

# Hemp TODAY

Voice of the Global Hemp Industries

## Man of Hemp

Looking back, and  
ahead with 25-year hemp  
veteran Daniel Kruse

### Europe

#### HELD HOSTAGE IN GREECE

Michalis Theodoropoulos on  
how *not* to build an industry

**UK:** A quiet CBD revolution

### Asia

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**JAPAN:** 'Room to fill'

### North America

#### OF HEMP AND BEES

An important role to play  
in supporting pollinators

**CANADA:** Rollercoaster dip

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- 🛡️ less damage to flowers and leaves: conveyor system protects CBD and seeds
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At the crossroads of sustainability and business


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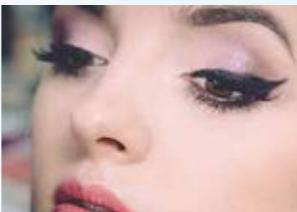
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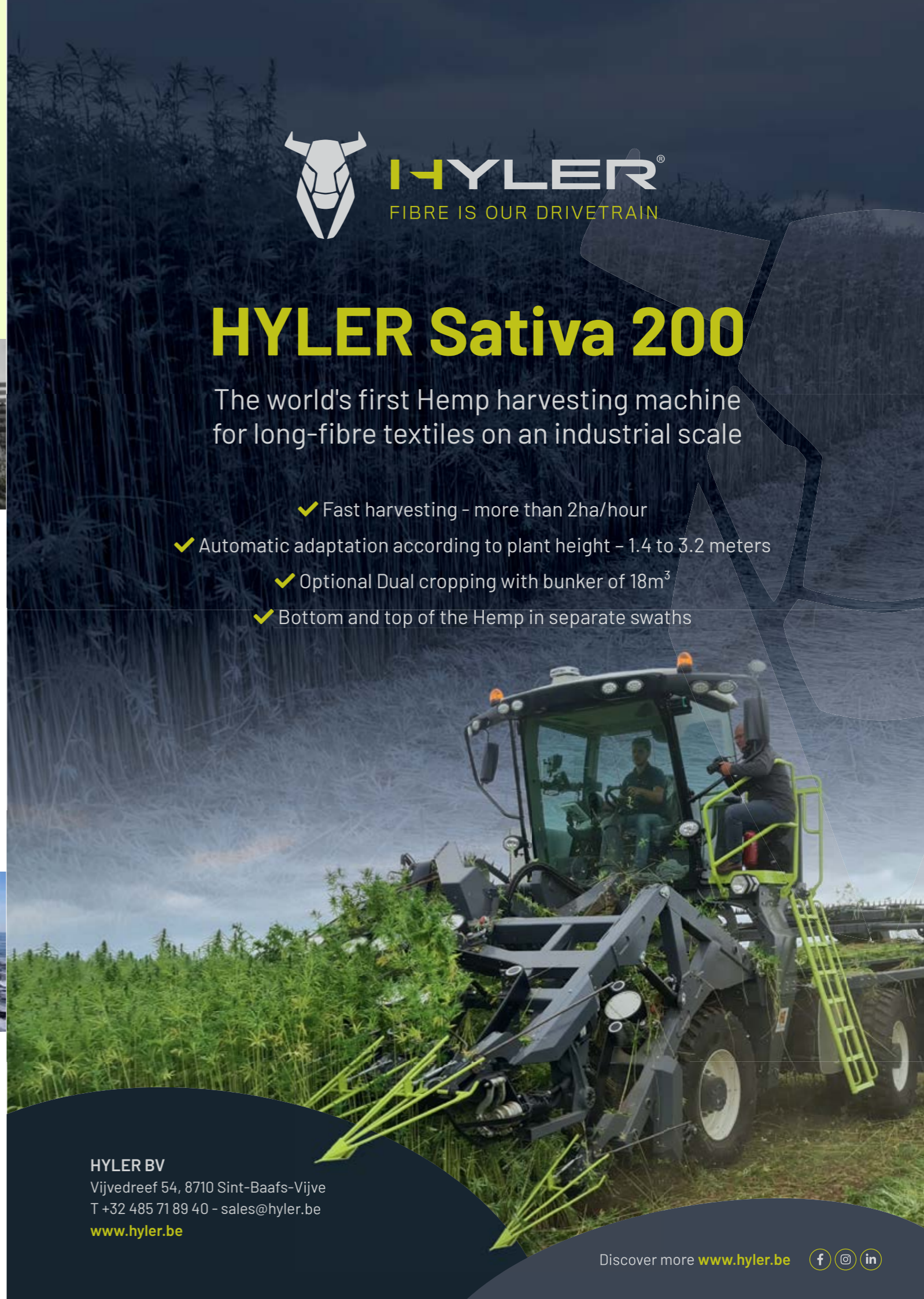


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*Hemp*TODAY

SPECIAL REPORT

## The Next **BIG** HEMP THING

### Beyond the dream, to reality

**E**veryone knows hemp has thousands of uses. But to realize all that potential after a more than 75-year hiatus in research and development, there's much to catch up on.

The inevitable boom and bust in the CBD sector had a silver lining. While many dreams were shattered, the CBD craze gave hemp greater exposure to the consumer while the business itself attracted serious investors, the bolder among them now looking beyond cannabinoids into the possibilities in hemp food and fiber, much longer-term, but truly promising opportunities.

Meanwhile, hemp continues to make inroads into those mainstream sectors where it offers a healthy, sustainable alternative to polluting conventional materials, processes and products.

What do investors see now that the CBD blinders are off? Farmers, researchers, inventors, entrepreneurs and other innovators who are developing the genetics, the technology, and the products and services that can make the hemp dream a reality in business, and in meeting the urgent need to clean up the planet.

It's those visionaries who are defining the next big things in industrial hemp.

COUNTING ON

# CARBON



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## Hemp's promise at the crossroads of sustainability and business

As European nations struggle to advance urgently needed environmental policy, industrial hemp can play an outsize role in reaching sustainability goals, and offers farmers an enticing business opportunity in the markets for carbon credits.

In addition to hemp's potential across a wide range of products and business sectors, trends in policy, pricing and demand for carbon credits put the crop squarely at the crossroads of sustainability and real business.

"The market for these credits can strengthen the business model for hemp farmers," said Nando Knodel, CEO at [HempConnect](#), a Hamburg-based startup that is working specifically on ways to quantify CO2 captured from hemp farming and production up and down the value chain.

While carbon credits from agriculture

are not yet traded in Europe's established Emissions Trading System (ETS) for carbon, discussions at the EU level indicate that the ETS will eventually embrace agriculture by 2024. Until that time farming carbon credits can be sold in private trading among individual entities.

As companies, particularly big corporations, look for effective ways to "decarbonize" their production and their products, many are able to manage their carbon emissions profile only by purchasing such carbon credits from other parties.

### 'Best chance for humanity'

By tracking and quantifying the CO2 absorbed by hemp crops, farmers can generate credits to be sold on these markets -- which Forbes has described as "the best chance for humanity's ability to thrive over the next century and to

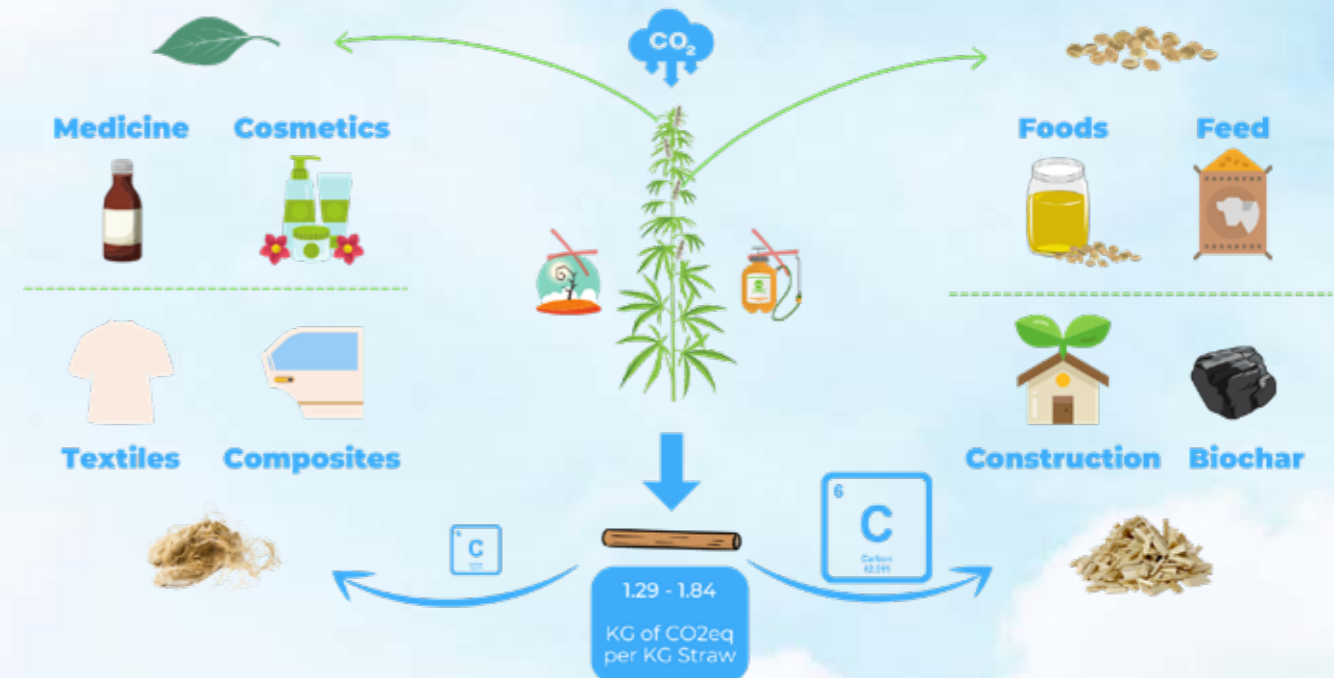
adapt to the sobering realities of climate change."

"Industrial hemp has massive potential for the EU's carbon removal strategy," said Knodel. "It's an excellent moment to establish standards for measuring carbon capture in hemp farming. We expect the market to be highly dynamic over the next couple years. Measurement will be crucial.

"Once we have quantitative proof of the carbon removal superiority towards other crops and deliver valid sequestration methodologies, hemp as a resource can become a verified carbon sink. Of course depending on the methodology. However, this will be a huge incentive for large emitters, such as big construction companies, to integrate hemp materials in their portfolios and consequently balance their emissions. Eventually, hemp may enjoy a competitive advantage over other resources."

