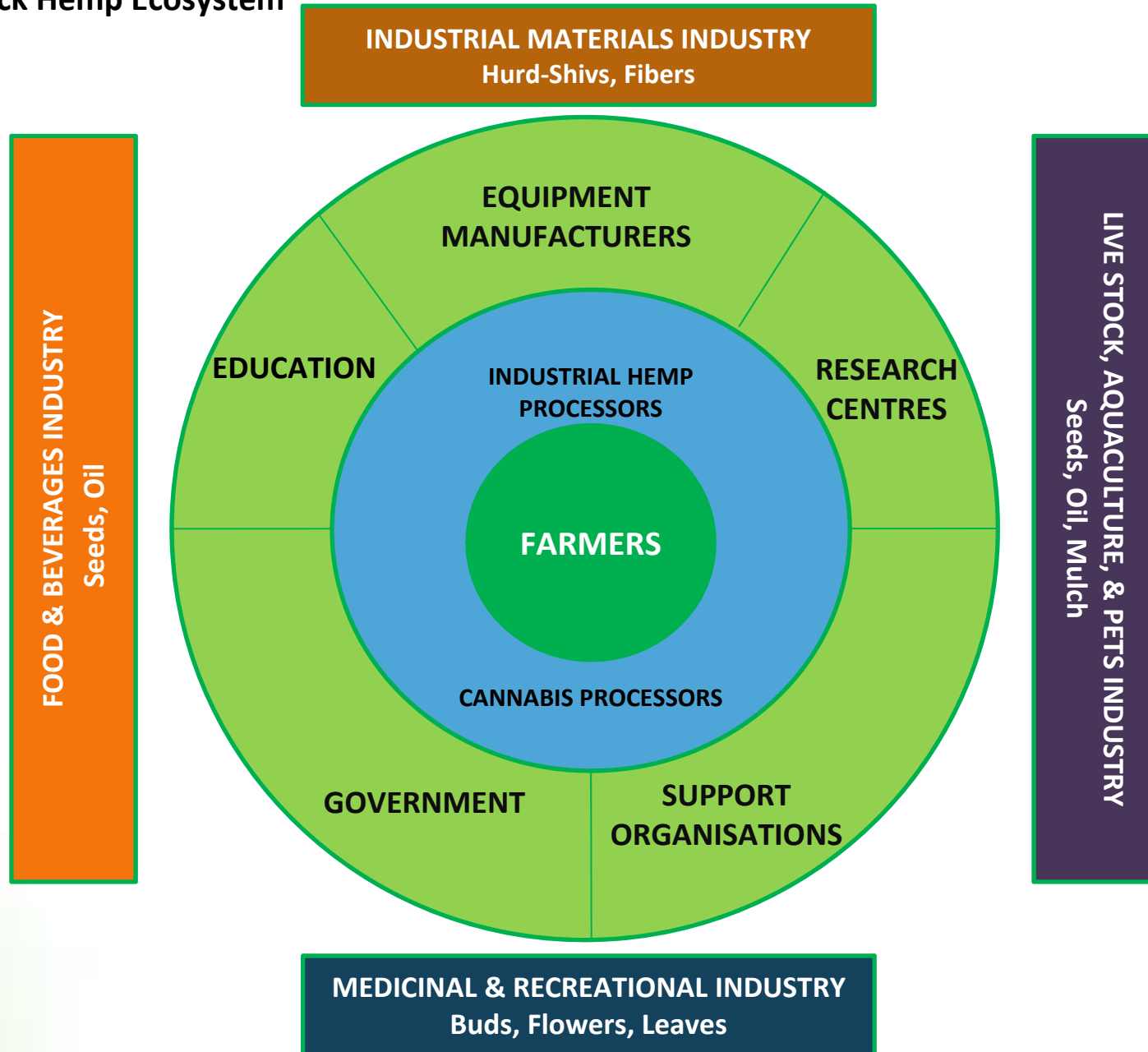
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1. Objectives

- To provide a provincial inventory of the strategic assets, which define New Brunswick's core competitive advantage and value proposition within the global hemp industry. The content of this inventory includes information on the following subjects:
 - Current companies involved in hemp either industrial or therapeutic companies (growers, processors) that have expressed interest to enter into such production will also be identified;
 - Organizations such as associations of producers and others who are expressing views on the subject of cannabis (medical groups, consumer groups, legal groups, etc.);
 - Institutions that are providing education services, training programmes, social services related to the value chain of cannabis;
 - Research and development organizations active or potentially interested in hemp;
 - Other stakeholder.
- To investigate the potential for aquaculture and ocean tech applications, synergies with established agricultural industries, production and processing capacity, supporting technology development, seed and genomics development, and proximity to regional and global markets.

2. New Brunswick Hemp Ecosystem



3. Farmers - Growers

Hemp Growers

- In 2017, a total of 203 hectares of industrial hemp were planted by a total of 14 producers. A potential new local market opportunity for the processing of grain hemp into culinary oil and protein powder was identified in the western part of NB. With this prospect of a new market, a total of 120 hectares was established by 8 producers growing under contract for a NB company (Arcadia EcoEnergies Ltd.). This anticipated processing capacity was not established.
- Crop yields in 2017 were extremely variable due to dry conditions and less than optimal crop management. Improved crop management will be required to successfully produce hemp in NB.
- In 2017, to support the development of the industrial hemp sector, the NB Department of Agriculture, Aquaculture and Fisheries (DAAF) established a departmental working group comprised of Crop Specialists and Development Officers, Integrated Pest Management Specialists and Business Growth Officers.
- In the fall of 2018, Health Canada changed the regulations and it is now permissible to harvest and utilize entire hemp plants, many companies are planning to grow industrial hemp for the extraction of cannabidiol (CBD) from the hemp flower. CBD is non-hallucinogenic and has many medicinal applications that have been proven to be effective.

3. Farmers – Growers (cont)

Hemp Growers (cont)

- In 2018, industrial hemp acreage increased to 448 hectares (1109 acres). The majority of this production was grown under contract for grain. Some of this industrial hemp was also grown for pedigreed seed and some potentially for cannabidiol (CBD) extraction.
- There is a strong expertise in the development and production of cereal and potato seeds. New Brunswick is a major exporter.

Potential for Hemp

- The growing of hemp is still a risky business due to the uncertainty of the markets and the fact that it is a very new crop.
- So growers are still in an experimental phase with limited knowledge of the agricultural parameters, climate conditions, regional situation, or other factors.
- Thus, at the present time, we can estimate that the hemp production can be considered by farms who have enough revenues to support the risk. There are around 150 farms with a gross receipts of \$1 million or more. This is a good base to create a brand new industry in New Brunswick.

4. Processors

4.1 Current and Potential Industrial Hemp Processors

Currently, five known companies or organizations have expressed interest in developing industrial hemp in NB: Arcadia EcoEnergies Ltd. (Wicklow), Global Hemp Group (Northeast), Modern Hemp Innovations (Moncton), Canutra Naturals (Bouctouche) and 1812 Inc. (Fredericton).

This section describe their activity in New Brunswick but some are also present in other provinces and this is covered in Section II - Situation Analysis which review the sector outside New Brunswick.

[Arcadia Ecoenergies Ltd.](#), Upper Kent

Originally dedicated to biofuel, the company switched to hemp for food. They started to grow hemp in 2017 and had 400 hectares (1,000 acres) in 2018.

Their business model is to contract farmers in the area which are potatoes growers. They harvest with their own equipment and bring the grain harvest to a drier located between 1/2h to 45 min from the field.

They have about 320 tonnes (700,000 lbs) accumulated in storage which they start to process using a 50 ft. mobile trailer. The oil is bottled in 250 ml, 500 ml and 1 L and was previously sold to Mexico. But since a new partner from Florida join the project, shift is under way.

They plan to build a new facility (50 ft. X 100 ft.) this year. The priority is to process the existing stock but they plan to move to CBD given that they can get a 8% concentration which is the minimum for viability.

4. Processors

4.1 Current and Potential Industrial Hemp Processors

[Global Hemp Group](#), Bathurst

This company is based in Vancouver and publicly traded in Canada, USA and Germany. In 2017, Global Hemp Group (GHG) is in joint venture with Marijuana Company of America (MCOA). They contracted four farmers to grow hemp on 50 hectares (125 acres) in the region in 2018. The goal of the project is to increase hectareage under cultivation to more than 400 ha (1,000 acres) within three years. Climatic conditions in 2018 were not favorable because of drought.

A 4,000 sq. ft. facility in Bathurst has been leased for the project. The building will be used for its office space, as well as a drying facility to process the fresh biomass and for storage once complete. Drying prepares the biomass for shipment to third party processors for extraction of the cannabinoid.

[Canutra naturals](#), Bouctouche

This company is based in British Columbia and came to New Brunswick by acquiring the former

H. J. Michaud experimental farm of Agriculture Canada in 2016.

The company has a partnership with [Canuevo Biotech](#) which brings scientific expertise in cannabinoid plant extracts.

They will concentrate on the production of CBD as an ingredient for their line of cosmetics to be sold from BC under the brand name: [Whole Hemp Health](#).

They work with the University of Moncton on a plant breeding project.

They have a cautious approach to development in order to master each step of the growth.

4. Processors

4.1 Current and Potential Industrial Hemp Processors (cont)

[Modern Hemp Innovations](#), Notre-Dame

The company was founded 8 years ago with the intention to use the whole plant. They have a partnership agreement with First Nations to produce derived products with branded names for the export markets. They have a agreement with 5 growers for 40 ha (100 acres) and a list of another 30-40 growers which could bring the production capacity to 2,800 ha (7,000 acres). Their business model is to supply the seeds to the growers and as well as support services. They are at the stage of evaluating the equipment for harvesting, drying, and decorticating. They also are making samples of industrial products to test the market and potential manufacturers.

1812 Hemp, Fredericton

This new company founded in 2019 has entered into an agreement with OrganiGram Holding Inc. (see page III-11) to secure supply and support research and development on the genetic improvement of hemp through traditional plant breeding methods. 1812 Hemp is focused on further developing a line of Canadian cultivars (specific varieties of plants cultivated to enhance desirable qualities) of high cannabidiol (CBD) yielding hemp for the Canadian climate.

4. Processors

4.2 Cannabis Producers and Processors

This section presents the cannabis producers in NB and their facilities.

Information on cannabis producers across Canada is covered in Section II - Situation Analysis

[Canopy Growth](#), Fredericton

Based in Smith Falls ON, the company had sales revenues in 2017-2018 of \$78 million. In New Brunswick, they have a facility of more than 5 574 m² (60 000 sq. ft.) with future plans to increase to 9,290 m² (100 000 sq. ft.). This new \$40 million production plant obtained its licence March 25, 2019.

In 2018, Constellation Brands made a investment of \$5 billion dollars in Canopy Growth.

[Zenabis](#), Atholville

Zenabis is a BC-based, publicly traded licensed producer of medical and recreational cannabis. They have 3.5 million sq. ft. of available production space in British Columbia, New Brunswick and Nova Scotia which represents a capacity of approximately 479,700 kg annually.

They have 400+ full-time and part-time employees in four locations across Canada.

The NB facility is 380,000 sq. ft.; 34,283kg design capacity and indoor cultivation space. Currently, an operational area of approximately 126,000 sq. ft., of which approximately 51,000 sq. ft. is dedicated to cultivation space.

4. Processors

4.2 Cannabis Producers and Processors (cont)

Organigram Holding Inc , Moncton

Organigram's head office is in Moncton where they have production facility and R&D in two buildings on 14 acres and 480,000 sq. ft. of production space at full build out.

They were the first licensed producer in 2015.

Tidal Health Solutions , St. Stephen

Tidal Health Head Office is in Oakville ON.

Its founder, Dr. Douglas Smith, is a pioneer in prescribing medical cannabis. He is a specialist in physical and rehabilitation medicine and has been practicing medicine for over 40 years.

Tidal produces in a hospital-grade indoor growing facility. The company has recently acquire land and 4 buildings over 40 acres.

