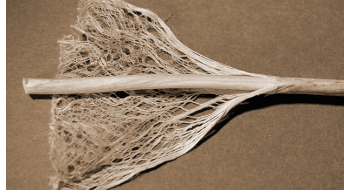


How growing

**50**  
**MILLION**

Acres of Hemp Can  
Change the World



## CONTENTS

The Versatile Hemp Plant.....	3
Environmental Magic of Hemp .....	4
Hemp, Sequestration & Numbers .....	5
Markets for 50 Million Acres .....	6
Why China Leads .....	8
Conclusion .....	9

## APPENDICES

- I. Industrial hemp fiber is better than wood in every way
- II. How thinking machines can speed development of the fiber value chain
- III. Hemp building materials have big role to play in environmental renewal
- IV. For long-term value from the hemp plant, look to the fiber

## AUTHOR



**Robert Ziner** is Founder & CEO, Canadian Industrial Hemp Corp. (CIHC), Toronto, which is developing an advanced hemp stalk processing and optimization system. Ziner has more than 30 years in the building materials distribution and secondary wood processing industries.

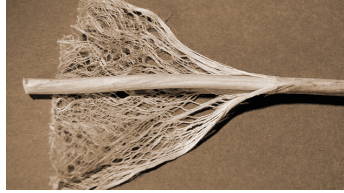
## INTRODUCTION

The hemp industry offers great potential benefit to the global environment. However, only a technology-driven, cost-effective hemp industry will be able to redefine the economics of production to better serve the market. Besides the many, large, existing markets, many new opportunities will surface when costs are lowered, quality control is automated, and delivery is “guaranteed”.

CIHC believes that our commitment, along with our experience, vision, and IP, give us a unique role to play in achieving the global scale needed to fulfill hemp’s amazing environmental potential as well as delivering its valuable economic benefits.

Our AI-driven Smart Stalk System will help provide the flexibility, creativity, lower costs, and higher value-added opportunities which the hemp fiber Value System will need to thrive! Canadian Industrial Hemp Corporation (“CIHC”) offers a unique and practical vision: A solution to reduce carbon dioxide (“CO2”) pollution by over three billion tonnes a year. This opportunity is built around the global implementation of profitably processing hemp stalk to increase the annual global cultivation of hemp to 50 million acres, in less than 15 years.

Considering that in 2020, the global hemp crop was an estimated 1.35 million acres – some may see this simply as wishful thinking. They may be right. Nonetheless, here we share CIHC’s Vision.



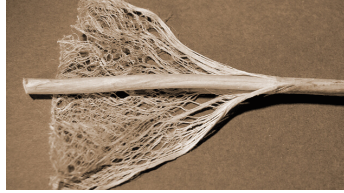
## The Versatile Hemp Plant

Hemp is one of the oldest, heartiest and most versatile plants on earth. It has been an important source of fibers, food and medicine throughout history. The industrial strain, known as cannabis sativa, produces fibre, oil and seeds while its flowers produce cannabinoids including CBD. The entire plant can be processed into a wide range of raw materials such as pulp, paper, fuel, resins and wax, cosmetics and other health and beauty products.

The hemp plant has been scientifically proven to absorb more CO<sub>2</sub> per acre than any forest or commercial crop and is therefore the ideal carbon “sink”. Clearly, the more acreage the more carbon “sequestration”. What is needed is a way to ensure the rapid adoption of hemp fiber-based finished products: What is needed is a NEW way to ensure the consistent availability of fiber quantity, quality, and meaningfully lower market prices to deepen market penetration. A way to cost-justify the growth of 50M acres of hemp!

This exceptional plant can grow in a wide variety of terrains and soil types, across most parts of the globe; wherever sunshine is plentiful, and the soil is workable. It needs very little water to thrive and unlike cotton or flax requires considerably less pesticides or herbicides. The hemp plant is not difficult to grow or maintain and generates an above average net profit for farmers.

In the construction industry, variously processed hemp is used as a main component in bricks, particle board, insulation, and hempcrete, a concrete-like mixture that can be plastered or sprayed onto interior and exterior walls. Hemp building materials reverse the damaging effects of greenhouse gases by locking up harmful CO<sub>2</sub> emissions. In essence, these materials breathe. They are also stronger and lighter than those used in traditional construction.



## By the numbers

Production based on 10 tons per hour;  
fully automated decortication technology.

CAPEX:  
**\$24M**

Input Capacity (ton)  
**71,428/ Yr**

Employees/ facility  
**70**

Trucking  
**48,000 hrs**

\$ Revenue (at capacity)  
**\$70M**

EBITDA  
**47%**

Acreage / facility  
**14,250**

# of Facilities  
**3,508**

Est # Employees  
**245,560**

Est. # of trucking hours  
**105M**

Est \$ Annual Revenue  
**245.6B**

Est tonnes Annual Sequestration  
**3B**

## Environmental Magic of Hemp

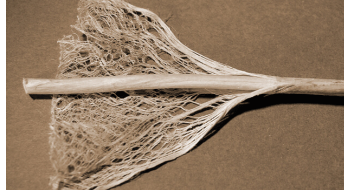
One acre of hemp grown specifically for fiber provides about 10 tonnes of direct sequestration including capture of carbon from the soil. Notably the CO<sub>2</sub> is permanently bonded within all the fiber - and any product it is used in - including bio-composites, “cottonized” textile-quality fibers, insulation batts, paper products and building materials.