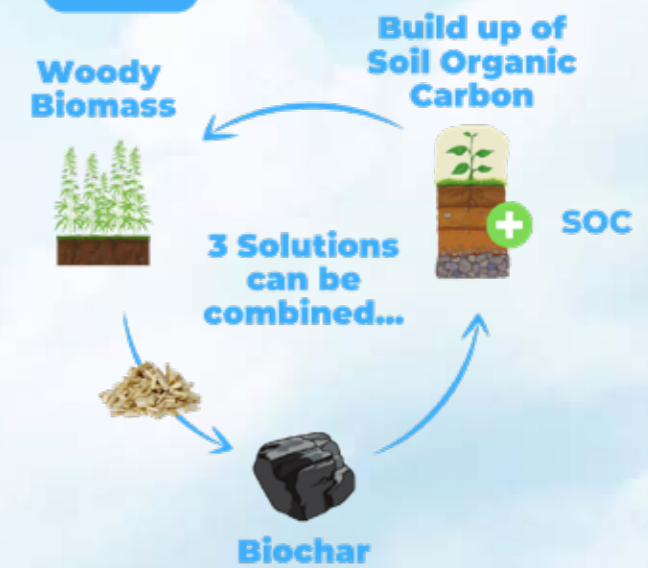
## Hemp & CO2

Hemp has an exceptionally high capacity to draw out and contain CO2. Depending on the type of hemp grown, as well as the farming practices, up to nearly double the amount of CO2 trees can absorb when planted on a similar parcel of land. Research suggests that a kilogram of hemp straw absorbs between 1.29 - 1.84 kilograms of CO2.



### A circular player

Hemp can also be turned into biochar, which can be part of a truly circular cycle that provides many benefits in soil. Hemp is the perfect crop for climate farming methods that enrich soils, as it is highly efficient in degrading organic compounds.

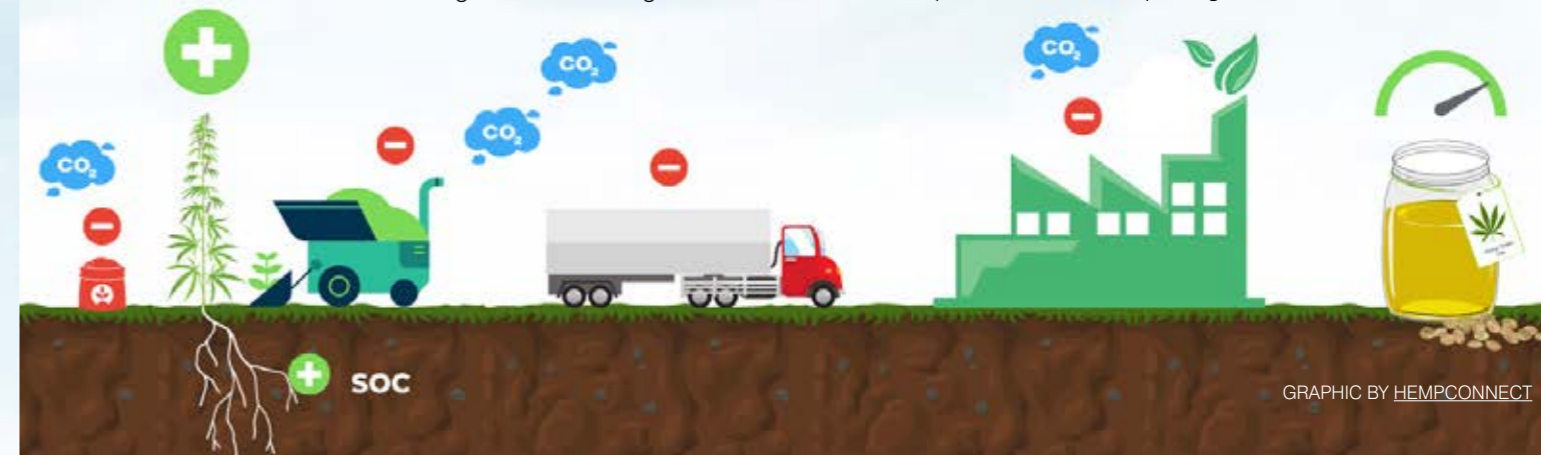


### Downstream savings

Downstream in the supply chain, substituting toxic raw materials with hemp in renewable products ranging from plastics to construction materials means even greater CO2 savings.

### Life-Cycle Assessment

Life-Cycle-Assessment (LCA), a tool to capture all data on CO2 emissions along the supply chain, also provides a basis for placing value on carbon credits.



GRAPHIC BY HEMPCONNECT

**Carbon negative**

It's difficult to overstate the potential of hemp in EU and member state strategies for both agriculture and the environment. Hemp is carbon negative, and is the most efficient biomass source on Planet Earth. Hemp has an exceptionally high capacity to draw out and contain CO<sub>2</sub>; depending on the type of hemp grown, as well as the farming practices, up to nearly double the amount of CO<sub>2</sub> trees can absorb when planted on a similar parcel of land. Research suggests that a kilogram of hemp straw absorbs between 1.29 - 1.84 kilograms of CO<sub>2</sub>. Downstream in the supply chain, substituting toxic raw materials with hemp in renewable products ranging from plastics to construction materials means even greater CO<sub>2</sub> savings.

Hemp is also the perfect crop for carbon farming methods that enrich soil, as it is highly efficient in degrading organic compounds.

**The carbon markets**

Carbon credits are exchanged through two market systems. The "compliance" market is set by government agencies, and managed by government rules and regulations. A second, "voluntary," private market for carbon credits exists among entities which establish environmental programs independently out of a sense of corporate social responsibility.

Both the "compliance" and "voluntary" market systems are based on certification schemes managed by specialist companies under government contracts, or non-profit industry organizations. These specialists provide solutions to measure CO<sub>2</sub>, and support farmers and other supply chain participants in the management of CO<sub>2</sub> assets.

**'Compliance' market**

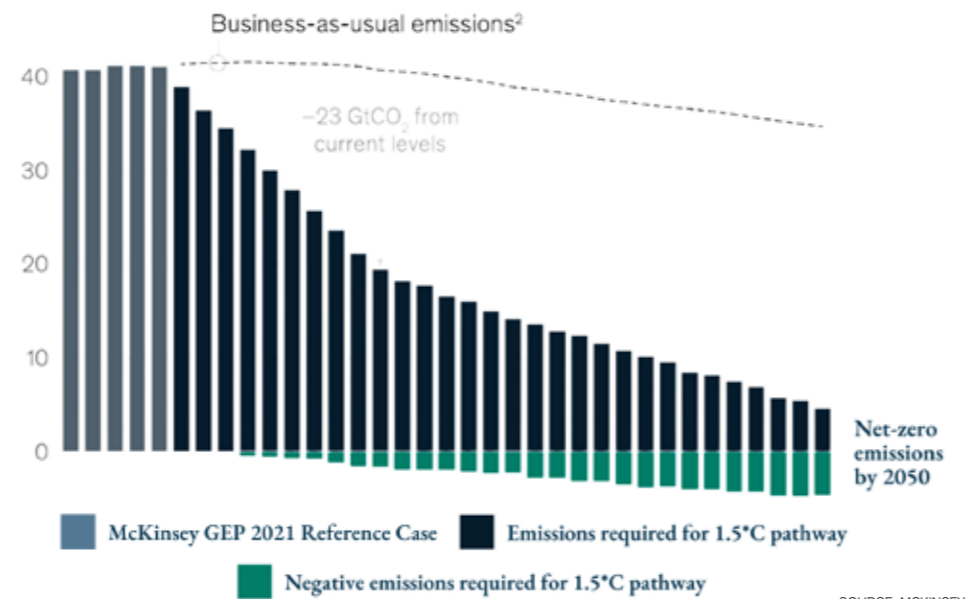
Major industries and power generators operate under the European Union's ETS through which they pay for every ton of CO<sub>2</sub> emitted. The first large-scale public emissions trading scheme in the world, the ETS was launched in 2005 to fight climate change, and is generally considered to be functioning well 16 years later.

This Europe-wide system is central to EU energy and environmental policy, and has spurred re-thinking about the way timberlands and agricultural assets are managed.

Wide participation in private carbon markets through innovative initiatives shows sound environmental principles at work among the growing number of companies directly involved in the hemp

**Global carbon-dioxide emissions**

Gigatons (GtCO<sub>2</sub>) per year



SOURCE: MCKINSEY

business. Expect those companies to contribute significantly to a brisk trade in hemp-based carbon credits in the coming years, and to play a major role in efforts to reverse climate change.

**U.S. federal carbon bank**

Under one Biden administration proposal, the government would create a federal carbon bank that would guarantee buyers for agricultural carbon credits – providing a strong incentive for more farmers to turn to regenerative agriculture, and a logical reason to grow industrial hemp.

While nobody expects such a program to develop overnight, the growing concern over climate change could speed up efforts to reduce the approximate 5.1 billion metric tons of greenhouse gasses annually produced in the USA.

The challenges are considerable. First, no standard exists for measuring carbon in crops, and measurement technology and services that do exist are expensive. While the U.S Senate passed the bipartisan Growing Climate Solutions Act in June, which proposes that USDA establish science-based standards for carbon-offset claims, putting a price on carbon and creating a new financial instrument to underwrite the carbon market framework are complicated matters.

**High tech solutions**

New York-based Hudson Carbon, a soil specialist, hopes to do just those things. The company is developing a carbon offset platform combining real-time carbon measurements on the ground

calibrated with analysis of satellite and drone imagery, using artificial intelligence based on ground topography and geography. The company said it will launch a new marketplace for carbon capture this year.

Meanwhile, Ecosystem Services Market Consortium, a non-profit based in Virginia, and other groups are also developing carbon measurement systems.

Even in the absence of a government run carbon offset program, agriculture carbon credits are becoming more popular. For example, Microsoft purchased 193,000 metric tons of soil offset credits in the private carbon markets earlier this year. Big food makers such as General Mills and McDonalds and agro-industrial and pharmaceutical companies such as Cargill and Bayer are also investing in company carbon programs.

**Growing popularity**

For hemp farmers, carbon credits represent a potential additional revenue stream – if buyers materialize. Stakeholders say if farmers see a path to money through such credits, it might push them to grow varieties better suited to the the production of building materials and other industrial outputs that sequester carbon throughout their product lives.