The company has constructed a 12,000 square foot secure warehouse, of which 10,000 square feet are designated growing space, in the St. Stephen business park. The facility hopes to produce 1,700 kg of medical cannabis per year.

5. Research Centres

An initiative is already in place for cannabis with the Regional Cannabis Cluster Pilot project with Springboard Atlantic which involves several universities and community colleges from New Brunswick.

The key research organizations with existing experience and potential role in the development of the hemp industry are:

[Wood Science Technology Centre](#), UNB Fredericton

Its mission is to strengthen the innovation capacity of the wood products industry. But, it has become the only centre in Atlantic Canada to cover also agricultural research and non timber forest products. In agricultural research, the centre has been active in plant breeding for many years and their focus is to improve the efficiency and quality of the cultivars. In this area, they consider themselves being ahead of the industry. Of particular interest, the centre can perform all testing required for regulatory agencies. It is also active in bioenergy.

[CCNB Innov](#), Grand-Sault

CCNB has research and industrial services capacity suitable for the hemp industry. They offer a wide range of services from analytical services to machinery development.

They work on composite material applications, green technologies, and environment and food safety. They are coordinating the [New Brunswick Wood Products Industry Innovation and Commercialization program](#), an initiative of the Atlantic Canada Opportunities Agency, the New Brunswick Department of Economic Development and the CCNB.

5. Research Centres (cont)

Fredericton Research and Development Centre Agriculture and Agri-Food Canada, Fredericton
This research centre specializes in potato and is looking at building a research project on hemp as a crop rotation option for the growers.

Biorefinery Technology Scale-up Centre, UNB, Grand Falls

The centre provides services in the following areas:

- Enzymatic, physical and chemical hydrolysis of forest;
- Agricultural and marine biomass as well as industrial and municipal wastes into sugars;
- Fermentation;
- Purification of biochemical products by distillation, filtration, evaporation, lyophilisation, etc.;
- Bio product development through the extraction of sugars, proteins, oils, antioxidants, etc.;
- Production of alcoholic beverages and analysis of their components (water, yeast, grain, hops, malt, beer and spirits).

Support services for the composite materials industry, CCNB Shippagan

The Centre offers the following services:

- Thermal processing of parts;
- Technical assistance ;
- Prototyping ;
- Technological integration, testing and characterization of materials or products ;
- Staff training.

The CCNB owns an hydraulic compression press (Wabash, Genesis series), the only one of its kind in NB for compression molding, superplastic molding, bonding and laminating. The device supports small-scale production, and since closing, compression, heating and reopening processes are fully automated.



5. Research Centres (cont)

[Coastal Zones Research Institute \(CZRI\)](#), Shippagan

A private non-profit institution, CZRI's mission is to promote the viable development of coastal zone resources, and to support the optimal development of related businesses and organizations through research activities and scientific analysis services. The Institute focuses on four main areas of research relevant to coastal zones: aquaculture; fishery & marine products; peat & peatlands and sustainable development of coastal zones.

[RPC](#), Fredericton, Moncton, and St. George

RPC is New Brunswick's provincial research organization (PRO), a research and technology organization (RTO) offering contract R&D and technical services such as: analytical services, applied research and engineering and inspection services in various sector including aquaculture, biotechnology, food & drugs, manufacturing and energy which may be relevant for the hemp industry.

[The Huntsman Marine Science Centre](#), St Andrews

The centre is engaged in a broad range of marine science and applied research initiatives and can contribute to the use of hemp as a feed ingredient in aquaculture.

[University of Moncton](#), Moncton Campus

In 2018, a three-year research program started in partnership with Government of Canada, Genome Atlantic, Genome Canada, NB innovation Foundation and Organigram to increase the productivity of cannabis with inoculants and news strains, to improve the quality through genetic mapping, and to improve the key cannabis attributes such as THC/CBD and terpenes levels.

6. Education

Institutions

The key institutions for education and training which can contribute to the development of the hemp ecosystem are, at the university level:

[St. Thomas University](#)

[Université de Moncton](#)

[University of New Brunswick](#)

[Mount Allison University](#)

And at the college level:

[Collège communautaire du Nouveau Brunswick](#)

Training Programs

[CCNB](#)

In 2017, CCNB started a program called “Cannabis Cultivation Technician Program”. This 12-week program is offered in English at CCNB’s Dieppe Campus in collaboration with CCNB’s Campbellton Campus. This training is offered in partnership with the department of Post-Secondary Education, Training and Labor and Organigram Holding Inc., a Moncton based company looking to hire a highly skilled workforce. Twenty-five applications were accepted in the first group.

No other specific program dedicated to the hemp and cannabis industry are offered at the present time.



7. Government

The Government of New Brunswick supports the development of the hemp ecosystem through several departments. The key players are:

[Agriculture, Aquaculture and Fisheries](#)

It provides a wide range of programs to support financially the sector.

[Post-Secondary Education, Training and Labour](#)

It provides services to the manpower needed by the industry.

[Aboriginal Affairs](#)

To include aboriginal groups to contribute and benefit of the development of that new industry

8. Support Organizations

ONB - Opportunities New Brunswick

Since 2016, ONB has been a pioneer in the development of a strategy for the cannabis industry which resulted in the attraction of major players to invest in production and research. ONB has an internal cannabis industry task force supporting the development of the sector.

They are prospecting potential investors and/or partners to increase the production and processing in the province. When these companies will be in position to export, ONB will assist them in the export development.

BioNB

BioNB is the trusted bioscience authority in New Brunswick. They promote a supportive business environment for bioscience ventures through coaching, community building and advocacy.

There are already playing a leadership role in the development of the emerging hemp industry by stimulating collaboration between companies, research institutions and partners. They provide sector intelligence services, organize industry meetings and offer a range of business services from proposal editing to collateral design and business plan development to pitch coaching.

Atlantic Canada Opportunities Agency

ACOA has various programs to support financially the development of companies but also support initiative such as the Regional Cannabis Cluster Pilot Project.

9. Equipment Manufacturers

As this is an emerging industry in New Brunswick, it is anticipated that initial opportunities in the machinery sector will be in modification of existing equipment, local support for harvesting and processing equipment companies selling materials in New Brunswick, and provision of ancillary equipment, such as conveyors, inspection tables etc.

Existing combines used for cereals need technical modifications to harvest hemp and take into account the size of the hemp plant. For processing, the industry will need post harvest equipment such: as dryers, decortication machines, etc.

In New Brunswick there are some companies active in the development of machinery.

Company Name	Address
<u>Excel Manufacturing</u>	2003 Route 3, Harvey, NB E6K 1K3
<u>GOW Group Inc.</u>	783, rue Portage Road, Grand Falls, NB E2Z 1M5
<u>Johnson Enterprises Inc.</u>	69, Chemin Lac des Lys, Val D'Amour, NB E3N 5E7
<u>MITTC</u> (Metal Innovation and Transfer Technology Centre)	75 Youghall Drive, Bathurst, NB E2A 3Z2
<u>Nate's Welding Fabrication & Repair</u>	3230 Route 585, Newbridge, NB E7N 1K3
<u>RCO Ltd.</u>	9, rue Godreau St. Grand Falls, NB E3Z 3E8
Smalley's Welding & Repair Ltd	403 Greenfield Rd, Florenceville, NB E7L 3C7
Hartland Machine Ltd	P O Box 709, Hartland, NB E7P 3K4
Michaud Equipment	109, Desjardins Road, Saint-Andre, NB

10. Market Potential

10.1 Overview

This section covers the sectors where there are opportunities to use hemp products in ingredients or as components of a new product. It also considers sectors with major companies located in New Brunswick either with their head office or a manufacturing plant or a research centre. This is to facilitate the exchange between the processors and these end-users due to proximity. These industries that belong to the New Brunswick industrial network are:

- Food and beverages industry;
- Potato industry;
- Aquaculture industry;
- Poultry industry;
- Industrial materials industry.

The processors are not limited at these sectors in New Brunswick, opportunities are also possible in other Atlantic Provinces and elsewhere.

Potential for Hemp

The growing of hemp is still a risky business due to the uncertainty of the markets and the lack of knowledge of the agricultural parameters, climate conditions, regional situation, or other factors. Thus, at the present time, we can estimate that the hemp production can be considered by farms who have enough revenues to support the risk. There are around 150 farms with a gross receipts of \$1 million or more.

In the case of the potatoes cultivation, the situation is different if hems is primarily a rotation crop.

10. Market Potential

10.2 Food and Beverages Industry

Hemp seeds and oil can be used as ingredients in a variety of food products. The main food processing companies with potential interest to consider these ingredients are:

[Ganong](#), St. Stephen

Ganong Bros. Limited started in 1873 and is Canada's oldest independently family owned and operated chocolate company. Today, they operate a modern facility is state-of-the-art with both nut and nut-free operations producing a ranger of chocolate products, snacks and bars.

[Moosehead Breweries Ltd](#), St. John

Moosehead Breweries is the last major brewery in Canada owned by Canadians. The company had an estimated 3.8 percent share of the Canadian domestic market in 2016. The company is innovative with its Small Batch Brewery designed to create innovative and unique brews.

[Crosby Molasses](#), St-John

the company provides molasses and sweeteners and a growing line of dry and liquid sugar-based products and co-manufactures products for top retail brands.

Interest for hemp

For a processor of hemp seeds (or grains) and oil (no CBD), there are numerous opportunities in the region with smaller companies and artisans to make a wide variety of hemp craft made products such as: body lotions, balms / lip balms, shampoo & conditioner, body wash, facial cream & cleanser, sunscreen, serum, etc...

The availability of local supply of seeds and oil may interest dozens of entrepreneurs to innovate around the province and enrich the offer of farmer's markets

Processors will also find a market for their grains that is not suitable for food but appropriate as feed for companion animal and birds.

10. Market Potential

10.3 Potato Industry

Production

- Potatoes are the main crop grown in the province. New Brunswick produces over 20,000 hectares of potatoes. The number of potato farms dropped from 238 in 2006 to 144 in 2010 which represents a 25% decrease over the last ten years. This situation which affected not only NB but also PEI, is the result of drops in prices under the cost of production. The consumer pattern is changing and potato is becoming less popular. They produced 13.6% of the total Canadian production in 2016.
- In terms of seeded areas, in 2016, New Brunswick had 19,275 hectares of potatoes producing 650,225 tonnes. The sector generated revenues of 153.6 million dollars.

Processing

The production is distributed with 56% of the crop destined for processing, 25% to fresh market and 19% for seed.

The processing is in the hands of two large corporations with international presence: McCain based in NB with a research centre in Florenceville. The other one is Cavendish based in PEI.

Interest for hemp

- If hemp can be considered as a crop rotation for potatoes, consultations will be needed with these two processors to evaluate the technical and agricultural feasibility of this option.
- A research program will be required and may need 3-5 years to assess that feasibility.
- The Fredericton Research and Development Centre has the expertise and the resources to lead such a project.
- If we assume a 3-year potato rotation, the maximum potential for hemp production could be up to 20 000 ha.

10. Market Potential

10.4 Aquaculture Industry

Production

- Salmon aquaculture has now over 90 sites and sales were estimated at \$117.3 million in 2013 in NB.
- 60% is exported to the Northeastern US, 35 % is exported to the rest of Canada and 5% is sold locally. The sector employs 1,500 persons.
- The value chain includes feed production, cage and net manufacturing, boat building motor sales, fish processing, anchors, moorings, rope sales, transportation, fish health, veterinary services, packaging, research, consulting and schools.
- Research: [Provincial Fish Health Institute Laboratory](#) offers diagnostic services for different aquatic animals diseases.

Feed production

Two major players are making feed for aquaculture: Sketting and Corey [Skretting](#) is based in St. Andrews and is part of Nutreco, an international company based in the Netherlands. They have a research centre with R&D units in Europe and Asia. Skretting has a production volume of 1,7 million tonnes with a 32% market share internationally. They employ 2,700 persons in total and 80 in the research centre.