This incredible plant protects the environment compared to farming most other crops: Hemp is in the top five out of 23 crops for biodiversity friendliness, performing better than all the current major North American crops, including wheat, corn, or canola. It is also an ideal regenerative soil solution because it naturally forms deep roots which helps hold soil together, in turn preventing soil erosion. There is also sequestration opportunity in the soil itself, enabling it to additionally capture and store a significant proportion of CO<sub>2</sub>.

Soil holds four times the amount of CO<sub>2</sub> stored in the atmosphere, more than is held in the entire world’s vegetation. Good soil management is critical for global sequestration and hemp is well known to repair worn out soil. Hemp is often used in land reclamation as well as phytoremediation; ‘cleaning’ land polluted by heavy metals. It is so effective at absorbing toxic materials that hemp has been considered for remediating soil from the Fukushima nuclear reactor site.

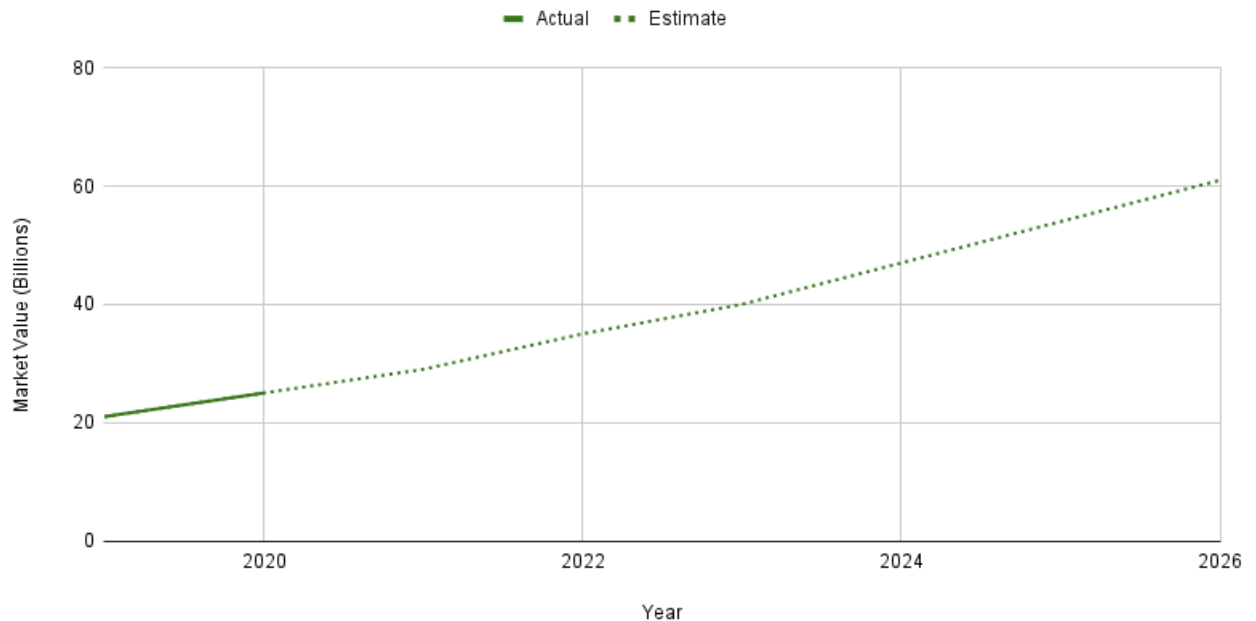
As a rotation crop, hemp has been shown to be invaluable to avoid the devastating problems associated with monoculture farming which upsets the natural balance of soils. Too many of the same plant species in one field area rob the soil of its nutrients, resulting in decreasing varieties of bacteria and microorganisms that are essential to maintain soil fertility. Without remediation, worn out soil stays that way and further undermines this important natural source of carbon capture.

The growing of hemp also increases the microbial content of soil: With the stem and leaves of the hemp plant being rich in nutrients, allowing these nutrient-dense remnants of the hemp plant to be returned to the soil after harvesting rejuvenates the soil for a richer yield in the following year’s crop.



## Global biocomposites market

Strong steady growth is forecast for a key sector. (Source: Market Research Blogs, CIHC)



Market Research Blogs/CIHC

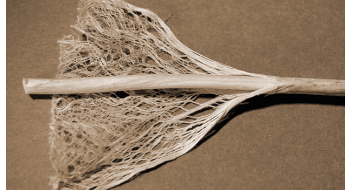
## Hemp, Sequestration and Numbers

Fifty million acres of global hemp crop grown specifically for fiber would generate on average about 5 tonnes of total biomass per acre per crop; which from a sequestration perspective represents about 2.5 billion tonnes of absorbant biomass. From a stalk processing perspective, 50 million acres would generate approximately 2.5 billion tonnes of feedstock.

However, before one can determine what the actual impact of this vision could be in carbon sequestration, one needs to consider the size and growth of global hemp markets to appreciate why the “50 million acre” vision is not unrealistic.