But if the government is to be successful turning farmers to hemp, the USDA will have to provide greater incentives than those that currently exist for sustainable farming practices, which operators say don't go far enough to cover the extra labor required. Farmers must be assured they can cover the additional labor and equipment needed to reduce carbon emissions.

# An alternative to fossil-based carbon

From waste treatment to supercapacitors, the potential in biochar

As developers continue to seek innovative uses for the hemp stalk, the simple process of reducing hemp hurd to charcoal opens the door wide to a number of large industrial sectors based on carbon.

From waste treatment to supercapacitors, biochar – charcoal made from plant material – has massive potential as a replacement for fossil-based carbon.

Fast-growing hemp is assuredly the most efficient plant to produce large volumes of biochar input, but there's more: carbon-rich biochar offers soil health benefits by helping to trigger favorable interactions among soil components, a key factor in soil management.

As if that's not enough, while hemp is a highly efficient soil conditioner that can support the buildup of soil organic carbon as it grows in the field, it also sequesters carbon if transformed into a carbon sink, for example charcoal foam, serving double duty in mitigating CO<sub>2</sub> on Earth.

Biochar is produced through pyrogenic carbon capture and storage (PyCCS) processes in which the plant material is subjected to temperatures ranging from 350°C–900°C in the absence of a significant amount of oxygen. Studies have demonstrated that PyCCS renders the resulting material stable for hundreds of years as it fragments into micro- and nano-particles that protect soil from degradation.

**Waste management now**

Perhaps the most immediate and promising application of biochar is in waste management. Farm manures, municipal solid waste, and wood waste are streams that could be converted to valuable energy products when mixed with biochar, scientists have indicated.

Carbon-based filters from plant matter can also replace traditional osmosis-based de-salination while reducing energy consumption required in the desalination process. That happens through electrodialysis in which two differently polarized electrodes extract the majority of the salt's sodium and chloride ions from the seawater. The process results in largely salt-free water which is then further desalinated through reverse osmosis, requiring considerably less energy.

Moreover, scientists have figured out a way to power the electrodes by introducing bacteria that produce the energy required for the carbon-based



Biochar, left, produced from industrial hemp hurd, right.

desalination cells. The micro thin carbon fibers provide a support structure for the bacteria and carry the electricity required to fire the electrodes.

**Electrochemical applications**

With energy in greater and greater demand and the ongoing depletion of fossil fuels, biochar-based materials also signal promise for several electrochemical applications related to energy storage, starting with batteries.

Carbon from hemp also has shown promise in the development of graphene, a microscopically thin but strong material that results in supercapacitors that can store nearly as much energy as alithium-ion batteries, and charge and discharge in seconds over tens of thousands of charging cycles.

With growing interest in highly efficient, cost-effective and renewable energy storage, the demand for such nanomaterials can only be expected to grow.

**Carbon 'foams'**



SOURCE: ABBRI

Carbon foam has long been investigated as a core material in structural composites for military applications, and is the basis for new era structural composite

materials constantly being developed. The black foam feels like foam insulation, but is a thousand times stronger; it can be graded in density and pore structure to adjust stiffness and weight. Depending on its composition, the material is suitable for use in such things as ship bulkheads, smokestacks, blast deflectors, armor, thruster nozzles and stealth materials.

In addition, carbon foam is seen as a potential replacement for balsa wood, intumescent mats, polymer matrices, metallic honeycombs, ceramic fibrous insulation, ceramic tile polystyrene, plastics, fiberglass, rubber and various metals that currently are in use as basic construction materials. Possible commercial uses include acoustic floor materials, structural panels and firewalls for automobiles, fire-proof attic doors, and recreational equipment such as small boats and canoes.

**Asphalt**

Scientists have found that mixing in 6% of straw biochar powder can significantly improve the high-temperature performance of asphalt. Research shows that biochar produced from crop straw has properties similar to commercial coal, and has proven to be a better asphalt modifier than carbon black and carbon fiber. A study at the University of Tennessee showed biochar laced asphalt showed improved performance against pavement distresses, and remained intact under fatigue and cracking resistance tests. The asphalt industry is generally believed to have a good track record using sustainable practices in the manufacture of asphalt pavements, indicating paving companies could welcome biochar as a component in road building materials.

# Uniting the world of hemp

New global group forms to 'cooperate, advocate, and co-create'

Organizations from around the world are joining to form an international association to advance the interests of the hemp industry.

The new body, as yet unnamed, will work to establish industry development priorities, and officially represent hemp stakeholders before global intergovernmental agencies, with a core first objective to remove hemp and hemp extracts from the 1961 UN Single Convention on Narcotic Drugs, said Daniel Kruse, President of the European Industrial Hemp Association, and one of the initiators of the global effort.

## Key interface

The group intends to interface with international agencies such as the World Health Organization, the UN's Committee on Narcotic Drugs; the Organisation for Economic Co-operation and Development; and the UN's Food & Agriculture Organization (FAO) on matters related to that agency's Codex Alimentarius, internationally recognized standards for food production and safety.

The association will also work on environmental issues and represent the hemp industry before the Intergovernmental Panel on Climate Change, which is under the United Nations Environment Programme and the World Meteorological Organization.

The new organization will "champion a diverse and robust hemp industry that benefits all stakeholders along the value chain," according to a startup document that outlined the group's mission.

"The international association can foster engagement in multilateral relations, advance the industry's agenda, statistical programs, partnerships, trade, and global regulation," Kruse said. "It will improve substantive engagement among the hemp sector and benefit all, globally and nationally, as a result."

A wide range of issues and challenges could also be addressed by the new association based on hemp's potential to mitigate climate change and advance sustainable development, Kruse said.

"There is a compelling need to develop a new international hemp organization to allow industries from around the world to create a single voice," said Ted Haney,



President & CEO at the Canadian Hemp Trade Alliance, another of the lead organizers. "The new organization will also create a place for hemp industry players to cooperate, coordinate, share information, advocate, and co-create."

Product and process standards, crop protection, standards for maximum chemical residue levels, seed registration standards, and international standards for maximum THC levels for hemp flowers and finished goods are all among the many pressing issues identified by the initiative.

## Enthusiasm is high

Charter members from around the globe spoke of their enthusiasm for the project.

"The organizations that are getting together to form this new global-wide initiative are formed by some of the most experienced and high-level professionals within the industry," said Lorenzo Rolim da Silva, President of the Latin-American Industrial Hemp Association.

"Our goal is to create a world where hemp is truly integrated into multiple other industries and in agriculture all over the world," Rolim da Silva said.

"We look forward to joining this visionary mission to consolidate and strengthen cooperation for development of the hemp industry on a global level," said Anar Artur of the Mongolian Hemp Association. "Mongolian farmers and manufacturers are actively showing interest and joining our local association. They are aware of hemp's future. We welcome hemp entrepreneurs to Mongolia."

A round of fundraising among various national associations is already completed and the group has appointed Emerging Ag, a Manitoba-based boutique communications and public affairs consultancy as a facilitator on the project.

Emerging Ag already works with international organizations on global policy issues in the agriculture, food and health sectors. The company serves as the secretariat for the International Agri-Food Network, which coordinates consultation on policy recommendations to the Committee on World Food Security.

## Representative organizations

Haney said the group will most likely be headquartered in Europe for best access to intergovernmental agencies with whom the new association will eventually register formal relationships. The group will now develop a governance structure, initial budgets, strategy, and a work plan going forward. Information on the group's membership program will be forthcoming.

Kruse said the new global association is also considering setting up a parallel technical association that would publish an international hemp research journal and create a peer review network. That would fill a current gap in which research carried out on hemp and its multiple applications is not comprehensively compiled, Kruse said.

## The working group initiating the project includes representatives of:

Canadian Hemp Trade Alliance; Mongolian Hemp Association; Australian Hemp Association; European Industrial Hemp Association; Hokkaido Industrial Hemp Association; China Hemp Alliance; Latin-American Industrial Hemp Association; Friends of Hemp (South Africa); Chamber of Industrial Hemp of Paraguay (CCIP); Uttarakhand Hemp Association (India); and the Indian Industrial Hemp Association.

From the USA: American Trade Association for Cannabis and Hemp; Texas Hemp Growers Association; Oregon Hemp Association; National Hemp Association; Hemp Industries Association; National Industrial Hemp Council; Kentucky Hemp Association; Hemp Feed Coalition.

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# Getting more from the plant

Product lines multiply in minor cannabinoids, new CBD formulas

As top CBD producers continue to add minor cannabinoids to their product portfolios, many are also combining functional ingredients with CBD to bolster health claims commonly associated with the compound, according to analysis from researcher Brightfield Group.

Growth in the launching of CBN and CBG lines that started in the second half of 2020 is continuing as “CBN found its place as a sleep aid, while CBG’s main appeal is its ‘newness’ to the market,” Brightfield said in its 2021 U.S. Mid-Year CBD Report.

Mixing approved functional ingredients in CBD products lets producers make claims that also apply to CBD without suggesting the compound has those health effects. “A brand cannot say CBD helps with sleep; it can say melatonin plus CBD helps with sleep,” Brightfield noted.

## ‘Industry or ingredient’?

CBD brands are mixing in common wellness product ingredients such as mushrooms, botanicals, and adaptogens with CBD in formulations for dietary supplements; beauty product makers are also turning out variations that combine CBD with popular skincare ingredients, Brightfield observed.

“These additives further blur the line between whether CBD is an industry or ingredient,” the analysis notes. “New consumers introduced to CBD in this context could come to see non-psychoactive cannabinoids the same as other plant-based wellness ingredients.”

Once rules for CBD are established, the compound is most likely to find application primarily as an ingredient in the cannabis and wellness industries, Brightfield said. Reflecting that observation, Brightfield noted the U.S. CBD sector has attracted the attention of major Canadian cannabis producers looking to diversify their portfolios.

## 1,000 brands disappear

Brightfield reported in May 2021 that the number of U.S. CBD brands is contracting as failures and mergers continue apace. At the time, Brightfield estimated



1,000 CBD brands had disappeared during the previous 12 months, blaming coronavirus-related market disruptions which brought store closures, a shift in consumer priorities, and pricing cuts.

Nonetheless, CBD sales are expected to rise 15% this year, to \$5.5 billion, Brightfield said, driven by strong growth in ingestibles, cosmetics and CBD-infused beverages. The CBD beverage sector is projected to grow by 71% in 2021; sales of gummies are on pace to increase by 44%, according to Brightfield.

## Rules still missing

With the overall industry expected to remain strong – despite the fact that “CBD discovery is stunted, and there is still no federally-supported regulatory structure for ingestible products” – the researcher estimated the U.S. CBD market will reach \$16 billion by 2026. That’s wildly off an estimate Brightfield made in 2015, when it was predicting that the market would hit \$22 billion by 2022.