[Corey Nutrition Company](#), Fredericton, is a family-owned company in pet food and feed for aquaculture.

Interest for hemp

The use of hemp as a feed ingredient is not approved by CFIA at the present time but research projects are being considered in Kentucky by Friends of Hemp who submitted an application to the FDA.

10. Market Potential

10.5 Poultry Industry

Production

In 2016, the poultry inventory in NB was 3.1 million hens and chickens of which, broilers, roasters and Cornish hens were 2,1 million from 312 farms reporting. Only 35 of them are producing at a commercial scale while the others are without a quota licence which means a production level under 199 birds.

Feed

There are several feed suppliers like or Shur Gain and Coop in Moncton.

Interest for hemp

The use of hemp as a feed is not approved by the CFIA at the present time. Some research has been conducted in the US. North Carolina State Extension has conducted a research on the use of hemp seed cake in poultry diets as a replacement of the soybean oil meal in 2018. The results were encouraging.

In 2017, Washington State Department of Agriculture conducted a study: “Preliminary Assessment of Hemp Seed Products as Feed Ingredients for Laying Hens” and it concluded that “it is not yet appropriate to move ahead with rulemaking or other administrative actions allowing hemp seed to be included in commercial feed for laying hens, due to lack of research related to public health”.

10. Market Potential

10.6 Industrial Materials Industry

This includes several sectors:

Wood products industry

- 117 firms manufacturers of wood production 2016;
- Mills: particle boards and fibreboard mills;
- Other wood products manufacturers: flooring and panels, prefabricated homes ;
- The wood products sector was estimated at \$600 million in 2002 with 7,000 employees.
- A 2014 sector profile indicates that New Brunswick has a wide variety of wood products manufacturers: 77 in wood furniture, 12 in wood buildings, 17 in veneer, plywood and engineered wood products and 12 in converted paper.

Construction material industry

Companies active in the manufacturing of concrete blocks.

Interest for hemp

Hemp fibers and hurds/shives can be processed in a wide variety of applications:

- Insulation panels, acoustic panels;
- Fiberboards, particle boards, wall plastering ;
- Hempcrete and other light concrete products;
- Biocomposites: reinforced panels, non-woven fleece, door panels for cars, injection moldings, cases;
- Agrotexiles for weed suppression, organic growth medium, mulch for gardens;
- Animal bedding.

10. Market Potential

10.7 Medicinal & Recreational Industry

Recreational cannabis

A new government-owned organization, Cannabis NB, a subsidiary of New Brunswick Liquor Corporation, has the exclusivity to sale recreational cannabis to the public 19 years old+ with a maximum of 30 gr.

The distribution network consists of 20 stores across the province and offer an online order system.

Personal home growing is permitted with a maximum of 4 plants. The plants have to be purchased at a licensed cannabis retailer

Medicinal cannabis

The latest version related to medicinal cannabis is the [Access to Cannabis for Medical Purposes Regulations](#). In order to qualify as a medical marijuana patient in Canada, an healthcare practitioner must have authorized the use of cannabis for relief of one or more of designated symptoms.



Section IV

FUNDING PROGRAMS

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1. Objectives

- To identify the current funding programs and opportunities at the provincial and federal level including such things as Industrial Technical Benefits (ITB) funds, agro-tech, clean tech and the bio economy.
- To present the options to support and coordinate the development for this sector as presented in the strategy.

The main Organizations offering programs potentially suitable for the hemp industry.

Government of New Brunswick

- Department of Agriculture, Aquaculture and Fisheries
- Regional Development Corporation
- Community Business Development Corporations (CBDC)
- Opportunities NB

Government of Canada

- Atlantic Canada Opportunities Agency
- Agriculture and Agri-Food Canada
- Farm Credit Corporation
- National Research Council of Canada
- Export Development Corporation

This report is based on information posted on the websites of the different organizations.

2. New Brunswick - Department of Agriculture, Aquaculture and Fisheries

Programs Under the [Canadian Agricultural Partnership](#)

Several programs are offered in cooperation with Agriculture and Agri-Food Canada (presented in the Ag Canada section) .

Programs Managed by the Agricultural Development Board

[Agricultural Direct Loan](#)

- Loans, to projects that are deemed strategic to provincial agricultural strategies. These loans are designed to complement other sources of lending such as Farm Credit Canada and financial institutions.
- Direct loans are amortized for up to 20 years, at the provincial interest lending rate.

[Agricultural Loan Guarantees](#)

- Loan guarantees to financial institutions, on a portion of a line of credit, for working capital requirements. The guarantees are typically for up to a maximum of 80% of line of credit, and usually for a period of up to 3 years.

[New Entrant Farmer Loan](#)

- Loans, to persons entering into the agriculture sector. The program is designed to assist in the purchase of a farm and can complement other sources of lending such as Farm Credit Canada and other financial institutions.
- Loans of up to 100% of the appraised value of security, to a maximum amount of \$750,000.

[New Land Lease Purchase](#)

- Lease of land for a period of up to six years. The applicant agrees to purchase the land at the end of the lease.

3. New Brunswick – Regional Development Corporation

Miramichi Regional Economic Development and Innovation Fund

Provides investment funds to existing businesses that already generate economic development. We will support local investments and we will strongly encourage new business startups. The area eligible for assistance is defined by the boundaries of the county of Northumberland and the northern portion of Kent County

Northern New Brunswick Economic Development and Innovation Fund

will emphasize investments to existing businesses that already generate economic development. We will support local investments and we will strongly encourage new business startups. Areas eligible for assistance include those defined by the Victoria, Madawaska, Restigouche and Gloucester county boundaries.

4. New Brunswick – Community Business Development Corporations (CBDC)

4.1 Local Corporations



Enterprise Saint John's objective is to attract investors and provide support services for businesses of every size, and offer coaching and programming for Saint John's entrepreneurs.



3Plus leverage regional assets to foster new job creation, to enhance prosperity and to improve overall competitiveness. Their expertise is to promote their region and attract investment, to help expand existing businesses and key sectors, and to help build and attract the workforce needed for new and existing businesses to thrive.



Ignite Fredericton is a non-profit community economic development organization, offering free and confidential business counselling and tools to help you start, grow or locate your business. Their core functions include supporting entrepreneurs, attracting and retaining talent through Immigration, strengthening the economic development ecosystem through strategic initiatives and partnerships.

4. New Brunswick – Community Business Development Corporations (CBDC)

4.2 Clean Technology Initiative

- The Community Business Development Corporations ([CBDCs](#)) have designed a new loan product that provides financing to new and existing entrepreneurs for the purpose of advancing clean technology.
- The CBDC Clean Technology Loan is a loan product that is meant to augment existing loan products and to provide a flexible financing instrument in support of the adoption, adaption and/or commercialization of clean technology.
- Can provide up to \$150,000* per eligible borrower, in the form of a repayable loan with competitive interest rates and repayment terms.
- Loans can be from one year to ten years.
- Clean Technology Advisory Services component that will assist small- and medium-sized enterprises and social enterprises to assess clean technology solutions for their businesses. These services will allow small businesses and social enterprises to hire professional outside expertise to assist them in addressing timely issues, opportunities and/or challenges related to their use of clean technologies.

5. Atlantic Canada Opportunities Agency

[Atlantic Innovation Fund](#) (AIF)

Partnerships among private sector firms, universities, colleges and other research institutions to develop and commercialize new or improved products and services.

Funding between \$500,000 and \$3 million.

Preference will be given to shorter-term projects ranging from 18 to 36 months.

Contributions to the private sector are conditionally repayable based on the commercial success of a project. Contributions to not-for-profit organizations are non-repayable.

[Business Development Program](#) (BDP)

To set up, expand or modernize a business. Also provide funding for [clean technology projects](#).

Focus is on small- and medium- sized enterprises.

Non-profit organizations providing support to the business community may also qualify.

Projects of less than \$500,000.

Interest-free repayable assistance.

[Regional Economic Growth through Innovation](#) (REGI)

➤ [Business Scale-up and Productivity Stream](#)

For high-growth firms to scale up and expand, commercialization of new technologies, early adoption or adaptation of leading-edge technologies and processes, market diversification and entry into global markets.

➤ [Regional Innovation Ecosystem Stream](#)

For support business organizations such as strategic clusters, groups, business accelerators and incubators.

Projects in business productivity, global competitiveness, investment and talent attraction.

5. Atlantic Canada Opportunities Agency (cont)

The [Women Entrepreneurship Fund](#)

For women owned firms with project on pursuit of market opportunities abroad, Scale-up, Expansion and Growth

Up to \$100,000 in non-repayable contribution funding for 12 months.

[Ecosystem Fund](#)

For non-profit Organizations supporting women entrepreneurs.

Multi regional steam and regional stream.

The minimum funding amount that will be considered for a national or multi-regional project is \$1 million.

[Innovative Communities Fund](#) (ICF)

For non-profit organizations with strategic projects that build the economies of Atlantic Canada's communities, including clean technology projects.

Non repayable.

6. Agriculture and Agri-Food Canada

6.1 Main Categories of Programs

Youth in Agriculture

This category is targeting the youth and young farmers between 18 and 39

It is made up of 8 programs:

- Advance Payments Program
- Agricultural Youth Green Jobs Initiative
- AgriDiversity Program
- AgriInsurance
- AgriStability
- AgriInvest
- Canadian Agricultural Loans Act Program

Youth in Agriculture also offers some training and learning assistance such as continuing education, data banks of various services and mentoring.

Canadian Agricultural Partnership

New Brunswick is a partner which provide access to a wide range of programs covering Business risk and non-Business risk Management programs.

- The partnership is cost-shared on a 60:40 basis and delivered by the province to ensure programs are tailored to meet regional needs.

Agricultural Business Management

This category provide access to resources and support in managing farming operations to stay competitive and prepared for unforeseen situations.

6. Agriculture and Agri-Food Canada

6.2 Youth in Agriculture

- [Advance Payments Program](#)
Provides producers with a cash advance based on the value of their agricultural products.
- [Agricultural Youth Green Jobs Initiative](#)
Funds internships for post-secondary graduates in the agriculture industry focusing on environmental projects.
- [AgriDiversity Program](#)
Helps under-represented groups in Canadian agriculture, including youth, women, Indigenous Peoples, and persons with disabilities to fully participate in the sector.
- [AgriInsurance](#)
Offers protection against production losses caused by hail, drought, flooding, disease and other natural hazards.
- [AgriStability](#)
Offers protection against declines in farm income as a result of low prices, rising input costs and production losses.
- [AgriInvest](#)
Helps cover income declines and supports investments that help mitigate risks.
- [Canadian Agricultural Loans Act Program](#)
Increases availability of loans to new and existing farmers to establish, improve or develop their farms.