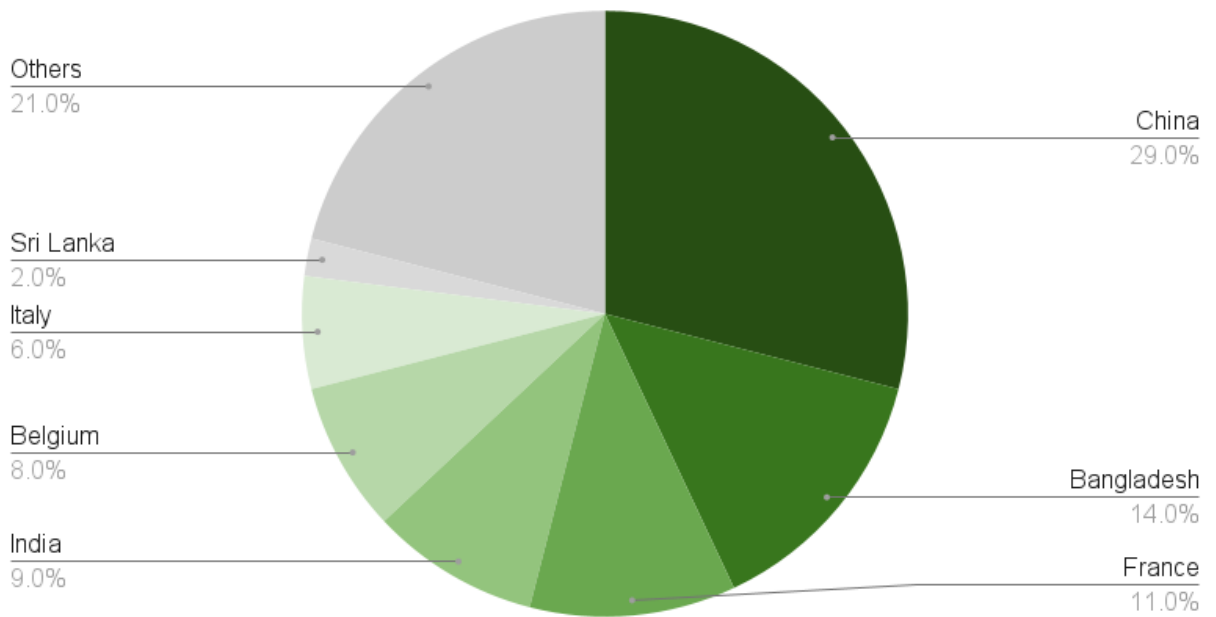
Significantly, there are many ecologically unfriendly existing products that hemp fiber - as a feedstock - will help replace over time – including huge volumes of pure oil-based polymer plastics, concrete, fiberglass and bentonite clay. In their creation, all these products are major generators of CO<sub>2</sub>. For example, one tonne of steel generates 1.46 tonnes of CO<sub>2</sub>. That is one and a half times the weight of the steel itself! These are huge global markets which hemp will either replace, or significantly reduce. And, It will replace these environmentally unsustainable products at a lower cost!

We estimate that growing 50 million acres of hemp at a rate of 10 tons-per-acre of CO<sub>2</sub> reduction would annually sequester more than



## Vegetable fiber production

Global output (excluding cotton).



CIHC

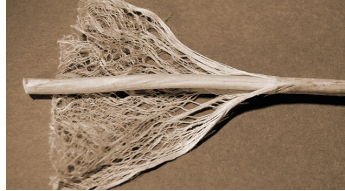
500 million tons of CO<sub>2</sub>. Considering the existing feedstock products identified above, the use of hemp fibers to replace them in applications would result in a further reduction in CO<sub>2</sub> up to five times the amount of the base sequestration benefit of the hemp plant itself, another 2.5 tonnes. This would suggest that 50 million acres of hemp could annually benefit CO<sub>2</sub> reduction by an annual total of more than 3 billion tonnes.

## Hemp Markets for 50 Million Acres

Hemp seed is very nutritious food/oil product. It contains large amounts of omega-6 and omega-3 fats, which are two types of unsaturated fats (“good fats”), as well as a high content of protein. It also provides Vitamins B and C, Calcium, Gamma linolenic acid, Arginine, Magnesium and a significant amount of Iron.

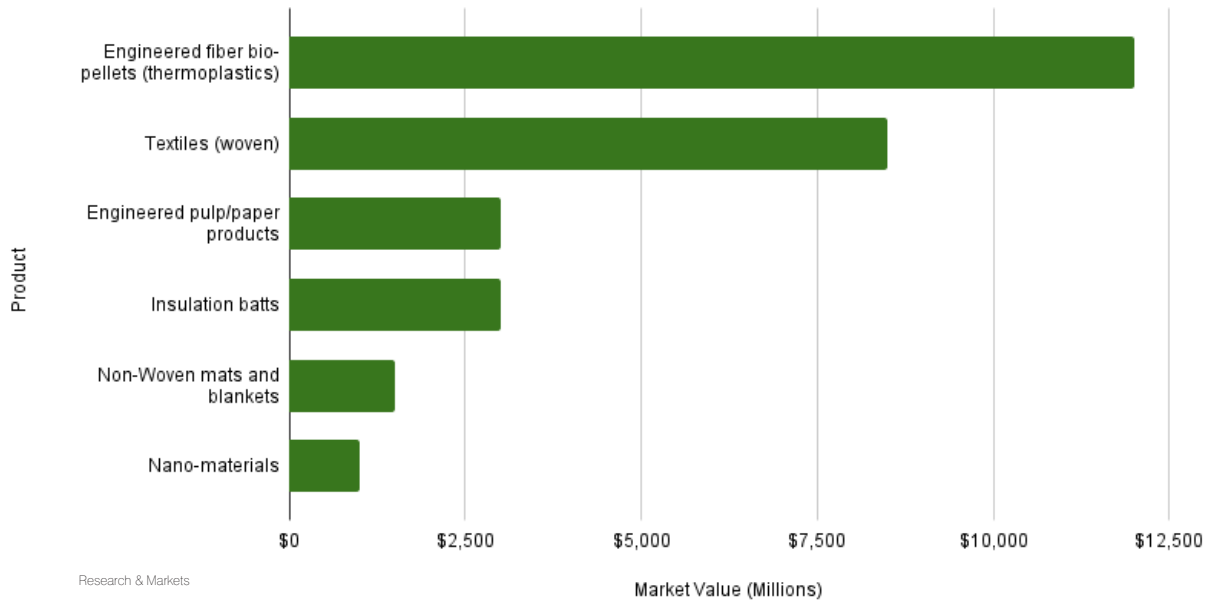
The plant’s flower contains CBD chemical content that has been proven effective in treating anxiety and depressive disorders and help to manage arthritis and combat insomnia. It has also been successfully used to aid opioid addiction withdrawal. CBD has already gained global market recognition and acceptance.