As in-store retail sales slowed last year, growth in CBD came to be driven by e-commerce, according to Brightfield, with marketers shifting budgets to online sales initiatives. High-profile brands and those already strong in e-sales benefitted most in the unstable environment, said Brightfield, which projects online sales will pass \$2 billion this year, and rise to 38% of the total sales.

Smaller players suffered: “It has

become increasingly difficult for smaller CBD brands to enter the space and find growth opportunities in what has become a very crowded marketplace,” Brightfield’s mid-year analysis of the sector suggests.

The May report had recorded that while smaller companies and brands have failed, many major players were also wiped out. GenCanna, Pyxus International, Myaderm, United Cannabis Corp., and Atalo Holdings were notable failures while other well-known brands and small boutiques entered mergers or were bought out by stronger competitors.

“The sheer number of brands became unsustainable during the pandemic, and those that could not compete were forced to drop out of the market,” Brightfield said.

## Other indicators

In other key observations from the mid-year report, Brightfield said:

- Millennials and Gen Xers account for 71% of CBD users, with word-of-mouth mainly driving CBD awareness among both groups.
- Gen Xers get their CBD information from doctors, television or print ads while Millennials learn about CBD mainly from social media, in-store browsing, or from a budtender.
- CBD brands should continue to expand their product offerings to increase growth potential within and outside of CBD products and channels.

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# 21st Century Priorities

## A need to incorporate hemp into existing production systems

**JEFFREY STEINER** is associate director of the [Global Hemp Innovation Center at Oregon State University](#). Formerly division director for plant production at the U.S. Department of Agriculture's (USDA) National Institute of Food and Agriculture (NIFA), Steiner has led interdisciplinary research teams with the USDA Agricultural Research Service (ARS) and at universities studying food and agriculture, natural resources, bioenergy systems, and hemp. He has served as an adviser to political appointees and government officials, as well as to commodity, conservation, and economic development organizations.

**HT: What can you say about the development of hemp as a commodity in the USA. What's required to establish such markets, and how fast can that happen?**

**Jeffrey Steiner:** Enthusiasm only goes so far. We are at a point when decisions need to be made based on science and financial soundness. With the great investments that have already been made and lost in hemp, now is the time to get facts ahead of the market excitement.

Many priorities need to be addressed to help establish hemp as a 21st Century industry. There is a general lack of knowledge about where different hemp grain, fiber, and

essential oil market classes should be optimally grown and what are the best genetics to use. Particularly with fiber, production must be close to handling and processing facilities to reduce transportation costs. Also, there need to be outlets for by-products from processing to return as much value as possible within the system.

Hemp will not be a monocrop spanning entire regions. Diversification of production risks is an established principle in agriculture and as hemp acreage expands, insect pest and disease problems will follow. Also, we need to know how to incorporate hemp into existing production systems in ways

that complement rather than disrupt current markets. Hemp is a new kid on the block and it would be best to find out which crops preceding hemp in a rotation benefit hemp and which crops benefit the most from following hemp. Farmers and processors need to be linked so farmers can be assured there is a market for the materials they grow and at a known price.

At the same time, processors need to be assured a dependable and likely year-round supply of materials they can turn into value-added products. Finally, standards need to be developed to evaluate products as they flow through markets to assure the quality and integrity of hemp-based products.

To accomplish these points, there needs to be a dependable flow of information that can help support industry expansion and identify likely growth markets. These are places where industry, researchers, and government need to closely work together. The sooner these are accomplished the sooner

hemp will be established in the market, with advantages like any other commodity.

**HT: How do you see the balance of outputs shaping up for hemp in the USA?**

**JS:** That is probably the greatest challenge we face as a country. In Oregon, as well as across much of the rest of the U.S., there was a rapid expansion of hemp production, particularly for cannabinoids such as CBD. Registered U.S. production went from 0 acres in 2013 to 525,000 in 2019 which far exceeded the largest historic hemp acreage in 1943 when 146,200 acres were grown.

However, following this initial enthusiastic expansion, the number of acres produced particularly for cannabinoids crashed in 2020 and again in 2021 because there is inadequate infrastructure to support harvest, handling, and processing, and the market outlets are not there to absorb that level of production.

Also, the regulatory environment and its uncertainty greatly restrict CBD and other cannabinoids production and the marketing of products made from them.

For the grain and fiber market classes, it is a different story. U.S. hemp grain production is becoming established in the North Central states, particularly Montana and North Dakota. These states are across the border from Canadian production in Alberta, Saskatchewan, and Manitoba where North American production was first re-established. Hemp grain production is relatively similar to the production of other grains and so doesn't require the establishment of an entirely new, costly infrastructure.

As for domestic fiber production, there is great interest across the U.S. I did a casual web search and found mention of 15 states planning to establish hemp processing facilities to separate fiber bast and hurd from stalks. At present, hemp fiber would mostly be produced as "bi-crop," with fiber production concurrent with grain production. Either way, if the fiber is produced as a dedicated crop as in China or as a bi-crop as in Europe, a great investment in infrastructure is required and this poses the classic "chicken-or-the-egg" problem: how does the acreage of production get established to assure the supply of commodity to support a processing facility that needs to draw investment to be built? And what farmers are going to produce the commodity at the scale

“There could be significant shifts in what hemp market classes are grown and where they are grown.”

needed year after year without a processing facility to assure the purchase of their fiber crop.

This is not a new problem. We can look back at examples from just 15 years ago when the cellulosic ethanol industry was trying to come up to scale using dedicated biomass energy crops. My guess is there could be significant shifts in what hemp market classes are grown and where they are grown depending on how hemp production and product development evolve in the U.S. and overseas.

**HT: What outputs best suit growing conditions in Oregon?**

**JS:** Essential oil hemp and marijuana varieties are exclusively grown here. Potential pollen intrusion from dioecious hemp plants as with fiber and grain types is an inconvenience to usable flower markets and can interfere with the extraction and processing of cannabinoids from biomass. For grain and fiber crops to be grown at scale in Oregon, procedures will need to be worked out for where the different market classes are grown, as in the state of Washington where efforts among growers are being made to coordinate their production.

**HT: Tell us about the international partnerships under the 45th Parallel Strategy? How do those partnerships work?**

**JS:** Before passage of the 2018 Farm Bill, Oregon State University faculty could not do hemp research on university facilities. With the emerging opportunities that hemp presented for Oregon farmers and the industry more widely following hemp's decriminalization by the 2014 Farm Bill, Dr. Jay Noller looked for opportunities to begin working with hemp while waiting for approval to do research at OSU.

Jay was able to establish partnerships with research institutions in Eastern Europe and China where hemp was legal to grow. These regions are similarly located as is Oregon along the 45th Parallel where hemp production has historically flourished. Jay began conducting research with these partners and so was able to begin understanding how hemp would perform in Oregon.

Once OSU could do research starting in 2019, we were able to translate that background information and expertise to our faculty and begin our own research program.

With these partnerships, we also were able to begin scientific exchanges, including placing graduate students, doing reciprocal faculty visits, and hosting technical trainings.

**HT: And what kind of discoveries are they yielding?**

**JS:** Jay was traveling extensively beginning in 2015 to Serbia and 2018 in China conducting research and expanding our partnerships overseas. We were able to first-hand learn about the status of the hemp industry and the challenges and opportunities we could face in Oregon and the U.S. We have been able to assess the status of the production practices and systems used for commercial production there, and especially learn about the performance of the genetics that are being utilized. We looked particularly at hemp fiber production systems in China and Europe; high-density stands are needed to produce high-quality fibers. These will require planting seed amounts in pounds per acre rather than pricing each seed as here in the U.S. for CBD production.

Our research has found that the kinds and qualities of cannabinoids produced can be greatly affected by production practices, and there is not a concern with pollen affecting flowers as there is here in the U.S. In fact, there can be unique chemical compounds produced by plants that are allowed to pollinate.

Finally, there is a general need for establishing standards for the marketing – importing and exporting – of hemp products to assure the quality of those products is maintained between sellers and buyers.

**HT: How would you describe the development of the hemp industry in China?**

**JS:** Particularly in the area of fiber production, China is at least five years ahead of the U.S. There is dedicated high-quality fiber production with the supporting infrastructure needed for processing into textiles. Over half of world hemp production is in China of which most is for fiber, but very little of it is exported. The Chinese are utilizing hemp fiber domestically in the manufacture of garments with antimicrobial properties and for use in advanced technology manufacturing.

China is well-positioned for advancing carbon-based and other high-tech manufacturing, especially when you consider its hemp production and that more than 60%

“Frankly, I do not see a future for hemp as a dedicated crop in the bioenergy space.”

of graphite and nearly 60% of rare earth metals production is there. Likewise in Europe, there is high-quality fiber production, but particularly in Eastern Europe, the fiber processing technology infrastructure needs to be re-established. As for essential oil hemp production including cannabinoids such as CBD, the U.S., and in particular Oregon, lead the world in production capabilities. Our genetics for this market class are superior to those presently being utilized in China and Europe.

**HT: What interesting things are coming out of the Oregon state research stations?**

**JS:** Starting in 2019, ten of the OSU research and extension centers began for the first time to get familiar with growing hemp. Since then, faculty from campuses across six colleges and the research centers have begun to plan and participate in different projects. The centers, along with our partners around the country are using the slump in production acreage to get the science ahead of the initial boom market

There are strategic research questions that we are working to answer: where the different market classes can be optimally grown; What are the best agronomic practices to use (particularly for water management in the irrigated western states); how does hemp fit into crop rotations with established commodities to complement the overall production system and not disrupt markets; what are the actual costs of production; and how can hemp genetics be improved to optimize production, reduce risks from pests, diseases, and other stresses, and produce the highest quality end-user product.

We are also leading a six-location project in Oregon, California, and Colorado that is determining the actual water use requirements of essential oil hemp crops; and we have formed a three-state partnership with the University of California Davis and Washington State University, and the USDA Agricultural Research Service's National Plant Germplasm System to expand the genetic base of hemp for use in developing improved varieties of the three market classes. This work is not only important for the 45th parallel production areas, but also to extend the range of hemp production to more southern U.S. locations.