6. Agriculture and Agri-Food Canada

6.3 Canadian Agricultural Partnership with New Brunswick

Business Risk Management Programs	Eligibility
<p><u>AgriStability*</u></p> <ul style="list-style-type: none">Provides support when farmer experience a large margin decline and may be able to receive an AgriStability payment when your current year program margin falls below 70% of your reference margin	<ul style="list-style-type: none">All agricultural Producers
<p><u>AgriInvest*</u></p> <ul style="list-style-type: none">a self-managed producer-government savings account that allows producers to set money aside which can be used to recover from small income shortfalls, or to make investments to reduce on-farm risks.The limit on matching government contributions is \$15,000 per year.	<ul style="list-style-type: none">All agricultural Producers
<p><u>Wildlife Damage Compensation Program</u></p> <ul style="list-style-type: none">Provides compensation to agricultural producers who suffer crop losses due to wildlife.Maximum compensation per producer shall not exceed \$50,000 per year.	<ul style="list-style-type: none">All agricultural Producers

*May be applicable to hemp production in the future



6. Agriculture and Agri-Food Canada

6.3 Canadian Agricultural Partnership with New Brunswick (cont)

Non-Business Risk Management Programs	Eligibility
<p><u>Advancing Agri-Food Processing</u></p> <ul style="list-style-type: none"> • Support innovation and improvement in efficiency and competitiveness in new and existing agri-food processing companies. • Product conception and development of new agri-food products and Production improvement. • Funding on project merit. 	<ul style="list-style-type: none"> • Indigenous People or Organizations • Agricultural Producers (individuals or groups) • Agriculture Producer • Associations • Academic or Research Institutions • Agri-Businesses
<p><u>Agri-Industry Development & Advancement</u></p> <ul style="list-style-type: none"> • Funds will be available to support activities related to: <ul style="list-style-type: none"> ➤ Business development funds for producers and New Entrant farmers and associations. ➤ Advancing Crop can be used for plant genetic* and for strategic infrastructure for agricultural machinery clubs or cooperatives. ➤ Market and Product Development funds for marketing approaches for potential new markets, both domestic and international, meet industry standards or certification requirements, etc... ➤ Agri-Land Enhancement funds to support agriculture producers in bringing new land into production. 	<ul style="list-style-type: none"> • Indigenous People or Organizations • Agricultural Producers (individuals or groups) • Agriculture Producer • Associations • Academic or Research Institutions • Agri-Businesses

*May be applicable to work on hemp genetic production in the future



6. Agriculture and Agri-Food Canada

6.3 Canadian Agricultural Partnership with New Brunswick (cont)

Non-Business Risk Management Programs	Eligibility
<p><u>Enabling Agricultural Research and Innovation</u></p> <ul style="list-style-type: none">• Assistance for innovative research and development projects; on-farm demonstration trials; pre-commercialization development activities; on-farm innovation; and adoption of new technologies that have a regional or local impact.• Three areas:<ul style="list-style-type: none">➤ Innovative Research and Development: financial assistance to support short to medium term (1-5 years) projects.➤ Accelerating Agricultural Innovation: financial assistance to accelerate new product, practice or process development.➤ Innovative Technology and Demonstration: To support the early adopters of new technologies or practices as well as supporting the development, adaptation, or demonstration of technical innovations on-farm.	<ul style="list-style-type: none">• Indigenous People or Organizations• Agricultural Producers (individuals or groups)• Agriculture Producer• Associations• Academic or Research Institutions• Agri-Businesses

* May be applicable to hemp production in the future



6. Agriculture and Agri-Food Canada

6.4 Canadian Agricultural Partnership: Federal Activities and Programs

<u>Growing trade and expanding markets</u>	Eligibility
<p>AgriMarketing Program A five-year, up to \$121 million federal initiative to help the industry increase and diversify exports to international markets and seize market opportunities. The program supports industry-led promotional activities that differentiate Canadian products and producers, and leverage Canada's reputation for high quality and safe food. The program also helps some sectors maintain their domestic market.</p> <p>AgriCompetitiveness Program A five-year, up to \$20.5 million program to assist industry-led efforts to provide producers with information needed to build capacity and support the sector's development. Funding will support sector-led activities such as farmer-oriented seminars, and conferences that identify industry best practices and build the capacity of the sector, farm business management, farm safety information and tools, as well as activities which raise agricultural awareness. Open to not-for-profit organizations including associations in Canada and Indigenous organizations.</p>	<ul style="list-style-type: none">• National Industry Associations• Small and medium-size enterprises • not-for-profit organizations• associations in Canada• Indigenous organizations.

6. Agriculture and Agri-Food Canada

6.4 Canadian Agricultural Partnership: Federal Activities and Programs

<u>Innovative and sustainable growth in the sector</u>	Eligibility
<p><u>AgriScience Program</u> A five-year, up to \$338 million initiative to support leading edge discovery and applied science, and innovation driven by industry research priorities. Designed to accelerate the pace of innovation, the program supports pre-commercialization activities and invests in cutting-edge research to benefit the agricultural and agri-food sector.</p> <p><u>AgriInnovate Program</u> A five-year, up to \$128 million initiative to accelerate the commercialization, adoption, and/or demonstration of innovative products, technologies, processes or services that increase agri-sector competitiveness and sustainability. The program will provide repayable contributions on projects that focus on one or more of the following priorities:</p> <ul style="list-style-type: none">➤ adoption of new or world or world leading clean technology (including precision agriculture)➤ increase productivity through advanced manufacturing, automation or robotics➤ strengthen Canada's value-added agri-sectors➤ secure or expand new export markets.	<ul style="list-style-type: none">• not-for-profit organizations• Indigenous groups in the agriculture, agri-food, agri-based products sector. • for-profit organizations that are incorporated in Canada, including: businesses and/or corporations, co-operatives, and Indigenous communities.

7. Farm Credit Corporation

- Established in 1959 under the Farm Credit Act, [Farm Credit Corporation](#) (FCC) is Canada's largest term lender in the agriculture sector.
- The goal is to foster rural development by providing specialized and customized financial services to farms, including family farms, as well as and rural businesses in Canada, including small and medium-sized businesses related to agriculture.

Crop inputs

Finance crop inputs through our network of crop input retailers.

Finance Equipment

Finance through our network of equipment dealers.

Lease Equipment

Lease new or used equipment through our network of equipment dealerships.

Young Farmers

Finance starting or expanding operation with the Young Farmer Loan.

Farm Transfers

Take over the family farm or passing farm assets to the next generation

Land and Buildings

Purchase farmland or expansion of operation with a new building.

Environmental Solutions

FCC finances environmental solutions that can help to switch to environmentally sound practices and renewable energy resources.

- For agri-business and agrifood. FCC works on case by case based on business plan to finance equipment, expand a business or finance a need specific operation.

8. National Research Council

Industrial Research Assistance Program (IRAP)

- IRAP offers financial assistance to eligible firms under different programs:
 - Technology innovation projects
 - Youth employment strategy programs
- Provides financial support to qualified small and medium-sized enterprises in Canada to help them undertake technology innovation.
- Firms must have the objective to grow and generate profits through development and commercialization of innovative, technology-driven new or improved products, services, or processes in Canada.

9. Export Development Canada

Buyer Financing

- The company provides EDC with the export contract and credit information on your foreign buyer and EDC completes the credit review and approval process.
- Once the review is approved, EDC issues a loan agreement to your buyer and alerts you, the exporter.
- The payment to you is usually triggered by EDC's receipt of a buyer-approved invoice and EDC holds responsibility for collecting payment from your buyer and administering the loan.

Direct Lending

- **Expand international operations**
A direct loan to support expansion plans, including financing equipment, facilities, or the establishment or the expansion of a foreign affiliate.
- **Grow sales in new markets**
Financing to increase capacity, allowing you to take on more export contracts and cover your work-in-progress costs.
- **Take a risk-positive outlook**
Loan to support a higher risk appetite than commercial banks in various markets.
- **Get financing flexibility**
A loan can be made directly to a Canadian company in support of its international investment, or to a foreign affiliate, secured by the foreign assets.

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Section V

REGULATORY ENVIRONMENT

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1. Objectives and Methodology

Objectives:

- To reflect current and potential regulatory and policy environment in the future.
- To be align or at least to recognize synergies with other related GNB initiatives impacting the hemp industry in New Brunswick.

Methodology:

The report summarizes the key elements of the rules and regulations at the federal and provincial level that are pertinent for growers and processors in the hemp industry.

The data was collected from government publications and articles from specialized publications.

2. Government of Canada Regulations

2.1 Overview

- The regulatory and policy environment at the federal level is at two levels:
 - ✓ For cultivation of industrial hemp, the regulatory body is Health Canada under the Cannabis Act.
 - ✓ Health Canada issues licences for the cultivation under the Industrial Hemp Regulations.
 - ✓ For trade, certification and grading of industrial hemp seeds, it is the Canadian Food Inspection Agency (CFIA) who is regulating under the following rules:
 - Seeds Act
 - Seed regulations
 - Plant Protection Act
 - Plant Protection regulations.
- The federal legislation came into effect on October 17, 2018.

2. Government of Canada Regulations

2.2 Health Canada

Cannabis Act

- The *Cannabis Act* (Bill C-45) is the law which legalized recreational cannabis use nationwide in Canada in combination with its companion legislation Bill C-46 an Act to amend the criminal Code.
- Under this Act, the provinces are responsible for setting up a system for retail sales.
- Mail delivery is handled by Canada Post by law.

Industrial hemp regulations

- These regulations are for growers and processors.
- The Industrial hemp regulations covers the following aspects:
 - ✓ Licence: to sell, import, export, cultivate, propagate and work on seeds.
 - ✓ Import permit: in addition to a licence, an import permit per shipment is required to import seed or grain.
 - ✓ Export permit: same as for import permit.
 - ✓ Importation: only for seeds of pedigreed status recognized by the Organization for Economic Co-operation and Development Seed Schemes or the Association of official Seed Certifying Agencies.
 - ✓ Exportation: declaration with licence number, export permit, date and quantities of export.
 - ✓ Cultivation: site identification, hectares, seed. Sales of heads, leaves and branches only to licensee.
 - ✓ Documents: keep a record of all pertinent info.

2. Government of Canada Regulations

2.3 Licenses

Canadian Industrial Hemp Licences by Province in 2017

Provinces	Total Licences and Registries	Licenses and Registries for Cultivation	
			% of total licenses
Alberta	480	325	68%
British-Columbia	31	14	45%
Manitoba	379	235	62%
New-Brunswick	33	23	70%
Nova Scotia	6	3	50%
Ontario	83	48	58%
Prince-Edward-Island	14	7	50%
Quebec	286	230	80%
Saskatchewan	518	351	68%
Total	1830	1236	68%

Source: Health Canada <https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/producing-selling-hemp/about-hemp-canada-hemp-industry/statistics-reports-fact-sheets-hemp.html>

2. Government of Canada Regulations

2.4 Canadian Food Inspection Agency (CFIA)

➤ Seed Act

The Seed Act covers all categories of seeds and define the rules for all aspects from imports to processing, research, analyses and control.

➤ Seed Regulations

This document regulates all type of seeds and it applies to companies involved in the imports of seeds, norms, classification, labelling, etc. such as the seed distributors.

➤ Plant Protection Act

The Plant Protection Act is designed to prevent the importation, exportation and spread of pests injurious to plants and to provide for their control and eradication and for the certification of plants.

➤ Plant Protection Regulations

This regulates the measures to eradicate and prevent the spread of pests. It covers importation rules and transportation conditions and exportation rules.

2.5 Canada Revenue Agency (CRA)

➤ A licence from CRA is required to cultivate, produce, or package cannabis.

➤ This licence is under the Excise Act, 2001.



3. Government of New Brunswick Regulations

In New Brunswick, five Acts are covering cannabis. One is related to the sales and marketing by the industry and the others are related to the consumer:

- The *Cannabis Management Corporation Act* establishes in legislation the Cannabis Management Corporation, a Crown corporation charged with the oversight, organization, conduct, management and control of the retail sales of cannabis. This means that the Corporation is the exclusive buyer and seller for cannabis products in the Province.
- The *Cannabis Control Act* controls the consumption and practice of cannabis. It establishes the legal age for the purchase, consumption and cultivation of cannabis at 19 and outlines general restrictions on consumption and possession.
- The *Cannabis Education and Awareness Fund Act* establishes a fund to support research and the development, implementation and delivery of education and awareness programs for harm reduction and the responsible practice of cannabis consumption.
- Amendments to the *New Brunswick Liquor Corporation Act* allows NB Liquor to operate cannabis retail operations through a subsidiary, Cannabis NB.
- Amendments to the *Motor Vehicle Act* establishes a drug-impaired driving program.

4. Overview in the USA

- At the federal level, the Farm Bill of 2018 approved in December includes the Hemp Farming Act of 2018.
- The Bill allows cultivation of industrial hemp (less than 0.3% THC) and hemp and hemp products are allowed to move across state borders.
- Regulations will be managed by USDA and state department of agriculture.
- State department of agriculture will produce a plan for licensing and regulations for hemp and this plan will have to be approved by USDA.
- CBD remain illegal at the federal level but the Farm Bill but create some exceptions.