An outstanding biofuel can be made from the hemp plant’s seed oil. It is completely non-toxic, can be locally produced and is realistically sustainable. It converts hemp to biodiesel at a remarkable 97 percent



## Global market for bast fiber products

The market for hemp bast fiber products totals roughly \$29 billion.

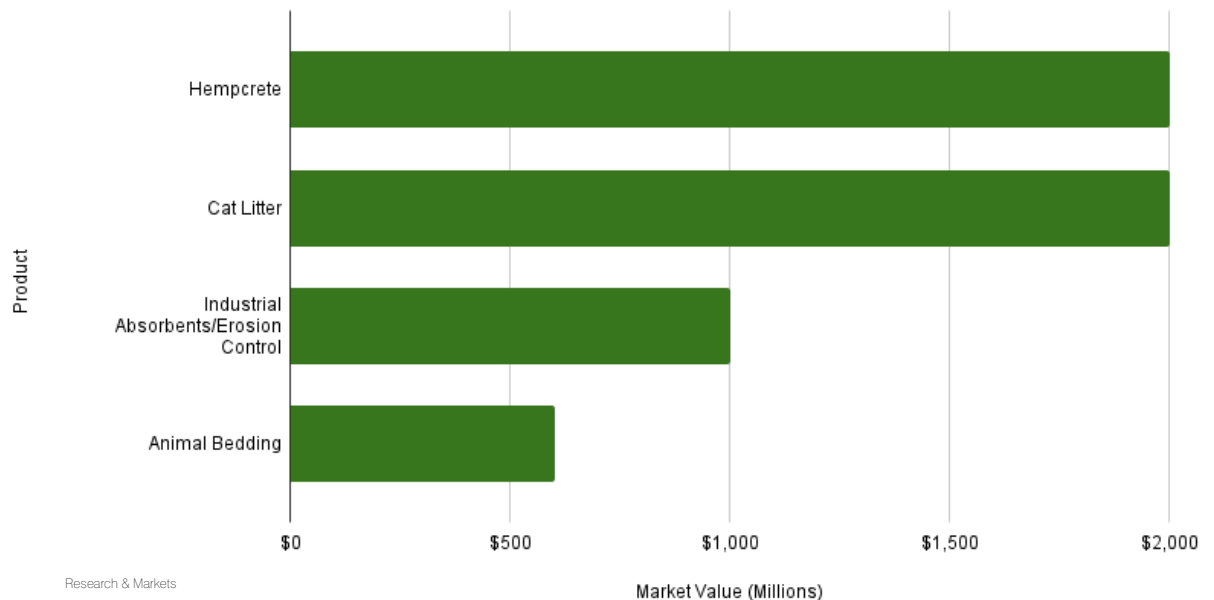


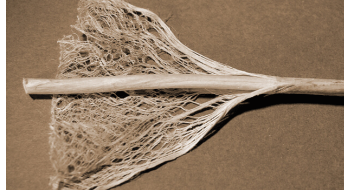
efficiency rate and burns at a lower temperature than any other type of biofuel. Obviously, hemp grown as an energy source will require huge acreage – and deliver great results.

There are many practical, large scale hemp fiber market opportunities to believe that it is not unrealistic to project the fast global growth of hemp fiber crops. Especially if processing and production costs are meaningfully reduced and a practical automated quality control capability can be developed and implemented.

## Global market for hurd-based fiber products

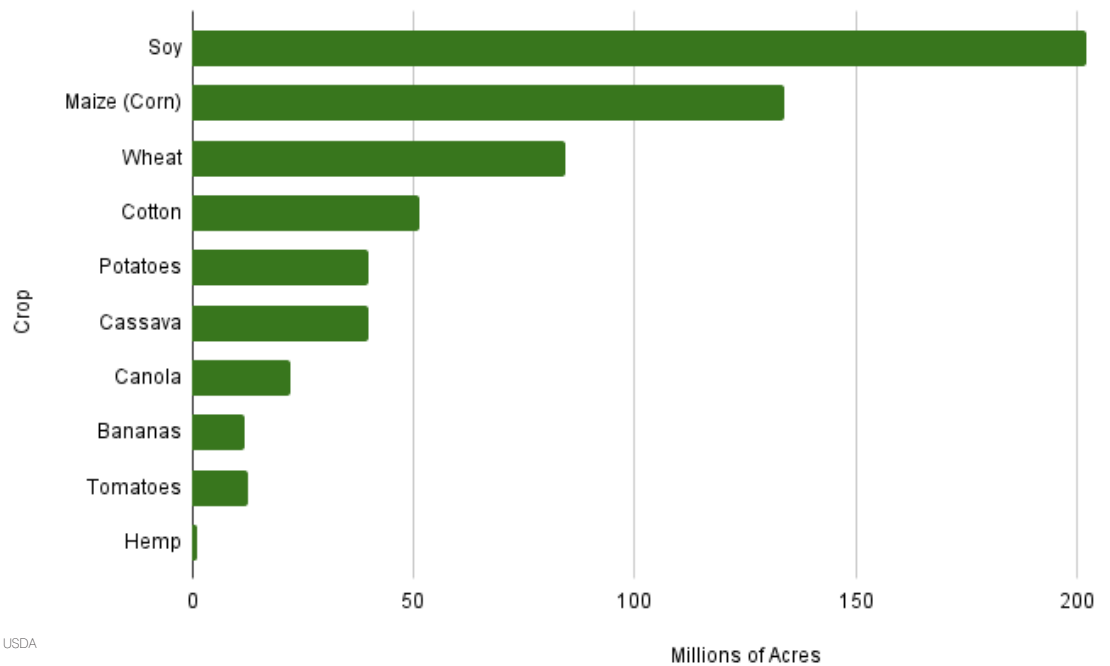
The market for hemp hurd-based fiber products totals roughly \$5.6 billion.