**HT: Talk about hemp's potential in bioenergy applications?**

**JS:** Hemp has many potential high-value uses in the manufacture of biobased high-performance textiles, advanced manufactured and construction materials that can be made from the stalks or seeds, and health and wellness products – the list goes on and on. These have potentially great value as substitutes for petroleum-based materials with potentially superior end-product and environmental performance advantages. Frankly, I do not see a future for hemp as a dedicated crop in the bioenergy space, other than its possible use as a by-product fraction that remains after all other higher value constituents have been utilized

**HT: Managing broad interdisciplinary teams to address hemp's potential would seem like a daunting task in light of the plant's many possibilities. What are the keys to successfully managing such a sprawling initiative?**

**JS:** First, the GHIC is fortunate to have strong support from the College of Agricultural Sciences and Dean Alan Sams. This support allows Jay, Kristin Rifai our center administrator, and me to work full-time on establishing the center, its operations and policies, and especially expanding our partnership across campus, the state-wide branch stations, and with partners at other universities and industry.

Second, along with the international partnerships mentioned above, Jay initially put into motion a working framework for OSU and the University of Kentucky to assist USDA researchers to become quickly established in addressing hemp research needs for the national good of the industry. These efforts, supported by research grants, appropriations, and gifts, have helped us form a shared vision for what is needed to address the many challenges that must be overcome to accelerate progress and bring hemp up to the same status in a world economy as any other established commodity.

Because an entirely new industry with complete supply chains needs to be established and matured as fast as possible, there are innovative contributions that must be made by disciplines not only in agricultural production, but also genetics/genomics, food science, engineering, logistics, business and

finance, and pharmacy. The key to making this happen is not so much what Jay, Kristin, and I do, but what we can help facilitate through working with like-minded faculty leaders across the entire campus who can contribute their expertise and experiences. What we are doing resonates with industry, which helps us all focus on their needs to establish a competitive hemp sector.

**HT: As a veteran of the USDA, how would you rate the agency's performance in establishing and nurturing the industrial hemp sector so far?**

**JS:** There has been good progress towards advancing hemp through research on many fronts, and in a relatively short amount of time. I was at NIFA (National Institute of Food and Agriculture) in 2018 when we worked with the USDA general counsel's office to establish the policies that allowed financial support of hemp research, education, and extension activities. Hemp is now considered like any other commodity when it comes to grant applications and the use of base capacity funds by the land grant universities to work with hemp.

We also recently hired a state-wide hemp extension specialist and we have received a higher education challenge grant to create hemp specialization certificates for graduate students. These new classes supported by NIFA will build on a general hemp course that has been offered for several years in the College of Forestry.

Also, the College of Engineering is sponsoring senior capstone design classes. The GHIC has also been able to establish new research partnerships with (USDA) ARS in cannabinoid chemical analyses and methods development at Peoria, Illinois; hemp fiber processing and quality assessments at New Orleans, Louisiana; and as mentioned earlier, work with the curator of the new hemp germplasm collection that will be housed at the USDA repository in Geneva, New York.

We have also worked with the National Agricultural Statistics Service, where they are developing the production survey tools that will bring hemp into the Agricultural Census surveys (just like other commodities) as well as giving input to the Risk Management Agency that is setting up crop insurance tools for hemp producers.



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# Getting the lead out



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Research shows stalks from polluted soil safe for building, energy

**H**emp grown to clean up polluted soil could be used for hempcrete construction and to produce energy, with virtually no health risks, an Italian researcher has suggested.

Vito Gallo, Professor of Chemistry at the Polytechnic of Bari, said the hemp plant's performance in the phyto-remediation (phyto-purification) process leaves only trace amounts of any pollutants behind.

"Hemp allows a sort of dilution of metals in the biomass and this results in material that, in principle, presents very limited or even no health risks," Gallo, who is also coordinator of BIO SP.HE.RE., a hemp-specific research initiative, told Canapa Industriale.

Gallo suggested that scientific organizations could get together to set acceptable levels of concentration of any foreign substances in downstream hemp products.

## Robust research

Italian stakeholders are working on significant research regarding phyto-remediation, in which specific plants are grown both to clean up pollutants such as heavy metals, and to stimulate the degradation of organic compounds to enrich the soil. Hemp has proven itself to be highly effective in both roles, as Italian scientists have set out to further document.

The question has always been what would be done with the adulterated hemp once it's harvested from polluted fields.

Italian researchers have posited that most of the heavy metals absorbed by hemp are stored in the roots and leaves of the plant, leaving only miniscule amounts in the hemp stalk, and continue to study that process.

## Hemp and soil

The research in Italy builds on studies from as far back as 2002, when researchers from the University of Wuppertal and the Faserinstitut of Bremen, Germany, showed that hemp plants sown for remediation collected most heavy metals in the leaves, while plant stalks were virtually unaffected by contamination. A later study in India in 2014 identified hemp as a promising tool for the hyperaccumulation of heavy metals such as arsenic, lead, mercury, copper, chromium and nickel. Further studies since then have underpinned both analyses.

In addition to using the hemp stalks for hempcrete, hemp biomass can be burned for energy. With the ashes collected under controlled conditions, the metals can be extracted and re-used, Gallo said.

"The use of hemp for phyto-remediation would not only lead to the creation of a new system of land use linked to envi-

ronmental protection, but also to the creation of jobs and sustainable resources for the community, according to the principles of the green economy and bio-economy," said Marcello Colao, a biologist at the Italian non-profit Association of Apulian Environmental Biologists (ABAP), which is also studying phyto-remediation.

Colao is directing the GREEN project (Generate Resources And New Economies), which is studying different varieties of hemp and ranking them for their phyto-remediation capacity. That research, in partnership with the region of Puglia government, is part of a broader initiative that is researching hemp for its potential in sustainable development and carbon sequestration, and developing strategies for improved agricultural management practices.

## Micro-algae & hemp

Also supported by the Puglia government, BIO SP.HE.RE, the project under Gallo's direction, is studying a mixture of micro-algae and hemp to see how it can enhance the phyto-purification of both water and soil. The researchers have reported that lab analysis showed the mix facilitated growth of hemp plants in polluted soil, thereby speeding up the phyto-remediation process; hemp plants were particularly effective at absorbing cadmium, nickel and zinc, the team said.

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# Tools for growth and scale

From traceability to crop analysis, what tech can do for hemp

**ALEX ARKENTIS** is the CEO and Co-Founder of [CanXchange](#), the European commodities exchange for physical hemp and CBD products. A serial technology entrepreneur and investor, Arkentis has been involved in successful startups in the UK and Europe. He and two co-founders started CanXchange in 2019 to advance industry standardization by creating the market and trading infrastructure needed to position cannabis as a thriving global commodity.

**HempToday:** If you look across all of hemp's potential applications, what do you see for the derivative sectors: fiber and hurd, food seed and seed oil, flowers for CBD and other cannabinoids? What do you expect to rise?

**AA:** My team and I are confident that fiber will rise. Its applications in big industries such as construction (shivs) and car manufacturing (fiber) have already grabbed the attention of big players who are looking to enter the market and will require huge volumes. The current lack of infrastructure is hindering the progress and access to the other products you mention, and this is exactly why CanXchange was started in the first place. We are working hard to further fill in the gap and strengthen the infrastructure to facilitate all product categories to ultimately help the market thrive.

**HT:** What are your thoughts regarding how technology can impact and help shape the industry moving forward?

**AA:** I strongly believe that our industry is no different to any other in terms of how much the presence of technology can help it grow and scale. There are so many innovative businesses popping up in the space, introducing new technologies which is exciting to see. For example, traceability technologies like seed to sale, satellite crop analysis, innovative testing solutions and so many others. At CanXchange we are constantly looking for new ways to disrupt and innovate so we closely monitor what other players are doing.

We think new technologies in R&D are fundamental to the growth of our industry and we are putting a lot of our effort and attention towards this to really address what's needed. We will soon be launching a brand new and improved version of our platform which will be a big "tech" moment for us, and will incorpo-



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rate all of our learnings and research thus far. We will continue to evolve our technology daily depending on what the market requires and how it evolves. Technology in the cannabis industry should be more of a hot topic and my team and I are fully championing it.

**HT: What do you see happening in the CBD markets these days? How did companies behave coming through the glut?**

**AA:** At CanXchange we have always seen CBD as a trend. But that being said we think it's one that will continue for a considerable amount of time and we're confident that it will be the precursor to a boom on the industrial side of the market.

We have also started to see businesses looking more towards alternative cannabinoids like CBC, CBG and CBN as there is a need for innovation and diversification to be competitive. At the beginning, CBD was very much centered around wellness oils, but now it has evolved into food and cosmetics as well. The market is undoubtedly still led by CBD but is slowly becoming less dependent on it as more doors open for industrial materials.

**HT: Talk about your trading portfolio. What's in there and what's moving?**

**AA:** We now have over 40 products live on the platform including biomass, flowers, distillates, isolates, oils and seeds. The product where we have seen the most movement has been with high potency biomass, CBD flowers and Isolates, which we believe will continue for the time being. As I mentioned previously, alternative cannabinoids (CBC, CBN etc.) are also gaining significant interest and it will be interesting to see how this develops.

My team has worked tirelessly over the past year to ensure we have a large supply of product available and now that it's in place we are committed to making sure our platform is equally valuable to the down and upstream components of the supply chain. This balance will be critical to the market's long-term success.

**HT: What's the short-term outlook for CBD biomass prices?**

**AA:** Large market players provided an increased amount of supply over the last year or so which obviously led to a price reduction across the low quality (low potency) biomass. It seems to be that after last year's glut, there is still a large amount of oversupply left in the market and hence why prices are so low at the

moment.

Rightly so, a lot of growers are concerned with regards to next year's demand due to the ongoing Covid-19 crisis and they have taken the decision to either plant much less or nothing at all. If the Covid-19 situation eases and the demand for CBD products continues to rise there will be a sudden rise in prices as the amount of fresh product on the market over the next year will likely be much less.

**HT: COVID has been a stress test for everybody. Who's coming out on the other end? What are the characteristics of those companies that will survive to thrive?**

**AA:** It's no secret that Covid-19 has brought on a host of challenges for businesses large and small. Sadly, many businesses in the cannabis space have simply disappeared or gone out of business.

The reality of the situation is that larger businesses who have significant

*“Technology in the cannabis industry should be more of a hot topic.”*

backing are able to weather the storm whereas smaller businesses face greater financial challenges. It's also an incredibly difficult time for new business and early stage companies due to the lack of funding and general nervousness with regards to the situation. That being said I still tend to think that if you offer a good product or service that adds value, there will always be demand in our fast-growing industry.