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Section VI

SWOT ANALYSIS

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1. Objectives

D7: SWOT Analysis

- To develop a SWOT (strengths, weaknesses, opportunities and threats) analysis based upon New Brunswick's current assets and gaps.
- To propose activities and programs to incorporate these into the overall development strategy.

2. Strengths

The principal strengths are:

Government has Created An Attractive Business Environment

- Opportunities NB has initiated and developed a cannabis growth strategy and is implementing it with success.
- DAAF has decided to allocate efforts and resources for the development on industrial hemp.
- The regulatory framework is in place to support the development of industrial hemp industry.
- A wide variety of funding programs are in place for the hemp industry.

Industrial Hemp Companies Already Established

- There are five currently major industrial hemp companies established in NB: Arcadia EcoEnergies Ltd, Global Hemp Group, Modern Hemp Innovations, Canutra Naturals and 1812 Inc.

Strong and Diversified R&D Network Already Active in Cannabis

- The network of about a dozen research centres has been active in cannabis since a few years. This network is presently playing a leading role in the creation of the Regional Cannabis Cluster Pilot Project within the Springboard Atlantic Network which has developed capacity in such areas as:
 - Outdoor cultivation of hemp for extraction of THC, CBD and terpenes;
 - Advanced genetic mapping of the cannabis plant;
 - Field trials of cutting-edge indoor and outdoor cultivars, growing techniques and equipment;
 - Social Science research assessing the social and economic impact of legalization;
 - Clinical trial data on specific cannabis molecules and whole plant extracts.



2. Strengths (cont)

Four Major Canadian Cannabis Companies Established in NB

- NB (Opportunities NB) has successfully supported Canopy Growth, Zenabis, OrganiGram Holding and Tidal Health, four major players in the world of cannabis which are developing international partnerships.
- The investment by Constellation Brands, a major wine and beverages US company, in Canopy Growth brings new market perspectives across North America.
- These companies have a great understanding of the cannabis industry and have international export plans.

Presence of Major Industries in NB as Potential Partners

- Forest products industries , food and beverage processing companies, feed manufacturers for aquaculture are potential local partners for “new” products containing CBD and hemp. These companies can leverage their national and international networks.

Agricultural Sector Developing Expertise in Hemp Cultivation

- Some “Early Adopter” growers have been working on a trial and error approach and are learning as they go, but maintain confidence in the potential of that new source of revenues and see it as an opportunity to improve the future of the agriculture sector.
- Good availability of land at highly competitive prices has already attracted investors from other provinces.
- Potato and other growers have valuable agricultural experience and are considering hemp as an alternative crop (rotation crop and/or cash crop).

2. Strengths (Cont)

First Nations Participation

- They have indicated a strong interest in participating in the development of the industrial hemp sector.

Key Support Organizations are Actively Involved in the Development of the Industry

- BIONB is actively supporting the industrial initiatives for the creation of the new companies.
- ACOA, acting through Springboard Atlantic Network, has already committed resources for the development of the sector.
- The industry is represented by the Canadian Hemp Trade Alliance.

3. Weaknesses

The principal weaknesses are:

Value Chain Structure Not Yet Developed

- Up to now the opportunities to bring the players together and create a value chain have been limited.
- Limited number of players in this new industry and lack of market opportunities has limited the growth of the sector.
- Limited availability of adequate equipment for harvesting fiber and flowers.
- Limited number and capacity of drying and storage facilities for flowers.
- Lack of processing capacity.

Need for More Research on Varieties Evaluation and Development

- The adaptation to local agricultural conditions of the varieties presently available on the market is not well documented.
- Genetics with a higher CBD content for improved profitability are still at the research stage.
- Research on terpenes is very limited while this will allow to produce varieties with aromatic characteristics targeting specific new products with some uniqueness.
- Intellectual property on varieties needs to be developed to provide protection for the stakeholder companies and some market advantage.



3. Weaknesses (cont)

Health Canada delays and limited registered pesticides

- The growers have difficulty getting technical and regulatory answers in a reasonable timeline.
- Health Canada has registered a limited number of pesticides for hemp production.

At present, Quality Assurance and Certification Procedures are limited

- The industry will need to adopt quality assurance program to facilitate the adoption of their products by either the companies using hemp as an ingredient or for the general public.
- The presence of pesticides is a concern as a recent US investigation found that some US products contained contaminants that exceeded FDA standards.

Lack of Standards for Fibre

- The use of fibre in many industrial applications will require that specifications are in place to facilitate the inclusion in manufactured products.
- Specifications and Standards will also need to be developed and approved by regulatory bodies.
- The Canadian Hemp Trade Alliance (CHTA) has initiated, in December 2018, an MOU with ASTM international's cannabis committee to overcome that issue but it will take time.

Very New Industry with Limited Historical Background

- With only a few years of existence, only months in some cases, the industry has to develop business and marketing experience in this new sector.
- Links with major industrial groups like food and beverage companies, feed companies and forest products companies to support and guide market development are possible but will require time and efforts to materialize.

3. Weaknesses (cont)

At Present, Limited Fibre Market

- While many industrial applications are known, only a few have passed the experimental stage and are manufactured on a commercial scale.
- When harvesting is done with traditional combine, the fibre tends to be damaged resulting in a lower value.

Absence of a Dedicated Industry Organization

- There is currently no NB industry association dedicated to the sector to facilitate the exchange of information in various forms.
- BioNB has been helpful, in the emergence of the hemp industry in New Brunswick.

4. Opportunities

The principal opportunities are:

Market for CBD Will Strong in the Short and Medium Terms

- The present price level for CBD and the abundance of very attractive forecasts being published, contribute to attract investors in every country where growing is legally possible.
- There is therefore a short term window of opportunity to develop customized CBD products.

Market for Conventional Grains and Hemp Oil Will Continue to Grow

- The market for conventional grains (low CBD content) and hemp oil which is primarily in the health and wellness segment will increase due to the new image of hemp as an acceptable product.
- Hemp seed and oil provide high concentration of vegetable-based proteins and a good balance of omega 3 and 6 and vitamins.
- To monitor that trend, the sales for Manitoba Harvest and similar companies will give a good indicator.

Market for Fibres Will Grow but at a Slow Pace in North America

- Product development, testing and certification are steps that take several years before being market ready. The ASTM international's cannabis committee will bring new opportunities.



4. Opportunities (cont)

NB is Well Positioned to Benefits from the Future Standards

- The European market for seeds, grain and fibre will open when standards will be in place and NB, with its port infrastructure will be more competitive than Western Canada.

Genetics and Intellectual Property (IP) Protection Can be Developed in NB

- The industry's growth potential is pushing companies to develop their research teams with scientists, geneticists, molecular biologists, and, more importantly, patent lawyers to access intellectual property.
- IP protection can also be applicable to the development of new equipment designed for the specific needs of the hemp industry.
- To compete in this environment, NB has the advantage of a few companies established in the province undertaking internal R&D projects and its strong public R&D network.
- R&D development and IP protection will allow companies to offer customized products and obtain a market advantage in an industry that is young.

Development of the Value Chain

- NB has the opportunity to organize the presently unstructured value chain into an efficient and balanced value chain with the existing public and private base sharing common goals.
- First Nations have expressed their interest to participate in the development of the industry.
- Provide training programs to develop the expertise in every aspects of the chain.
- Support the development of adequate facilities and equipment.
- Stimulate networking among the stakeholders.
- Promote the value chain in target markets.
- Develop a consulting expertise for the improvement of the chain and for foreign markets.



4. Opportunities (cont)

New Brunswick Has the Opportunity to Produce High Quality fibre

- Western Canada has positioned itself with the same approach that they have for cereals or pulses: volume orientated, bulk shipments, export markets, large machinery, etc. This results in damaging the fibre and very limited success in their ventures to use the rest of the plant (fibres, shives).
- New Brunswick has the opportunity to develop harvesting techniques that preserve fibre.

New Brunswick can Become a major Supplier of Organic Products

- Availability of land potentially certified.
- Strong demand in Europe.

New Brunswick Has the Opportunity to create a Unique Branding

- At the present, there is no dominant North American hemp industry brand.
- Opportunity for New Brunswick to position itself and build a brand to develop a competitive advantage around high value and quality.
- This will be based on three pillars: infrastructure of the industry, level of knowledge and the genetics.

5. Threats

The principal threats are:

Government Regulations on CBD Will Drive Market Development

- The success of the industry is very dependent on legalization and regulations in each market.

Impact of US Farm Bill

- The New US Farm Bill may have a negative impact on the access to US market.

Impact of Trade Regulations between Canada and the US

- This may affect the organization of the distribution networks, product registration by the regulatory bodies in each country, etc.

Lack of Regulatory Framework

- The lack of regulatory framework to oversee issues related to cross pollination and site location is a concern to many stakeholders already involved and those who may be interested in doing business in NB.

The Competition on Genetics will be Intense

- The race on genetic research is already started by start-ups and by multinationals from the food and beverages sector and the pharmaceutical sector.

CBD prices will drop as result of increased production

- The fast-growing supply will create a drop in prices.
- Some sources estimate that it may not happen before the horizon 2023 -2028, but it may happen sooner.



Section VII

PROPOSED STRATEGY AND ACTION PLAN

2019 – 2023

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1. Context

Overview

Based on the previous sections of this document we can derive the following conclusions:

- The New Brunswick business environment already has in place most of the components needed to burgeon and grow the industrial hemp industry over the next five years.
- As a result New Brunswick has a substantial competitive advantage which should not be lost.
- A group of five products offer high market opportunities to nurture that growth.
- Some investment in infrastructure is needed to complete the value chain such as harvesting and post harvesting equipment and a fibre processing facility.
- The by-products represent potential additional revenues.
- An integrated R&D program can be expected to develop new products.
- The presence of major industrial sectors in New Brunswick represents a unique potential for collaboration in the development of new products in food, beverages, animal feed and industrial applications.

Vision

To build a new industry based on the high value segments of industrial hemp and contribute to the growth of the New Brunswick economy in the 21st century.

Mission

To develop a vibrant ecosystem around industrial hemp by encouraging collaborations and creating synergies between growers, processors, R&D network, supporting agencies, companies that use hemp as ingredients in their products and the general public.



2. Priorities by Product: THE RANKING

Product opportunities have been ranked based on two criteria: competitive advantages and market opportunities. For each, the evaluation was done for the present situation and that expected for 2023.

- The nine (9) principal product categories are evaluated (not in order of priority):
 - Seeds/Genetics
 - Conventional grain and related products (oil and cake)
 - Organic grain
 - Hemp CBD
 - High purity Hemp CBD (obtained by CO² extraction)
 - New cannabinoids (research is underway to explore others than THC and CBD)
 - Fibre
 - High quality fibre
 - Shivs (hemp wood or hurds)
- Market opportunities by category, are ranked as a function of the combination of the size of the market and the value of the product evaluated from low to high in 2019 and in 2023.
- The competitive advantages have been measured by considering the seven major strengths identified in the SWOT analysis and their impact by product categories. These strengths are:
 - Attractive Business Environment
 - Presence of industrial hemp companies
 - Strong & diversified R&D expertise
 - Presence of four cannabis companies
 - Presence of major industries (food, feed and wood products)
 - Agricultural expertise (industrial crops, seeds)
 - Support organizations.

An evaluation made for 2019 and 2023 is described in the following tables and illustrated visually after the tables.

2. Priorities by Product: THE TOP FIVE DRIVERS

Five product categories are ranked as high priority for New Brunswick. The proposed strategies will detail how to achieve these targets and the actions to be implemented.