## Hemp's lowly position

Major crops, global in millions of acres (2019).



To appreciate the scale of opportunity possible for growing hemp, one need only consider the current global acreage in other major crops:

Other than cotton, these are all major food crops. Whereas cotton is grown almost exclusively for its fiber, hemp is grown not only for its fiber specifically, but also for its “food” as well as its chemical/ medicinal and bio-fuel energy opportunities.

There are other meaningful reasons why hemp fiber will attract enormous opportunities to replace other less sustainable feedstocks: For example, the global reduction of cotton defines a huge replacement “need” in the yarn markets.

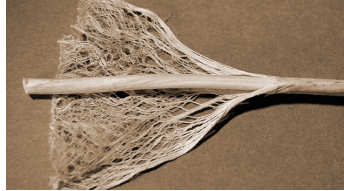
Although most of the shortage has so far been filled by synthetics, hemp, given scale and automation, could compete very effectively as a blend yarn.

## Why China leads

China has already reduced its cotton production by 30% from its peak in 2015, with a ministerial explanation that it was done “to protect the soil”.

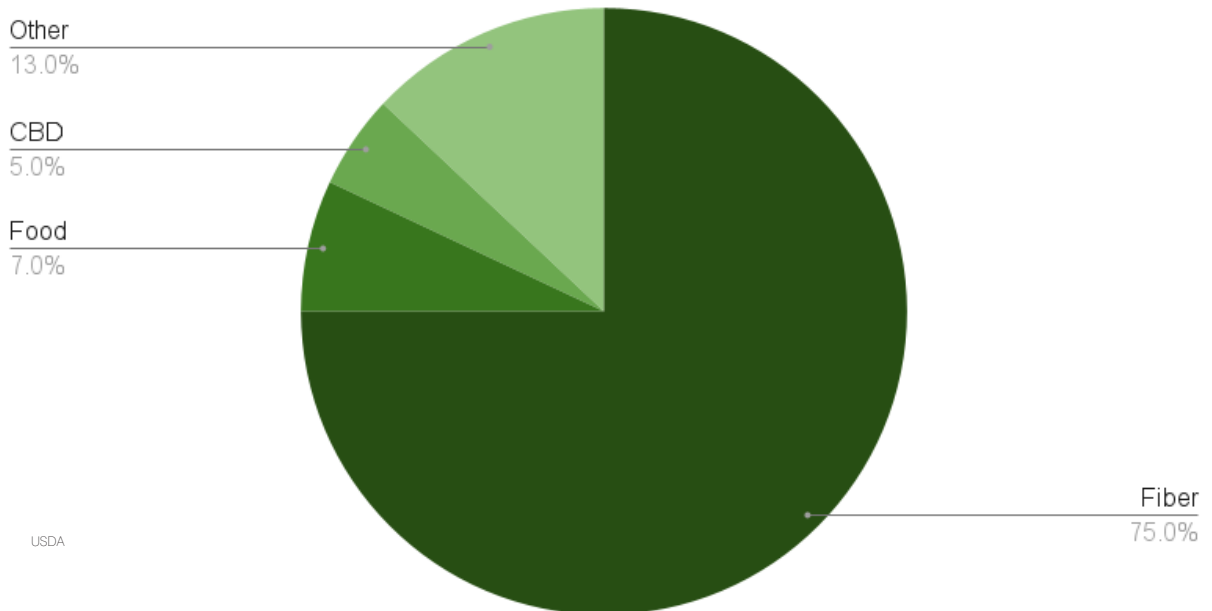
Meanwhile, China has focused 75% of its hemp potential on fiber which suggests it is processing ALL the stalk produced - whether grown primarily for fiber or not - into marketable products. Why would the Chinese process lower quality, lower value stalk if there was not a thriving market? They would not.





## China's hemp crop

Distribution across leading sectors. (Source: USDA)



While agronomists are quickly bringing China's research into advanced hemp genetics to par with Western markets, extensive R&D is also underway in bio-pharmaceuticals and nutraceuticals, fiber & textiles, food, building materials and home furnishings, natural cosmetics, hemp bio-plastics and new materials for industrial engineering, bio-fuel and other forms of energy. In 2020, the U.S. Dept. of Agriculture estimated that China's hemp fiber sales were \$1.2 billion in 2018, explaining that the Chinese government does not release official hemp cultivation, production, or sales data. Many people believe that China sees hemp as a strategic material they simply do not want to share.