**HT: You've said before that security and trust are fundamental to CanXchange's mission. How do you address those critical factors?**

**AA:** It's not a secret that the industry has lacked transparency and a secure market and we recognized that certain things were needed to be put in place in order to guarantee a legitimate market and transaction flow. The first thing we addressed was the implementation of a secure payment solution (operated by the conventional banking system) to eliminate cash payments and introduce financial security for business transactions.

We have also put in place a rigorous

due diligence/vetting process (in line with financial institution standards) for any business wanting access to trade on the CanXchange platform. This ensures all users are legitimate and ultimately protects our network of clients. Lastly our two laboratory partners, who test all items available on our platform, enable product standardization and consistency. These steps are fundamental to the CanXchange offering and we strongly believe they will open doors and encourage large corporations to confidently enter the market.

**HT: What are the basic qualifications to be listed on CanXchange?**

**AA:** We were inspired by the due diligence process for banks and financial institutions and literally no stone is left unturned. The main requirements are as follows:

- Demonstrate that you are a registered company or sole trader;
- Proof that you are active in the wholesale business;
- Consent and entry into an extensive background checks that include individual and entity checks, financial crime checks and anti-money laundering checks.

**HT: How would you describe the uptake with CanXchange so far? What's been the reaction?**

**Alex ArKentis:** A year ago our platform went live for the first time and the pick-up has been better than we anticipated. Currently we have more than 300 clients globally. We have taken the first year as an opportunity to focus on gathering customer feedback to ensure we are making the relevant tweaks to help us best serve our clients and improve the overall user experience.

The reaction has been positive to date and the feedback has really proved the gap in the market and need for the different services we provide. At the moment we are reinforcing our sales and marketing departments as we need the additional resources to help support increased demand and market growth.

**HT: Where do you see CanXchange in 5 years time and what is the long-term goal?**

**AA:** Although an exchange will remain an integral part of our business, we are also working towards diversifying into other areas that will add additional value to businesses who want to operate efficiently and securely in the cannabis industry. Essentially we want to be the global “go to” business and financial authority for cannabis businesses.



Bill Althouse of Colorado's Fat Pig Society

An innovative co-op in Colorado backs small organic farmers

A hemp cooperative in the U.S. state of Colorado has focused on boosting the fortunes of the state's small organic farmers, offering a range of support if they meet the initiative's criteria. A key goal is to cut out the middlemen who've insinuated themselves into every level of the hemp value chain, said Bill Althouse, one in a group of Colorado-based hemp veterans who are donating their time and expertise to the initiative.

“There aren't any real farmers in hemp. The whole industry has been investor-driven by corporations,” said Althouse. “Only a farmer can protect a farmer from getting exploited.”

“Through a cooperative model, farmers can secure a reasonable level of income and benefit for themselves by being the owners of the entire supply chain,” said Althouse.

Along the way, the worker co-op, Ft. Collins-based [Fat Pig Society](#) (FPS), is advocating the use of cloned plant cuttings instead of seeds as the path to stability in meeting THC limits, a constant headache for hemp farmers. That's key to reducing the risk factor for the small farmers FPS wants to help, according to Althouse.

**Co-op to co-op**

FPS is developing a lean, vertically integrated “farm-to-table” supply chain that will be turned over to a farmer-owned producers cooperative when the latter organization is formed under guidelines of the U.S. Department of Agriculture (USDA).

FPS includes Althouse, one of the very first U.S. CBD producers; Ignia Boccaldro, a sustainability expert who has a track record in organic hemp cooperatives; and Yamie Lucero, a farmer versed in biodynamic

growing who serves as a farm foreman and supports Fat Pig Society's extraction and sales efforts

In addition to the Fat Pig Society, the genomics project team includes Terry Moran, Moran Hemp Seeds and Ag Consulting, who developed the Colorado seed certification program while working at the state's Department of Agriculture; the Agricultural Genomics Foundation, a non-profit group that studies emerging crops for their promise as medicines; and Barbara Campbell, an intellectual property attorney specializing in horticulture.

While the co-op is working with just a handful farms now, Colorado's total 142 small, struggling organic farming operations offer plenty of room for expansion. That will come as Fat Pig Society fine tunes its value chain and pushes farmers to overcome the risk aversion common with new crops.

**Chemistry lesson**

The initiative starts, of course, with what the farmers put in the ground. That's why FPS is constantly working to develop hemp varieties for cloned plant “starts” – or cuttings – that will consistently remain below the U.S. THC limit of 0.3%, and working to get those cultivars approved under international criteria of the Association of Official Seed Certifying Agencies (AOSCA).

Seed cultivars under AOSCA standards must be unique, stable and result in uniform crops; to meet those criteria in cultivation seeds takes an average of three years. Althouse said cloned plant cuttings, analyzed by their chemical composition (known as “chemovars” or “chemotypes”) – rather than their adherence to cultivar standards – is a better way to arrive at hemp varieties that

consistently fall under 0.3% THC.

“The field data is also telling us that the process of developing seed is genocidal for the interesting clones. It kills off all the interesting plants,” Althouse said.

**‘Change agents’**

Fat Pig Society's production chain involves flash freezing of the hemp green matter to circumvent often-troublesome drying and storage, innovative ethanol-based extraction methods and a network of “change agents” who sell FPS CBD products by word of mouth. A limited number of food cooperatives also sell the co-op's CBD. Anyone who wants to support the mission and see their money go directly to farmers, instead of investors, can also buy directly from the FPS website, Althouse said.

In the ideal scenario, Fat Pig Society aims to demonstrate to farmers that they can add \$100,000 in income each year by planting 2 acres of hemp, a goal set based on state research which shows that amount of additional income can help small organic farms remain viable, according to Althouse.

“Last year we saved one dairy farm from bankruptcy,” Althouse said. “They made \$50,000 off one acre of hemp.”

To participate in the co-op, farmers need to have official USDA Natural Organic Program certification, engage in regenerative rotation of their crops, and be turning out produce that feeds their local communities. Also under co-op guidelines, hemp can be only one of the crops in a farmer's rotation,.

Fat Pig Society enjoyed a major advancement this year when one of the varieties it has developed, Unicorn 1, was added to the list of cultivars approved by the Colorado Department of Agriculture.

# Meet the MD1000 mighty hemp micro decorticator.



## Applications

Hempcrete construction  
Natural fiber insulation  
Animal bedding & litter  
Plant bedding

## Perfect for

Hemp building teachers  
Research organizations  
Small farmers  
Do-it-yourselfers

## Key features

Compact, simple design, Easy to operate  
Gear driven, Durable parts  
Stainless steel rollers  
Minimal maintenance

## Technical specifications

Power supply: 220V / 1500W  
Capacity: ~50kg/hr  
Dimensions: 80cm X 200cm X 125cm (32" X 79" X 49")  
Weight: 260kg/575 lbs



[hurdmaster.com](http://hurdmaster.com)



# Charting a different path

Europe is not known for its cannabinoid genetics; Enecta is changing that

**JACOPO PAOLINI** is a founding partner at *Enecta*, an Italian-Dutch company that develops new cannabis genetics and is a producer and seller of high-concentration cannabinoid products for the medical, pharmaceutical and nutraceutical industries. The company recently began marketing two new hemp cultivation seed varieties for CBD and CBG production. Founded in Holland in 2012, *Enecta* is based in Bologna, Italy.

**HempToday: Talk about your CBD business, branded, wholesale and bulk? What percentage of your overall business is in bulk and wholesale?**

**Jacopo Paolini:** In the last three to four years, the market changed fast. In 2016 and 2017 our Italian production of biomass and extracts was 60% in bulk and 40% in final products. The overall demand for CBD grew constantly throughout Europe, but the price of the bulk material available on the market dropped drastically.

Unfortunately, several companies are

filling the market with cheap bulk material that has neither quality control nor traceability of the production process. This can have a bad impact on the entire market due to the fact that all these products are consumed by people.

Our strategy was the opposite. We improved our expertise in growing and extracting CBD, together with a more strict control of each step of the production process, with the aim to guarantee high quality and fair prices to the final client. This strategy is paying off and currently our production is 72% in final products and 28% bulk.

**HT: Tell us about more about your products and quality assurance; What systems do you have in place that address product quality?**

**JP:** We monitor, control and certify each single step of the production process. All the genetics are registered at the Community Plant Variety Office (CPVO), three of them are at the National

Catalogue (NAK) in the Netherlands, and two of them in the state of Colorado (U.S.). The cultivation process is according to Good Agricultural and Collection Practices (GACP) guidelines.

We've created a GACP manual for our farmers. We're discussing with the national association of farmers in Italy about expanding distribution of our manual to all the farmers in Italy. The extraction process is EU – GMP certified by a German auditor. In 2021 we expect to obtain EU GMP certification for countries such as Australia and NZ, which are slightly different from Europe.

**HT: What's the difference between "registered" or "certified" seeds in Europe and the USA?**

**JP:** In the U.S., within six months you can obtain registration in the national catalog. In Europe, it takes three years. In the U.S. only 400 grams of seeds are needed for testing, while in Europe it's around three kilograms. Also, the current

“ I decided to enter the market with little steps, to be a student and learn how to grow together – and never pretend to be a master of it. ”

level for THC in Europe is 0.2% while in the U.S. It's 0.3%.

**HT: What's the geographic scope of your customer base on Enecta's CBD products? Where are those products sold?**

**JP:** Our network extends to most parts of Europe as well as Canada, Australia, Brazil and soon Japan. In Europe, our biggest markets are in Italy, Greece and Spain. For the years 2021 and 2022 we are focusing on the UK and France.

**HT: What kind of cannabinoid levels can we expect in the new varieties, Enectaliana and Enectarol?**

**JP:** Enectaliana is a genotype with high CBD levels. The results from the last harvest are: 6.0% CBD and less than 0.2% THC. Enectarol, on the other hand, is a genotype with high CBG. From the last harvest, we got 5.5% CBG and less than 0.1% THC. For outdoor cultivation we collected data from two sites: In northern Italy about 50 km from Verona, and in central Italy about 100 km from Rome.

**HT: What are the other key characteristics of these varieties?**

**JP:** Our strains are photosensitive (not automatic), tested in areas going from the south of Europe (Greece) to northern Europe (Lithuania) and always with good results. Other than the contents of cannabinoids, our aim was to obtain a higher quantity of biomass, reduce the quantity of seeds needed per hectare, and cut down the amount of stalk waste.

**HT: How long were these varieties in development?**

**JP:** The breeding program started in early 2015, and we were able to release the first stable pre-basic seeds in 2017. In 2018 we started the registration program at the CPVO and the following year, 2019, the registration in the NAK. Now we're in the process of improving the replication process. In the first part of 2021 we were able to reproduce almost 2 million seeds, and we're confident that by the end of the year we can guarantee 10 million seeds

each 4-month cycle.