Products	Competitive Advantages	Market Opportunities	Priority
High Purity CBD	Addition of CO ² Extraction facility to allow supply of high purity CBD.	Strong demand forecasted in the pharmaceutical sector at US\$625 million by 2022.	High
CBD	The core of growers and processors, including the cannabis producers are already in CBD.	CBD US sales forecast for 2022: US\$646 million and Europe is expected to reach same level in a few years.	High
High Quality Fibre	Capacity to cultivate and process high quality long fibres and develop new applications.	Strong demand in Europe for bio composites and other industrial uses.	High
Seeds/ Genetics	New Brunswick has strong expertise in genetics proven by its exports of seeds potatoes. The R&D network is already active in hemp genetics and can further develop this expertise.	The market for new genetics will grow rapidly and demand for new varieties (i.e.: higher CBD content).	High
Organic grains	Organic certification can be obtained rapidly because of availability of suitable uncultivated land, as well as growers expertise. Port infrastructure for the European export market.	The demand is strong in Europe and will grow in North America due to growing consumer interest for organic products.	High



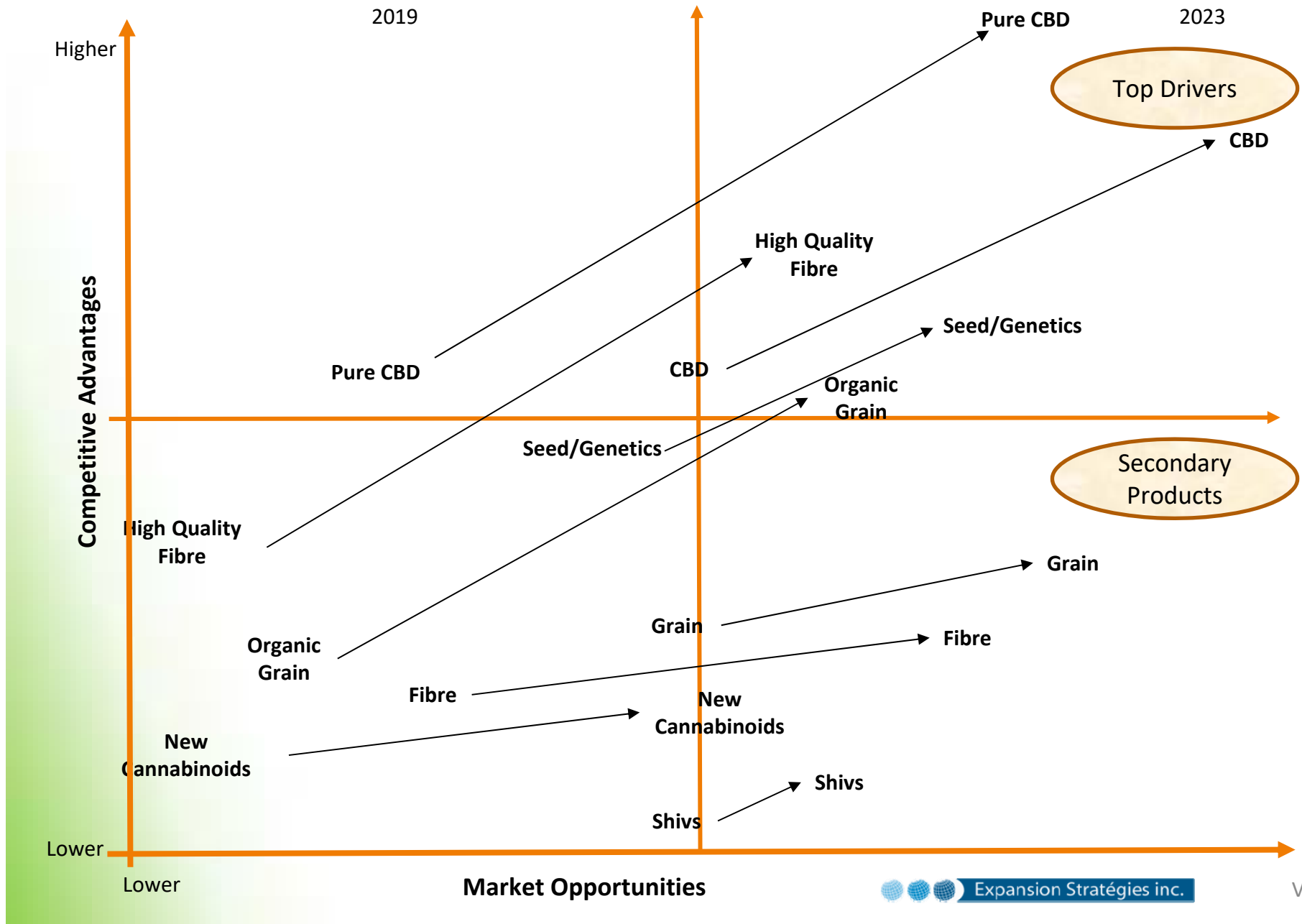
2. Priorities by Product: THE SECONDARY PRODUCTS

Other products have a large span of market opportunities which can bring additional revenues to the industry and reduce the risks associated with market changes for the top drivers. Specific strategies are proposed to take advantage of these opportunities and actions to implement these strategies.

Products	Competitive Advantages	Market Opportunities	Priority
Grain, oil & cake	New Brunswick has a group of growers already active in grain production and they are improving their expertise and their production.	Grains have been marketed for many years in the food sector. Demand will continue to grow slowly.	Medium
Fibre	The use of European technology to produce a technical fibre under high ecological and social standards at the same price level as Asian imports.	Moderate growth for short fibres in Europe for industrial applications.	Medium
Shivs	New applications for this by-product can be developed.	Established market for animal bedding, mulch, hempcrete, etc. in neighbouring markets.	Low
New Cannabinoids	Expertise of the R&D network to identify new cannabinoids with commercial value.	Uncertain at this stage but high market interest if benefits are identified.	Low for the moment

2. Priorities by Product: THE TRENDS TOWARDS 2023

This diagram shows a visual representation of the 2019 positioning and the expectations for 2023.



3. Horizon 2023: OVERVIEW OF STRATEGIES AND ACTION PLAN

To realize, over the next five years, the potential of each product category described in the previous pages, four (4) strategies are proposed and eight (8) actions are identified. These are detailed, together with the principal constituent activities, in the following pages.

- **Strategy 1: Organize the Industrial Hemp Industry**

- Action 1: Build the Foundations of the New Brunswick Hemp Industry Cluster with inclusion of First Nations

- Action 2: Create an Hemp Industry Development Fund with Focus on the Top Drivers including Intellectual Property (IP) Protection.

- **Strategy 2: Support the Viability of a Core Group of Processors**

- Action 3: Provide Technical Assistance to Growers for Development of the Top Drivers including Training for Food Safety and Good Agricultural Collection Practices (GACP)

- Action 4: Secure Markets for the Top Five Drivers Including Monitoring Competitive Market Intelligence

- **Strategy 3: Maximize the Use of the Whole Plant**

- Action 5: Develop an Integrated R&D Program on Fibre for Industrial Uses

- Action 6: Evaluate the Feasibility for a Pilot Plant for Fibre Decortication

- Action 7: Encourage Cooperation and Initiatives to Minimize Hemp Waste

- **Strategy 4: Maximize the Economic Benefits for the Province**

- Action 8: Promote Adoption of Hemp-based Products by New Brunswick Businesses Including Branding of the New Brunswick Hemp Cluster

After these descriptions, two (2) timetables illustrate quarter by quarter the schedule of the key activities taking into consideration the timing of growing and harvesting seasons, trade shows, etc.

STRATEGY 1: ORGANIZE THE INDUSTRIAL HEMP INDUSTRY

Action 1: Build the Foundations of the New Brunswick Hemp Industry Cluster

Definition of Cluster¹: “Geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries and associated institutions...in particular fields that compete but also cooperate”. A cluster organization will develop the networking between all the stakeholders, provide information through various channels (meetings, website, newsletter, seminars, training courses, etc.). It will create partnerships for research and funding, monitor trends, create new business opportunities, encourage product development, develop government relations, develop branding strategies, etc.

Situation 2019	Target 2023
<ul style="list-style-type: none">- The current core group consists of 5 Processors, each at the start-up phase. None has generated significant revenue to date.- The only products where they could have contract opportunities presently are: hemp seeds/grains.- They are not well equipped to extract oil or CBD and process fibre.	<ul style="list-style-type: none">- The activities of the a cluster have generated a good level of interaction between the stakeholders and resulted in economies of scale.- The markets for the initial products are established and secured.- The cluster is recognized for its leadership in the country and with neighboring provinces and states.
Action Plan	
<ul style="list-style-type: none">- Create awareness and secure start-up funding for a Cluster.- Collaborate with First Nations to determine their interest to participate and how they can best contribute.- Register a hemp industry Cluster where all the stakeholders will be represented.- Recruit a cluster facilitator with experience in economic development and start-ups.- Develop a business plan for the cluster to be approved by the stakeholders.	

1: Source: Professor Michael Porter

STRATEGY 1: ORGANIZE THE INDUSTRIAL HEMP INDUSTRY

Action 2: Create an Hemp Industry Development Fund

The development of the hemp industry has special needs because it is a new crop. These needs are in genetics, production procedures and techniques, processing, etc. Established crop sectors have solved most of these issues many years ago.

A dedicated fund will offer the opportunity to industry members to submit proposals for projects that will address these new needs.

Situation 2019	Target 2023
<ul style="list-style-type: none">- No dedicated fund for the development of the hemp industry.	<ul style="list-style-type: none">- A dedicated fund is in operation to support industry initiatives contributing to the development of the hemp value chain.
Action Plan	
<ul style="list-style-type: none">- Establish the new fund and its operation mechanisms.- Finance the new fund from existing programs and from partners like ACOA.- Organize a “Call for Proposal” system focused on strategic opportunities and issues.- Set up an “unsolicited Proposal” system where initiatives can be submitted.- Give a special attention to projects targeting the development of the products identified with a high priority – in the short term: CBD and genetics, in the medium term: organic grains and fibre.- Contribute financially to intellectual property protection for seeds and specialized machinery.	

STRATEGY 2: SUPPORT THE VIABILITY OF A CORE GROUP OF PROCESSORS

Action 3: Provide Technical Assistance to Growers for Development of the Drivers

The processors need high quality products from the growers to succeed in their marketing. Since most growers are working with production contracts from processors, growers will need technical assistance to develop their expertise in hemp production with specific agronomic considerations for the various plant uses.

Situation 2019	Target 2023
<ul style="list-style-type: none">- Growers have the land, the equipment and the agricultural experience but need to improve their knowledge of hemp production and related Best Management Practices.- They are ready to work on contract basis as long as a reasonable revenue is guaranteed.- No organic production	<ul style="list-style-type: none">- Growers with a few years in hemp cultivation will adopt Best Management Practices.- They have access to adequate harvesting and post processing equipment.- Organic production is gaining a fair market share.- New processors are investing.
Action Plan	
<ul style="list-style-type: none">- DAAF will monitor the production activities to gain additional knowledge.- DAAF will contribute to technical training events from soil preparation to post harvesting.- DAAF will give a special attention to technical support for priority products (CBD and seeds/genetics) and Intellectual Property (IP) protection including training for food safety and Good Agricultural Collection Practices (GACP).- DAAF hemp working group to continue its activities and increase engagement.- Define an integrated precompetitive R&D program on genetics (i.e.: variety trials, seed stock) and support intellectual property (IP) protection.- Investigate and evaluate harvesting and post harvesting equipment available on the market.	

STRATEGY 2: SUPPORT THE VIABILITY OF A CORE GROUP OF PROCESSORS

Action 4: Secure Markets for the Top Five Drivers

The short term priority is to assist the processors so they sign contracts with buyers.

Situation 2019	Target 2023
<ul style="list-style-type: none">- The processors have only small or no quantities of products available for sale.- Limited access to markets.- Organic products are not yet available.- High quality fibres have to be developed.	<ul style="list-style-type: none">- Each processor has signed contracts with buyers for the production contracted with growers. Some buyers may be in New Brunswick but the bulk of the sales will probably be done outside the province in the Northeast US and Europe.- Each processor has reached positive financial results.- Certified organic products are available.- Co-operative CO²- process extraction facility established for high quality CBD.
Action Plan	
<ul style="list-style-type: none">- Create a hemp website including a page with info on processors/ products and a brochure for buyers.- Develop the awareness of market opportunities for certified organic products with processors and growers.- Monitor market developments on on-going basis to identify the new trends.- Organize marketing initiatives for the processors such as buyers days, trade missions and/or a booth in selected Food Shows.- Investigate option of CO² process extraction facility for high quality hemp CBD.	