## CONCLUSION

If hemp is to meet its full promise as an industrial crop, stakeholders will need to see its margins erode in the highly competitive marketplace of a new industry. Lower market pricing will make the market more competitive, attract more buyers into the market and provide farmers justification to grow hemp and develop the necessary decortication infrastructure.

Establishing the primary processing technologies needed to accelerate the opportunities in hemp fiber is a critical factor in justifying the planting of 50 million acres of this amazing crop. By doing so, the industry can create hundreds of thousands of new jobs and a new multi-billion-dollar industry while addressing the critical environmental issues that face mankind.

## APPENDIX I

# Industrial hemp fiber is better than wood in every way

HEMPTODAY® APRIL 12, 2021  
By Robert Ziner | CIHC



**Hemp has always been a better natural resource than trees. The truth is, because hemp was not legal throughout most of the world for the last 80 years, it was never given a chance to compete on an equal footing with wood, or any other natural fibers.**

Coming from a 30-year background in lumber processing and optimization, I became hooked on hemp when I learned that the stalk's bast fiber is 10 times stronger than the fiber in Douglas Fir, the most revered softwood fiber for structural framing in the North American construction industry. Finding a proprietary automated solution enabling CIHC to become a low cost, high-value hemp fiber processor, immediately made a lot of sense to me.

In terms of quality and performance, hemp fiber stands out as probably the strongest and most durable fiber in nature. In addition to being 10 times stronger than wood fiber, hemp is four times stronger than cotton.

Industrial hemp is lighter and less expensive to process than wood. One acre of hemp planted for 40 years has 400% more usable fiber than one acre of trees through their 40-year lifecycle. Hemp is the most efficient biomass source in the world. In less than 91 days, the plant can generate stalk to the stage where its fibers have contained their full CO<sub>2</sub> content and are ready to be properly processed.

More and more scientific publications underscore hemp's other important characteristics: high absorption properties, IR and UV radiation protection capacity and natural low flammability. Further new, promising tests also indicate natural anti-bacterial properties of hemp fibers, believed to result from the alkaloids, cannabinoids and other bioactive or phenolic compounds.

## **Planet friendly**

Hemp also represents an alluring investment opportunity for those companies looking for an effective way to “decarbonize” their goods – in other words, decreasing their carbon emissions profile. Because of the strong carbon storage capability based on its high biomass content, and the low levels of water it needs, hemp is probably the most sustainable fiber of all.

Hemp plants have an exceptionally high capacity to draw out and contain CO<sub>2</sub>, which is much higher than trees. According to several scientific articles, one acre of a common hemp varietal can absorb 8.88 tons of CO<sub>2</sub> annually, whereas an acre of forest sequesters roughly 2.5 tons – only about 30% as much.

But wait, there’s more. Our research has shown that, hemp varietals being grown for fiber generally yield up to five times the biomass of leftover “seed” stalk – up to 42 tons – and that the CO<sub>2</sub> displacement when hemp is substituted for traditional raw materials, in end products such as plastic, textiles, steel, construction and other materials, can reduce CO<sub>2</sub> by as much as 200 tons!

Although plant life produces oxygen in the atmosphere through photosynthesis, this natural process decreases as plants age. It would seem logical that big trees with considerable leaf area would generate more oxygen, especially because they are alive much longer than a hemp plant, however this is untrue. While there is actually a decline in the capacity of older and larger trees to produce oxygen, hemp, on the other hand, is a fast-growing, large plant which is harvested at only 12 weeks. Well before it can be “aged,” the plant is pumping oxygen full throttle. This is ideal for shared crop agronomy.

## **Truly renewable**

Considering that less than 5% of the United States’ virgin forest remains, it only makes sense to plan for the future and protect what is left of this once naturally balanced resource by growing hemp. We can help to regain that balance by planting, harvesting and processing hemp into the many cellulosic applications for which trees have been predominantly used since wood-based paper replaced paper made from hemp in the 1930s across North America.

Cellulose is the main chemical that adds strength to paper and other composite products such as chipboard and particleboard. With a concentration of 72%, hemp bast has a higher concentration of cellulose than wood, which provides only 42%. Essentially, the more cellulose a plant contains, the fewer chemicals are needed to make paper. Hemp

bast has the highest cellulose content of all plants.

Not only does hemp grow at a much faster rate than trees, but its high cellulose content allows for a faster, lower conversion cost and doesn't require the significant quantities of toxic chemicals required for wood processing.

### **Better chemistry**

Making paper from wood requires polluting agents such as sulphuric acid, bleach and chlorine to remove its non-cellulose fiber mass during the pulping process. Hemp fibers, on the other hand, can be whitened using hydrogen peroxide, which doesn't chemically damage water. In addition, compared to its wood pulp counterpart, paper made from hemp fibers resists decomposition and does not yellow or brown with age.

Hemp fiber can play a pivotal role in commerce and economic development. But the most important thing governments need to understand is hemp's potential for healing the planet and advancing human health. As hemp fiber gains momentum it's not a question of phasing out other fibers and completely replacing them with hemp. The interesting feature of the "hemp business model" is that the synergies with existing industrial capacities are virtually unlimited.ww

## APPENDIX II

# How thinking machines can speed development of the fiber value chain

HEMPTODAY® FEBRUARY 18, 2021

By Robert Ziner | CIHC



**Growing hemp to process into fiber goes back more than 10,000 years. The fact that hemp could be easily grown to provide food, clothing and shelter means it has been a very important crop down through the ages. For much of that time, hemp was grown almost exclusively as a local product that served the basic needs of a farmer, his family and his neighbors. The cost of processing was not a key issue. Human survival was.**

But in those days there was no value chain per se. Farmers grew the crop, processed the plants and made the finished products they needed to personally survive – or could trade for other staples.