**HT: These new varieties are nearing a listing in the EU seed catalog. Tell us a bit about the process to get those listings.**

**JP:** In order to have the varieties registered in the EU, it's necessary to pass two important tests. The distinctiveness, uniformity and stability (DUS) test establishes if the new variety is clearly unique among all other existing varieties within the species; whether the variety remains uniform during propagation; and whether its characteristics remain stable during repeated propagation.

Testing for Value for Cultivation and Use (VCU) is a check against other industrial plant varieties to establish parameters important for hemp production; ~95% of production must be close to standard in order to pass.

In 2019 and 2020 we successfully passed 1 DUS and 1 VCU test, and in 2021 we're completing VCU 2. At the end of the process, we'll be granted the blue label and listing in the EU catalog that will give us the possibility to reproduce and market seeds in unlimited amounts. Our strategy is to invite as many farmers as we can from all around Europe to test our varieties and to get ready for the massive launch in 2021

**HT: Where do you see the markets for these new varieties?**

**JP:** The biggest markets are in the Czech Republic, Germany, Poland, Croatia, Romania, Greece, Hungary, Lithuania, France and Spain, due to the similar climate conditions to those of Italy. At the end of 2021 we will release variations of our strains which are more suited for producing CBD and CBG flowers.

**HT: What is your outlook for the CBD sector over the next two years?**

**JP:** Exciting. New high-cannabinoid strains and new methodology of extraction (no solvents and no CO<sub>2</sub>), will drastically reduce the price of the bulk material and we will translate this into lower prices for our customers while

maintaining the same quality level. I think I'm not the only one taking this road, so we'll see a lot more products on the market with lower prices – as much as 30%-35% lower.

**HT: How has your company managed through the pandemic?**

**JP:** Personally I took a lot of CBD against anxiety and stress in 2020. It was a tough year for everyone. First of all, our duty was to assure all our employees stability in their job and all the tools necessary to be able to work online. We didn't have layoffs, and, in fact, hired some new people. On the commercial side, in the first part of the year we faced a stop involving all the European shops that were buying our products. So it was a hard time, but restructuring our business model, we quickly switched from a B2B to a B2C model, and the change is paying off.

**HT: Your company is coming up on its 10 year anniversary in 2022. What's been the key to Enecta's longevity?**

**JP:** When you're doing something that you love, time flies. Three things are the secret to our longevity: First, humility. From the first moment, I felt that the CBD market was going to be one of the biggest markets ever. I decided to enter the market with little steps, to be a student and learn how to grow together – and never pretend to be a master of it.

Second, flexibility. From way back in 2012 when my partner Marco and I were resellers of Enecta branded CBD products, each year we tried different ways to grow. Sometimes it went well, sometimes not so well. But we were always able to rise from a fall and run faster when the path was right.

Finally, responsibility. Our products are used by individuals for health reasons. So it's our duty, it doesn't matter if it costs us more, to guarantee our clients the highest quality products and to continually invest in reducing the production costs and the final prices of the products. Only in this way will more and more people be able to use CBD products for their benefit.

## Hemp stalk cellulose in cosmetic foundation

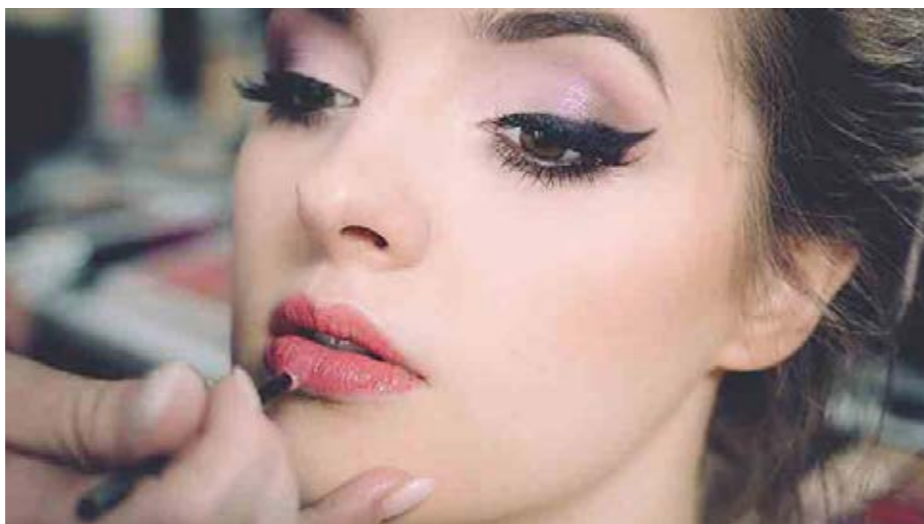
A team from China's Sichuan University has created a liquid cosmetic foundation based on cellulose from hemp stalk, which the researchers say brings several improvements over conventional makeup.

Made from hemp cellulose nanocrystals, the substance replaces ingredients such as mineral oil and titanium oxide that are common in such beauty products. The hemp-based foundation helps reduce skin barrier damage because removal does not require harsh cleansers needed to clear conventional foundations; such cleansers can lead to skin issues such as sensitivity and rosacea.

### 'Important role' envisioned

"It is imperative to find a new alternative material that avoids the skin barrier damage caused by excessive cleaning," the research team said in a study about the formula. "With the natural emulsifying and stabilizing characteristics, hemp cellulose is going to play an important role in cosmetics, besides food production and the packaging industry."

While hemp seed oil and extracts from hemp flowers are widely used in cosmetics and health products, and natural microfibrillated cellulose from other plants is more and more common in makeup, the Sichuan University initiative may be the



first potential application of cellulose from hemp to the health and beauty sector. The development was first reported this week by Cosmetics Design-Asia.

### Key advantages

While demonstrating adhesion similar to the conventional foundation, the hemp formula maintained stable gloss and uniform colors for nine hours, the researchers said. Analysis also showed the hemp foundation's performance matched the conventional foundation in coverage of facial pigmentation and acne.

The scientists said dermascopic

observation of tests on human subjects showed the hemp-based foundation left less residue behind compared to conventional foundation when simply wiped with a cotton pad. The hemp foundation was also observed to remain on the surface of the skin while the conventional foundation penetrated into the dermis, or second skin layer, risking damage.

Finally, because of the absorption effect of cellulose, the act of clearing the hemp-based foundation also removes excessive oil and air pollutants on the skin surface, similar to the manner in which cellulose acts during digestion and metabolism in the intestine, the researchers said.

## Italian developers debut eco leather from hemp waste powder

Italian developers have introduced Napee, an "eco-leather" textile containing hemp waste powder that does not use toxic solvents in the production process, is recyclable and has a negative carbon impact.

Developers Alessandro Fabbri and Giuseppe Guido said Napee is the first 97% green coated fabric from a biopolymer based on natural oils with 20-30% hemp.

The bonded fabric is made by adding dust produced during the fiber decortication process to biopolymers which are then spread on a textile base. The result is a mixture of plants and resins that can undergo the printing, drumming and embossing processes into a final faux leather product that maintains breathability.

### Advanced processes

The developers work with contractors who operate advanced technology for textile production that does not use



traditional, polluting solvents; also, new generation polymers used in the process are partly biodegradable.

The company's research is now aimed at developing biopolymers made directly from hemp in order to close a circular supply chain that is absorbing CO2 throughout. The developers are also studying the possibility of including a basalt filament yarn in the material that would make the eco-leather fireproof.

Fabbri has been experimenting with sustainable textiles since 2006, with a goal to develop waste material into commonly

used articles. Guido, a former military officer, director of a theater company, and commercial agent in the fashion industry, has also studied sustainable materials.

### Goal: local supply chain

The partners say they are sourcing hemp from all over Italy, but are developing a localized circular supply chain model that minimizes the need for transportation.

The company said it has held discussions with APM Automotive, France, which is already using hemp fibers in compounds for plastic car parts, and with fashion industry representatives through financier Furio Piemarioli, who is a backer.

The most promising first uses for the fabric are as a substitute for leather and imitation leather in boating, bags and accessories, shoes and upholstery, the company said.

## Australian study shows promise in hemp feed

Sheep that were fed hemp pellets showed production gains, indicating potential for a high yielding, multi-purpose, summer feed option for livestock, according to a study in the state of Western Australia.

The pilot study, "Opening the gates to hemp grazed livestock in Australia," was carried out by the state's Department of Primary Industries and Regional Development (DPIRD).

"The most profound outcome was the increase in minor volatile fatty acids, suggesting an improvement in energy availability and a change in the composition of the gut microbial population, which may account for the improved digestibility," said Bronwyn Blake, who led the research team.

### High digestibility

Results showed the digestibility of dry and organic matter were higher for both hemp diets compared with a control, though it is not clear why, the researchers reported.

Fifteen Merino wethers in New South Wales were fed hemp pellets made from the Morpeth Late hemp variety grown in Western Australia. The 8-millimeter pellets were manufactured by a West-



ern Australia stock feeds company that processes hemp under license. The sheep were fed three diets and five replicates per feeding, with measurements taken for digestibility, performance and developmental traits over 56 days.

### Addressing THC issue

The study showed THC was apparent in all measured tissues. While the levels were extremely low, they would not meet Australian regulatory requirements. But Blake said the results suggest it will be

possible to develop management practices for feeding hemp biomass to sheep, goats and cattle that can meet animal feed rules. No THC residue may be present in feed intended for livestock in Australia other than in approved research trials.

The results of the research will lead to a second-phase study which will explore the nutritional value and how to meet market regulations for hemp as a possible forage crop. That further research will also investigate the pathways to market for livestock-fed hemp, including clearance rates for THC.

## Italian initiative explores plastics supply chain

Authorities in the Italian town of Roccasecca say they will explore the potential for developing a hemp plastics supply chain while cleaning up local land through the plant's remediation possibilities.

Marco Delle Cese, president of the Consortium for the Industrial Development of Southern Lazio (Cosilam), and Roccasecca Mayor Giuseppe Sacco recently announced the initiative.

### Scientific partners

A memorandum of understanding was signed with the National Agency for New Technologies and Sustainable Energy (ENEA) and the University of Cassino (Unicas), which will be scientific partners on the project.



"The way to obtain plastic will be studied starting from hemp molecules and no longer from a synthesis process that starts from petroleum derivatives. Plastic that does not pollute, green plastic that is biodegradable: that is the dream," said Delle Cese.