STRATEGY 3: MAXIMIZE THE USE OF THE WHOLE PLANT

Action 5: Develop an Integrated R&D Program on Fibre for Industrial Uses

The use of long fibres (more valuable than short fibres) is not developed commercially in North America while in Europe a number of applications are marketed (i.e.: bio composites). In an effort to maximize the use of the whole plant, R&D is needed to identify marketable applications for New Brunswick fibres.

Situation 2019	Target 2023
<ul style="list-style-type: none">- Some preliminary product samples have been made by some processors.	<ul style="list-style-type: none">- To have a catalogue of the fibres available with their characteristics/specifications.- If standards are defined by ASTM, the potential applications could be enhanced.- Commercial production of some industrial products under way.
Action Plan	
<ul style="list-style-type: none">- Identify the characteristics of fibres presently used in Europe for industrial applications.- Identify partners with proven fibre processes.- Define an integrated R&D program to characterize the various fibres to be produced in New Brunswick.- Participate in the development of fibre standards.- Conduct prefeasibility studies for selected fibre-based products (i.e.: hemp panels for furniture, hemp flooring, woven mats boards, etc).- Organize a yearly conference on R&D program advancement and market opportunities.	

STRATEGY 3: MAXIMIZE THE USE OF THE WHOLE PLANT

Action 6: Evaluate the Feasibility for a Pilot Plant for Fibre Decortication

Processors will need to extract long fibres to access the industrial products markets. This required investment is too great for one company in the short and medium term. The options are:

- To attract a European company with a combination of processing expertise and market access either as a foreign direct investment or a joint venture with New Brunswick processors.
- To create a co-op of processors to set up the plant. The risk being the lack of technical knowledge and the need to build market access.

Situation 2019	Target 2023
<ul style="list-style-type: none">- Decortication can be done only outside the province. The closest fibre processing facilities are in Quebec.	<ul style="list-style-type: none">- To have a decortication plant with a sufficient capacity for the total raw material being produced in New Brunswick (industrial hemp and cannabis)- The decortication plant will be able to process high quality fibre.
Action Plan	
<ul style="list-style-type: none">- Evaluate the feasibility and the conditions to contract an outside fibre processing facility.- Trade mission to international equipment trade show (i.e.: “Hemp Machines & Technologies”, Poland in May 2019 or “EIHA Hemp Conference”, Germany in June 2019 or “NoCo Hemp Expo” in Colorado in March 2020)- Investigate the European market (especially France) for a potential partner investor.	

STRATEGY 3: MAXIMIZE THE USE OF THE WHOLE PLANT

Action 7: Encourage Cooperation and Initiatives to Minimize Hemp Waste

A large volume of biomass may be wasted and may become an environmental problem if the hemp industry limits its processing to the CBD component of the plant. Growers and processors need to be encouraged to collaborate to achieve economies of scale to make use of the whole plant or to dispose of waste in accordance with regulatory frameworks.

Situation 2019	Target 2023
<ul style="list-style-type: none">- Hemp/cannabis waste is not yet an environmental issue, but this may occur.	<ul style="list-style-type: none">- To have developed technologies and markets for by-products from industrial hemp and cannabis.- To dispose of residual waste in accordance with regulatory frameworks.
Action Plan	
<ul style="list-style-type: none">- Review production and environmental regulations applicable to hemp/cannabis waste.- Monitor initiatives in other jurisdictions that manage hemp waste disposal.- Identify initiatives in North America that innovate and create new by-products.- Encourage industry to collaborate to identify and follow best practises for disposal.- Encourage the hemp/cannabis industry to collaborate to develop and market by-products.- Government should support initiatives that utilize whole plant uses.	

STRATEGY 4: MAXIMIZE THE ECONOMIC BENEFITS FOR THE PROVINCE

Action 8: Promote Adoption of Hemp-based Products by New Brunswick Businesses

The increasing availability of hemp products in New Brunswick should provide new opportunities to a wide variety of businesses either to enrich their line of products or to launch new products, by using elements of the hemp plant as additives or prime ingredients. This is not just for large corporations in food, beverages, feed and industrial products but also to medium and small businesses (*i.e.*: livestock, bakeries for gluten free breads, hemp soap, cosmetics, etc.).

Situation 2019

- New Brunswick is home to several major food, beverage and industrial companies, and many smaller ones.
- Very few companies use hemp grains or oil in their line of products.
- Low level of awareness of the potential of hemp.
- Hemp as a feed ingredient for livestock and aquaculture is not currently permitted.
- Hemp ingredient for pet food is not used.

Target 2023

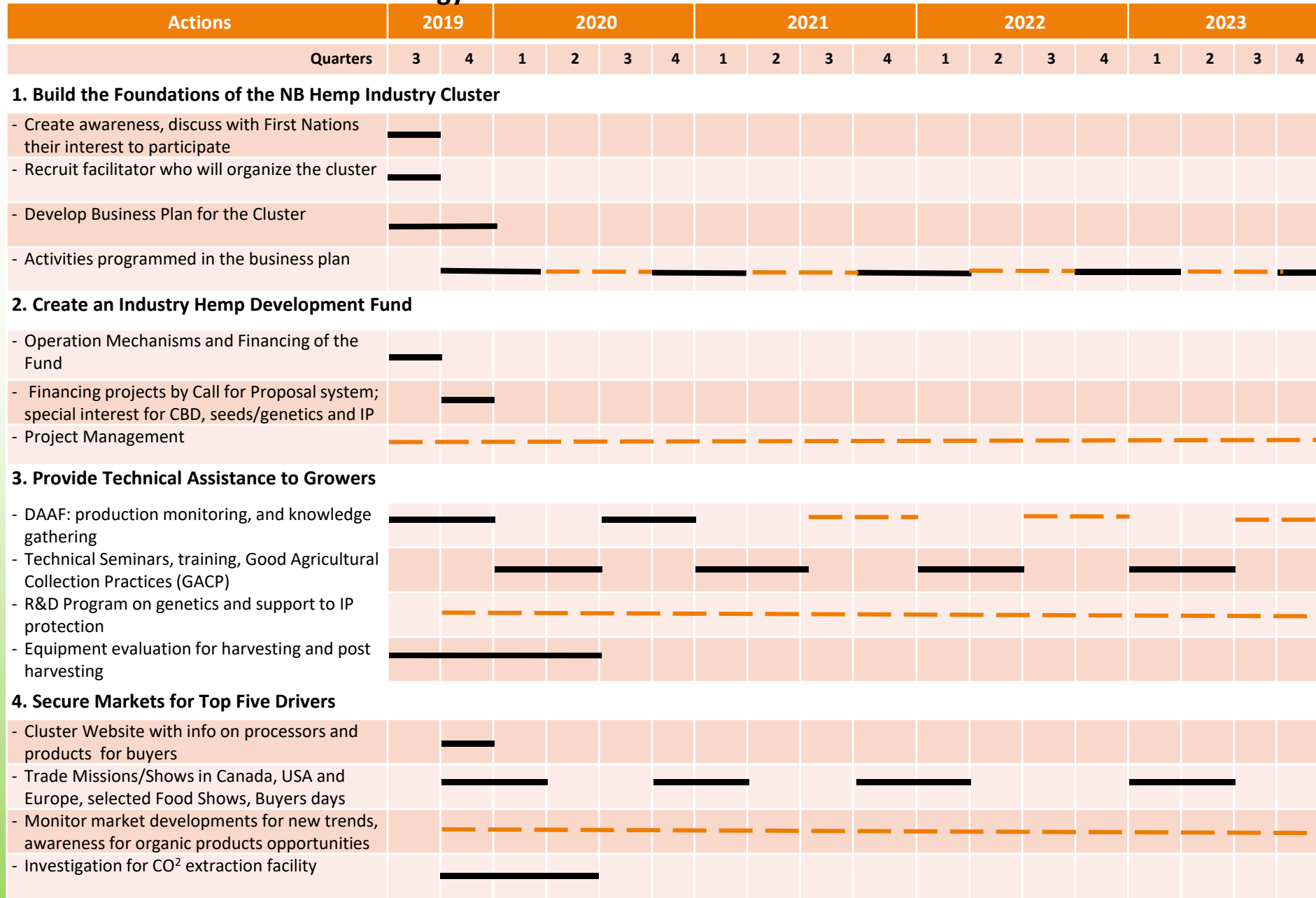
- To see in the market various products with the label “contains hemp grown in New Brunswick”.
- To reach a level of awareness in the community.
- Pet food with hemp ingredient is on the market.
- Hemp as feed ingredient is approved by CFIA.

Action Plan

- Include First Nations in the development of hemp-based products.
- Promote NB Hemp products in farmers markets, food shows, magazines, etc.
- Develop the branding of New Brunswick Hemp Cluster.
- Organize “Open Doors” visits at hemp processing facilities for potential buyers and users.
- Organize Industry opinion leaders roundtables on hemp uses.



4. Action Plan Timetable for Strategy One and Two



Intensive activity ■ Ad hoc activity - -



5. Action Plan Timetable for Strategy Three and Four

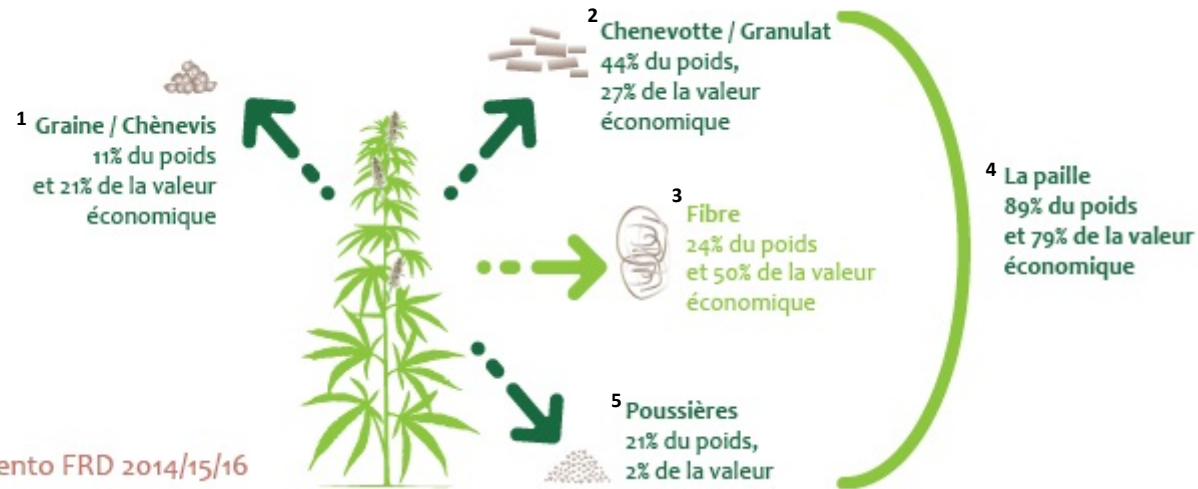
Actions	2019		2020				2021				2022				2023				
	Quarters	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
5. Develop an Integrated R&D Program on Fibre for Industrial Uses																			
- Analysis of EU Fibres and their industrial applications		■																	
- Design R&D Program to characterize the fibres from New Brunswick			■																
- R&D Activities and development of fibre standards				- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
- Prefeasibility Studies for new fibre-based products, conference on R&D activities				■				■				■					■		
6. Evaluate the Feasibility for a Pilot Plant for Fibre Decortication																			
- Evaluation of outsourcing potential fiber processing facility			■	■	■	■													
- Prospection EU fibre processing companies for potential collaboration					■	■	■	■											
- Negotiate Joint Venture agreement to establish a fibre processing plant							■	■	■	■									
- Construction of fiber processing plant										■	■								
7. Encourage Cooperation and Initiatives to Minimize Hemp Waste																			
- Review production and environmental regulations			■	■	■														
- Monitor Initiatives in other jurisdictions				- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
- Encourage New By-product development				- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
- Encourage Best Practises for disposal				- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
- Government Support to maximize the utilization of the whole plant				- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
8. Promote Adoption of Hemp-based Products by New Brunswick Businesses																			
- Include First Nations in hemp-based products development			- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
- PR Activities for the development of the branding of New Brunswick Hemp Cluster			- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -
- "Open Doors" for Buyers, roundtable on new products			■				■				■				■				■