Today, however, with specialization, high labor costs, erratic cannabis laws, mass distribution and other limitations, a transparent hemp fiber value chain is critical to production at industrial scale. It's not that the steps in the chain have changed; it's that every step involved ultimately impacts the end-to-end production process – by impacting a product's marketability.

### **Clearing things up**

Although contemporary hemp farmers need to be able to measure their costs relative to the revenue they expect to generate, they have no actual hemp fiber value chain to rely on. There is no way to source the data needed to determine actual market prices, or factor in such critical considerations as cost, availability, reliability and quality. Considering the relative newness of this industry, this lack of clarity is not surprising.

Traditionally, it takes time to evolve a market structure and define standards, cost-effective market opportunities and up-to-date market price levels. This would also be the fate of the hemp fiber industry except for

one thing: Artificial intelligence (AI), which can speed up this development process.

Artificial intelligence has been around since 1955. A special kind of software that can “learn” or solve problems by simulating human intelligence, it operates machines that are specifically programmed to “think” or “reason” like humans, and generate decisions and actions. Beyond “thinking,” AI chooses the best answer from a range of possible ones, and much faster than any human can.

### **Financial opportunity**

The hemp fiber value chain defines all the actions which must take place to bring hemp fiber to an end-user – from planting seeds all the way to ensuring reliable after-sale service. The costs and mark-ups incurred along the process required to ultimately achieve the sale of a product define its marketability, and thus its financial opportunity!

The transparency of a value chain is critical to the stability of an industry. Each of the stakeholders must have a clear understanding of their individual margins in order to stabilize the growth of a new industry such as hemp. All these operations must be profitable for an industry to maintain a healthy value chain.

AI brings forth a new realm of real-time data, flexibility and future market insights. When this 21st century high-speed system processing technology is embedded into a digitally driven production environment, it inevitably redefines the economics of production, and the market opportunities.

AI’s inherent machine learning capabilities means huge amounts of data can be accessed and analyzed to identify patterns that are not otherwise easily identified, with the results valuable to improved operational outcomes.

### **What AI can do**

AI can impact the hemp fiber value chain from start to finish. Here’s how:

**Farming:** Everything starts with the farmer, who is the ultimate entrepreneur. Every year, farmers must have faith that nature will reward them for their hard efforts. What they need to help nature is data. From statistical information about seed genetics, to data about weather, soil, irrigation and fertilization, AI can provide deep insight and guide future decision making.

AI is behind such things as planting seed equipment, GPS-driven

autonomous field equipment, drones for aerial field inspection and robotic harvesting.

**Processing:** Beyond farming and harvesting, decortication is the primary process of breaking the hemp stalk down into its two kinds of fibers: bast and hurd. It is a low margin business which operates today strictly in commodity markets. AI allows a company to deliver much higher margins by enabling it to reliably generate large volumes of automatically quality-controlled fiber. The system can measure and adjust bale weight for moisture content, do fiber quality scans to match customer order criteria, predict maintenance and help with production planning and scheduling.

Tracking the material throughout the value chain, AI generally controls production, planning & scheduling, supplying the logic for flow and process control. It can also signal predictive maintenance, integrate secondary production with primary processing, and provide flexibility for turning out customized products. Finally, AI sits on top of inventory control and sorts out other logistics.

**Other operations:** Moving through the value chain to the wholesaler or secondary producer, AI provides these vital intermediary operations timely data regarding supply, demand, logistics, quality and after-sales service — all vital to maintaining equilibrium in the hemp fiber marketplace. With more accurate forecasting, and automated scheduling & ordering, AI can help reduce supply chain costs by 50%; and costs related to transport and warehousing up to 20%. Automated order monitoring provides customers traceability and tracking.

### **Ad hoc value chains**

Thorsten Wuest, one of the world's leading authorities on artificial intelligence, has written that "future supply chains need to reinvent themselves, embracing disruptive technologies and reimagined processes – thus creating digital supply networks that are capable of rapidly adapting to all kinds of scenarios. One crucial capability is to leverage a diverse set of organizations by creating efficient, ad-hoc value chains."

Given the ad hoc shape of the hemp fiber industry today, that's a clear roadmap. In order to deliver market stability, the industry needs to focus on providing digitally-driven supply capabilities to connect all parts of its current value chain. This will provide the invaluable real-time data, transparency and production flexibility which is needed to optimize the entire production network, and point the way to a prosperous future for the fiber industry and the many sub-sectors it can serve.

## APPENDIX III

# Hemp building materials have big role to play in environmental renewal

HEMPTODAY\* JANUARY 20, 2021  
By Robert Ziner | CIHC



**According to the United Nations Environment Programme (UNEP), the conventional building sector contributes up to 30% of total annual greenhouse gas emissions globally. Left unchecked, those emissions will more than double in the next 20 years. Hemp can help.**

Hemp-based construction projects, both residential and commercial, can already be found around the globe, including in the USA. While hemp-based material costs are relatively high, that's only because of the limited number of suppliers, which often means shipping what's essentially simple straw long distances.

### Healthier living spaces

Hemp building materials, made from the plant's stems, are gaining acceptance primarily because they create healthier living spaces. According to the U.S. Green Building Council (USGBC), hemp is a non-toxic feedstock that delivers a number of unique properties for a broad range of building applications.