Intensive activity ■ Ad hoc activity - - -



ANNEXES

ANNEX 1 – Hemp Value Breakdown in France



Legend

	Percentage of the Weight	Percentage of the Economic Value
1 Grain / Hempseed	11%	21%
2 Hurds / Granulated Material	44%	27 %
3 Fibre	24%	50%
4 Straw	89%	79%
5 Dusts	21%	02%

ANNEX 2 – Products’ Prices

Products	Prices
Pure CBD	CBD Isolate: 1kg = US\$ 10,000 by Bluebird Botanicals, Louisville CO, USA
Hemp CBD	Hemp oil with 10% CBD: 100ml = US\$ 400 (retail). According to Hemp Business Journal, cultivating hemp for CBD can generate anywhere between \$2,500 and \$40,000 per acre (2018).
Seeds	Price from US supplier : Example: BOAX, 1 million seeds: US\$0.30/seed (BOAX has 16-18% CBD and low THC) \$2.50/lbs as per DAAF personal communications
Fibre	De-gummed hemp fibre pallet 595kg: US\$ 11.26/kg from Hemptraders
Organic Grain	In 2018 average grain price to growers: \$1.30/lb (\$1.80-\$1.85/lb from AgCanada Distributor Price**: Grain: \$4.00/lb for 10,000lbs orders; Oil: 200L: \$2675; Powder (50% concentrate): 1,000lbs: \$8,800; Flour: 1,000lbs: \$5,600
Conventional Grain	In 2018 average price to growers*: \$0.50/lb Ag Canada 2018: Around \$0.55/lb Distributor Price**: Grain: \$2.60/lb (1,000lbs order); Oil: 200L: \$1,810; Powder (50% concentrate): 1,000lbs: \$5600; Flour: 1,000lbs: \$3,800 Yield in North Dakota (2017) ranged from 785lbs to 1,800lbs/acre
Fibre	From Bulk Hemp Warehouse : Short fibre: US\$21.98/kg Hemp fibre can yield 3-3.5 tonnes/acre. Price is US\$ 285/tonne. For raw fibre per acre
Shivs	Bulk / Pallet 272kg = US\$ 1.32/kg from Hemptraders
New Cannabinoids	?. To be monitored

* https://www.producer.com/?s=hemp+prices&saved_search_keywords_count=0&c=n

** Wholesale Prices from [Hempseed Canada](#), a distributor. So not the price paid to growers. April 2009.



Annex 3 - Medical Cannabis in Canada

1. Market Size

- Medical cannabis is regulated by the [Narcotic Control Regulations](#) and it applies to dealers licences, pharmacists, practitioners and hospitals.
- Market data: Cannabis for Medical Purposes, 2018.

	2018					
Sold to clients	April	May	June	July	August	Sept
Dried cannabis (kg)	2,354	2,310	2,103	2,151	2,069	1,755
Cannabis oil (liters)	4,020	4,756	4,443	4,652	4,734	4,799

- Cannabis is a controlled substance under the *Controlled Drugs and Substances Act* (CDSA). Possession, trafficking, import, export and production of all varieties of Cannabis regardless of the THC content are prohibited unless authorized according to regulations or an exemption.
- Industrial Hemp Varieties Approved for Commercial Production: 51 varieties in 2018

Source: <https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/licensed-producers/market-data.html>

Annex 3 - Medical Cannabis in Canada

2. Market Data by Province

- Market data: Number of Client Registrations at end of month, 2018

	April	May	June	July	August	Sept
New Brunswick	6,709	7,050	7,231	7,497	7,655	7,715
Nova Scotia	12,689	13,003	13,416	13,658	13,869	13,800
Prince Edward Island	1,279	1,286	1,413	1,515	1,577	1,610
Newfoundland and Labrador	3,274	3,506	3,704	3,768	3,778	3,879
Quebec	8,844	9,410	9,663	10,053	10,439	10,667
Ontario	129,431	136,528	143,082	147,861	152,189	155,217
Rest of Canada						
Total Canada	307,397	320,073	330,344	337,480	341,402	342,103

Source: <https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/licensed-producers/market-data.html>

Annex 3 - Medical Cannabis in Canada

3. Companies with licences in New Brunswick

- At present, there are 149 licences for growers processors and sellers in Canada.
- In New Brunswick, 3 companies have a licence for cannabis:

Licence Holder	Licence	Class of cannabis	Date of initial licensing
<u>Organigram Holding Inc.</u>	<ul style="list-style-type: none"> •Sale (Medical) •Processing •Cultivation 	<ul style="list-style-type: none"> •Plants / Seeds •Dried / Fresh •Oil 	2014-03-26
<u>Tidal Health Solutions Ltd.</u>	<ul style="list-style-type: none"> •Sales (Medical) •Processing •Cultivation 	<ul style="list-style-type: none"> •Plants / Seeds •Dried / Fresh 	2018-04-13
<u>Zenabis Ltd.</u>	<ul style="list-style-type: none"> •Sale (Medical) •Processing •Cultivation 	<ul style="list-style-type: none"> •Plants / Seeds •Dried / Fresh 	2017-06-12

Source www.canada.ca/en/health-canada/services/drugs-medication/cannabis/industry-licensees-applicants/licensed-cultivators-processors-sellers.html



Annex 3 - Medical Cannabis in Canada

4. Top Canadian Cannabis Companies

Company	Profile	Revenues
FSD Pharma	<ul style="list-style-type: none">➤ Hydroponic production techniques.➤ Operating out of Cobourg, Ontario,➤ Potential 3.8 million sq. ft. production facility could become the world's largest facility of its kind upon completion.➤ Several partnerships that provide the Company with strategic exposure to a variety of cannabis products, including pharmaceuticals, beverages, and topicals.➤ Target all aspects of the cannabis industry – cultivation, processing, extracts and research and development.➤ On October 22, 2018, the Company signed an LOI to acquire Therapix Biosciences, a specialty pharmaceutical company developing cannabinoid-based treatments.	\$29.4 Million (3 months ended June 30, 2018)

Source: <https://smallcappower.com/canadian-marijuana-stocks-pot-stock/>



Annex 3 - Medical Cannabis in Canada

4. Top Canadian Cannabis Companies (cont)

Company	Profile	Revenues
Cronos Group Inc.	<ul style="list-style-type: none"> ➤ Vertically integrated, Canada-based cannabis company with a diversified global presence. ➤ Focusing investment efforts on firms located in Canada, Cronos Group operates through its subsidiaries and producers. ➤ Several international distribution and production platforms ➤ Existing capacity is 355,500 sq. ft., annual estimated production capacity of 40,150 kg. ➤ Expansion underway to increase of 910,000 sq. ft. of it production facility, with an estimated annual production capacity of 77,000 kg. ➤ On December 7, 2018, the Company released that it has entered into an agreement with Altria Group, Inc. which has agreed to a strategic investment of ~C\$2.4 Billion into Cronos Group. 	\$3.8 Million (Q3 2018)

Source: <https://smallcappower.com/canadian-marijuana-stocks-pot-stock/>



Annex 3 - Medical Cannabis in Canada

4. Top Canadian Cannabis Companies (cont)

Company	Profile	Revenues
Supreme Cannabis Company	<ul style="list-style-type: none"> ➤ Focused on cultivating premium dried sun-grown cannabis flowers on a commercial scale through its subsidiary, 7ACRES. ➤ 7ACRES operates 40,000 sq. ft. have an average output of approximately 5,000 kilograms of dried cannabis per year. ➤ Once completed, the Company expects the facility will span more than 342,000 sq. ft, producing 50,000 kilograms of premium dried cannabis per year at full capacity. ➤ Supply agreement with Tilray to be in excess of \$2 million. ➤ On November 13, 2018, announced a partnership with MediPharm Labs to launch a line of cannabis oil products. 	\$5.1 Million (Q1 2019)
Aurora Cannabis	<ul style="list-style-type: none"> ➤ ACB has just under 1,000,00 sq. ft. of licensed production space and plans to produce at least 270,000 kg/year ➤ 20% ownership interest in Liquor Stores N.A., the dominant alcohol retail chain in Western Canada. ➤ Supply agreements with 12 provinces and territories comprising over 98% of the Canadian population. ➤ International expansion in Germany, Denmark, Italy and Australia. ➤ Discussions with Coca Cola to develop cannabis related beverages. 	\$29.6 Million (Q1 2019)

Source: : <https://smallcappower.com/canadian-marijuana-stocks-pot-stock/>

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Annex 3 - Medical Cannabis in Canada

4. Top Canadian Cannabis Companies (cont)

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Source: : <https://smallcappower.com/canadian-marijuana-stocks-pot-stock/>



Annex 3 - Medical Cannabis in Canada

4. Top Canadian Cannabis Companies (cont)

Company	Profile	Revenues
Sunniva	<ul style="list-style-type: none"> ➤ Vertically-integrated medical cannabis company operating in in Canada and California. ➤ SNN estimates it will complete its licensed 324,000 sq. ft. greenhouse production facility in Riverside County, California by Q3 2018. ➤ In Canada, it intends to have a 688,000 sq. ft. facility estimated to produce about 200,000 kilograms of cannabis annually. ➤ On October 17, 2018, the Company signed an LOI to acquire a licensed cultivation and genetics facility in Northern California, providing Sunniva with current production capacity of 1,600 lbs per year. 	\$4.5 Million (Q2 2018)
Aphria	<ul style="list-style-type: none"> ➤ By January 2019, cumulative licensed greenhouse growing space to 1,000,000 sq. ft., increasing their annual production capacity from 9,000 kilograms to 100,000 kilograms. ➤ The Company currently has 44,000 sq. ft. of production space. 	\$13.3 Million (Q1 2019)

Source: <https://smallcappower.com/canadian-marijuana-stocks-pot-stock/>



Annex 3 - Medical Cannabis in Canada

4. Top Canadian Cannabis Companies (cont)

Company	Profile	Revenues
Canopy Growth Corp.	<ul style="list-style-type: none"> ➤ Diversified multi-brand cannabis and hemp company, offering distinct brands and curated cannabis products with varieties in dried, oil and soft-gel capsule forms. ➤ Sales of 67,500 kg of product per year. ➤ Largest licensed production platform in Canada, with over 600,000 sq. ft. of production space. ➤ Plan to have up to an additional 5,000,000 sq. ft. of production over the next 12 months. ➤ A \$5 Billion dollar investment by Constellation Brands to establish a global position and development of cannabis infused beverages. 	<p>\$3.8 Million (Q3 2018)</p> <p>\$23.3 Million (Q2 2019)</p>
Cannex Group Holdings Inc	<ul style="list-style-type: none"> ➤ Canada based company with cannabis operations in Washington and California. ➤ Indoor cultivation, extraction, manufacturing, branding of edible and derivative products, as well as retail operations. ➤ The Company's subsidiary, BrightLeaf Development LLC, is the largest producer/processor in Washington State. ➤ Cannex is also in the process of acquiring Jetty Extracts, one of the largest processors and extractors in California. ➤ Plans to produce from two indoor cultivating facilities with a combined 30,000 sq. ft. and 19,000 kg/year capacity. 	<p>US\$1.1 Million (Q1 2019)</p>

Source : <https://smallcappower.com/canadian-marijuana-stocks-pot-stock/>