Hemp stems offer two important byproducts for the construction industry. The plant's stringy exterior, or bast fibers, provide a cost competitive, sustainable alternative to fiberglass batts as an insulation material. Hemp bast fiber insulation creates an airtight mass with minimal heat loss, and will not mold or mildew. The use of this insulation enables any structure to automatically fulfill LEED design standards for energy efficiency. Hemp bast fiber insulation also has excellent acoustic and high-level fire-resistance capabilities.

The stalk's thick inner core (hurd, shivs or shives), chopped and mixed with lime and water to create hempcrete, makes for excellent hempcrete walls, and solutions for both load-bearing and non-load-bearing hemp building materials are already on the market.



## **Energy efficient**

Structures built from hempcrete are highly energy efficient due to low thermal conductivity, high thermal capacity and high insulation values. Testing has shown that a hempcrete home is about 80% more energy efficient than a conventional build in temperature control, and delivers an annual CO<sub>2</sub> carbon “reduction” of about 8,000 kg. Significantly, hemp-based insulation and finished products stay energy efficient throughout their installed life. How long is that? In Nagano, Japan, there is a national heritage site honoring a hemp house built in 1698 – more than 300 years ago. It’s still standing!

Although the construction costs of hempcrete can be as much as 10% higher than traditional wooden residential structures covered in siding, lower energy costs offset much of the difference. Hempcrete construction is already directly competitive in price with brick-veneer structures. And hemp materials bring the added benefits of lower heating and air-conditioning costs as well as better ventilation throughout the enclosed structure. Perhaps most importantly, hemp construction materials create a healthier, more comfortable living space.

Prices for hemp hurd are expected to come down as hemp straw processing initiatives get off the ground to supply more quality hemp fiber products to the market.

## **Carbon sequestration**

Considered to be the most energy-efficient building material on the market today, hempcrete is also an amazing carbon sequestration tool.

Back up the building materials production chain, growing hemp addresses serious issues that have been pointed out by, among others, the UN Intergovernmental Panel on Climate Change, which has recommended that farmers focus on the restoration of over-cultivated and worn-out soil as the easiest way to reduce the global carbon footprint. Soil is a potent, relevant carbon storage medium and contains more carbon than the atmosphere and all living greenery combined. Hemp plants actually increase and redefine the natural ability of the land to absorb “surplus” carbon, the Panel advised.

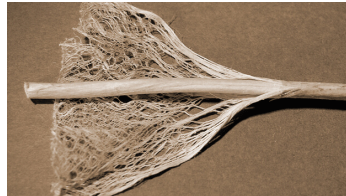
## **Soil improvement**

Growing hemp improves the soil it is grown in. The roots go deep and draw in toxins from the ground, as well as CO<sub>2</sub> from the air, right into the plant itself where it is stored in the cell walls – permanently. One crop of industrial hemp grown on one acre can annually absorb 10 tons of CO<sub>2</sub> from the atmosphere, and sequester 4.2 tons.

Hemp is nature’s greatest carbon sequestration tool and its fiber provides unique properties – significant properties, which make it invaluable in the ongoing global effort to control climate change. Hemp, and hemp building, can ultimately play a pivotal role in reversing the growing CO<sub>2</sub> buildup which now threatens mankind, and the entire planet.

## For long-term value from the hemp plant, look to the fiber

HEMPTODAY® MARCH 7, 2019  
By Robert Ziner | CIHC



**Over the long run hemp fiber will become the most relevant part of the hemp plant, and the most valuable of its outputs.**

Just as iron ore is a primary product, and steel is a secondary product, seed and CBD outputs are strictly primary – while in hemp only the fiber is secondary.

As primary commodities, hemp seed and CBD outputs react swiftly to the reality of the world’s quick changing market dynamics, driven by inevitable and often unpredictable pricing fluctuations.

### **Gap in supply/demand**

However fiber will respond to changing market needs as a secondary “feedstock” product for many years because of the huge gap between the existing supply and demand in the marketplace.

As the supply of quality-controlled, large volumes of hemp fiber increases, more commercial end-users will learn of hemp’s benefits and choose to pursue hemp for their needs. These large potential users will learn that the potential benefits of choosing hemp fibers will include:

- Greater profitability across the value chain.
- Sustainability; environmental friendliness.
- Lower overall cost of finished products compared to other natural fibers.
- Lighter weight and greater strength.
- Increased durability.
- Quality and cost

It's clear that the greater the supply of quality-controlled fiber for the marketplace, the more demand will increase, and in turn, cause supply to increase.

This is because current large-scale users do not specify hemp because the volumes needed for training, marketing and large-scale logistics required for a new product can't be cost justified today

Eventual savings

Using hemp fiber in many existing product applications can eventually mean considerable cost savings.

Once commercial end-users understand that there is an increasing supply, they will be encouraged to pursue the possibility of lower costs and better products — which can be based on hemp. One need only look to the \$21 trillion construction industry globally to see the potential in fiber for hempcrete. And that's just one example.

Growing demand will cause growing supply – not lower prices.

Of course, this does not mean that fiber prices will never go down. It is just that a supply/demand equilibrium won't happen for at least the next 20 years.

Scale opportunities

The fiber market will grow substantially over that time – bringing scale opportunities and financial success to the innovators. Whether from the perspective of a farmer, a large-scale decorticator, or a major end user of fiber, the hemp plant's fiber will end up being the long-term, dependable and most profitable output of the hemp industry.

When the price of seed or CBD retreats, the fiber will always be there to stabilize the opportunity for the farmer. Even before the price of CBD falls in the future, farmers should look into the the unique opportunity of growing hemp for fiber.