The partners have already identified packaging as a key business opportunity. The initiative now seeks industrial partners who will bring expertise in polymers, green management and energy, according to Delle Cese. "We need those who are able to take the product and transform it," he said.

Delle Cese said an industrial consortium being formed in Lazio can also play a role in

establishing a hemp industry for the region.

Mayor Sacco, whose administration has focused on environmental issues, said the initiative can not only help clean up the land but also put it back into business and create jobs. The project is the first effort to reclaim land in the Roccasecca industrial area through crops capable of absorbing metals authorities say have poisoned the local soil for years.

### Neighboring initiative

Officials in Umbria, an adjacent region in central Italy are also looking closely at the potential in hemp fiber-based bioplastics and biopolymers, as well as the natural textile and fashion sectors.

The project aims develop a supply chain similar to one organized among stakeholders for the local tobacco industry in Roccasecca and several local communities in the Lazio region. Authorities envision a local industry that starts with seedlings, ensures raw material is available to processors and guarantees payment to farmers.

# Rows yet to plow



## Rules for food, smokable, delta-8 THC challenge USA

**C**losing in on three years since the 2018 Farm Bill legalized hemp federally, the U.S. industry continues to face a wide range of challenges on the way to maturity.

After the CBD crash of the past two years upended the value chain, eliminating thousands of companies in the sector, those hemp farmers sticking around have begun to look more seriously into grain and fiber, with hemp acreage dedicated to those outputs expected to rise over the next decade.

Meanwhile, American hemp stakeholders are addressing such things as the legality of smokable hemp flowers and delta-8 THC products derived from industrial hemp, as rules that will finally legalize CBD are held up by the Food &

Drug Administration (FDA).

Some individual states are also up against an end-of-year deadline to make a decision whether to continue state-run programs or let farmers operate directly under the USDA's federal hemp program.

Those challenges come as outputs from hemp appear to be balancing out, with interest growing in grain and fiber production. While the balance is being reached mainly by virtue of CBD's fall, it's clear stakeholders are looking to the hemp plant's potential on a broader scale.

### Challenges to CBD

While CBD has tumbled, those players who survived say the sector cannot stabilize until clear rules for the compound emerge. After the FDA turned

back two New Dietary Ingredients (NDI) applications for approval of CBD products in summer 2021, it now looks like federal legislation may be the only path to legalization, according to stakeholders.

In rejecting the NDI applications, the FDA equated CBD in full-spectrum hemp supplements with concentrated CBD, such as that contained in Epidiolex, the only FDA-approved high-CBD drug. By doing so, the FDA is suggesting such CBD supplements should be available only by prescription.

With the NDI approval process putting the sector in danger, stakeholders now say Congress should be called on to pass legislation clarifying CBD's legal status.

Lawmakers are attempting to do so.

overturned in Texas earlier this year after a judge found it violated the state constitution. And Wyoming lawmakers last year rejected a proposed measure that would have banned smokable hemp and products containing CBD.

But many states are rejecting smokable hemp. New York banned hemp prerolls, cigarettes and loose flowers (but abandoned an original proposal that would have also blocked the sale of flowers for purposes other than smoking).

Hawaii has banned smokable hemp products. Hemp operators in Indiana are still awaiting a decision on their challenge to a 2019 smokable-hemp ban brought by the Midwest Hemp Council, an industry group, and other petitioners.

It's an issue that won't be sorted out soon.

### Delta-8 THC

U.S. states also continue to grapple with how to handle delta-8 THC, a form of THC distinguished from the more common delta-9 THC prevalent in marijuana plants. Delta-8 is produced by extracting CBD from industrial hemp and then using acetic acid to turn it into THC.

Producers have argued that the compound is legal under hemp provisions in the 2018 Farm Bill that made all parts of the hemp plant legal, but regulators have pushed back because the compound is created by further processing of CBD, and therefore is not a direct natural extract. That makes it a controlled substance although it is not explicitly outlawed under the U.S. Controlled Substances Act.

Hemp processors over the past two years started turning out delta-8 THC from hemp for such products as vape liquids, edibles, and high-CBD hemp buds laced with the compound. Many legal marijuana dispensaries have stocked the products, but delta-8 brands have also shown up in convenience stores and independent smoke shops.

While a group of stakeholders led by the Hemp Industries Association has challenged the federal government's stance, analysts have repeatedly warned that delta-8 would likely come under tighter regulation by the DEA. Other hemp organizations have gone so far as to criticize producers who have put delta-8 products on the market.

Nearly a dozen states have already set outright bans on the compound,

which had sparked a vibrant gray market. Colorado officials recently moved to ban sales of hemp-derived delta-8, and Alaska, Arkansas, Arizona, Delaware, Idaho, Iowa, Mississippi, Montana, Oregon, Rhode Island and Utah all have moved to block delta-8 THC sales.

Other states are considering going the path of Michigan; instead of outright bans, they look to regulate delta-8 THC in the same way as the more common delta-9 THC found in marijuana plants. California and Washington are among states also known to be exploring this option.

### Rise of fiber

As the U.S. hemp industry takes a more comprehensive approach to the plant, 2021 may come to mark the relaunch of an American hemp fiber industry. Roughly 15 initiatives to start facilities to process hemp stalks have been announced, as some enterprises enter what's surely a classic chicken-or-egg conundrum: Who'll provide the input crops, and who'll buy the outputs?

Observers say northern U.S. states, many of which grew fiber hemp in the 20th century, can again become major producers. That potential was signaled this year in South Dakota, where hemp farmers shied away from CBD, overwhelmingly putting in grain and fiber crops in the second year of the state's program. The South Dakota Industrial Hemp Association said a total of 20 farmers seeded roughly 2,000 acres in the state, with only 35 of those dedicated to CBD flower production.

There are other positive indicators for hemp fiber.

Hempcrete building, which uses hemp chips (hurd, shives, shivs) from the stem's inner core in hempcrete wall construction, and insulation made from fibers of the outer skin, is gaining an ever greater profile. Simple hurd-based products such as horse and other animal bedding, plant bedding, cat litter, fire starters and energy pellets are finding buyers.

Many startup processors tout the potential for using hemp technical fibers in textiles, but it is doubtful the USA can compete long term with the likes of China's mature hemp textile industry, and India's potential one.

### Licensing

The 2018 Farm Bill allows U.S. states and tribal nations to set their own licensing and regulatory schemes for hemp production as long as their programs are

in compliance with USDA regulations.

Some states, and most Native American tribes, are operating directly under the USDA's Domestic Hemp Production Program. In the case of states, some have given up on establishing their own hemp programs, leaving farmers no options but the federal program.

Twenty-four states currently operate USDA-sanctioned state hemp programs. Of the remaining 26 states that as yet lack USDA-approval, 20 continue to operate under the 2014 Farm Bill's pilot program, which expires at the end of the year.

While hemp enterprises in states which lack their own programs say federal oversight simplifies things for them – they must comply with only one set of (federal), pay no licensing fees, and are eligible for federal grant and research funds – they won't benefit from the support state government involvement in the sector can offer.

**Looking ahead**

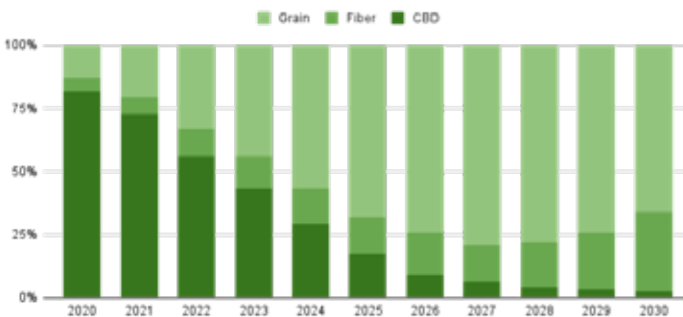
Over the long term, acres licensed for CBD hemp are expected to be dwarfed by those dedicated to fiber and grain. In a recent report, the National Industrial Hemp Council (NIHC) projected CBD-hemp fields will shrink to just 2.78% of total U.S. acreage, with hemp sown for seed production growing to become the dominant output one decade from now.

With CBD this year having been grown on 82% of total licensed U.S. hemp acres, NIHC expects seed production will rise to 65.8% of total acreage while that dedicated to processing of the hemp stalk will reach 31.4% by 2030.

Those totals will come as hemp expands robustly in the United States to meet growing demand, and becomes a major commodity with farm-gate sales surpassing \$10 billion a year by 2025, NIHC projects in the report, released in summer 2021.

**Projected outputs**

(% 2020 - 2030)



**Licensed hemp acres**

(000s)



**California has hemp law after years of controversy**

California has a new hemp law after years of controversy among hemp and marijuana interests. Gov. Gavin Newsom signed Assembly Bill 45 in September 2021, the end of a long road for hemp legislation.

- Under main provisions of the new law:
- Hemp-derived extracts – including CBD – may be added to foods, beverages, cosmetics and pet products.
  - Farmers and businesses operate under the regulatory framework for marijuana companies, such as lab testing standards.
  - Out-of-state hemp products imported into California must meet new state standards.
  - THC isomers such as delta-8 THC may not be sold outside regulated cannabis sales channels.

**Tax will delay smokable hemp**

Sales of smokable hemp will be allowed, but only after lawmakers agree on a new tax for “inhalable products.” The timing for such a tax is uncertain. Producers can produce smokable-hemp products for out-of-state sale before the tax is set.

It's the tax provision that has hemp stakeholders up in arms in California, as it means an indefinite ban on smokable hemp. “It's a trick they pulled on us,” said Chris Boucher, CEO at Farmtiva, a hemp ag services company and CBD consultant who also serves as a board member and treasurer at the California Hemp Farmers Guild. Boucher said wording regarding “inhalables” in the bill's final draft means those products won't be available until the state establishes a tax levy.

Meanwhile, the remainder of the bill “creates a confusing new bureaucracy adding burdensome regulations and compelling CA state agencies to inspect and certify out-of-state hemp facilities selling into California,” the Guild said.

“AB45 doesn't just inhibit California hemp farmers in the middle of this season's grow from selling their crop, but will also shut down thousands of California's CBD Wellness companies by criminalizing their products,” the Guild added.

**Advantage to marijuana industry**

Opponents said the marijuana industry stands to benefit because low-THC hemp products now will be subject to the same regulations that guide the marijuana business.

Those against AB45, which puts hemp under the state's Bureau of Cannabis Control, have long argued that the law is the result of lobbying by marijuana interests that are looking to disadvantage industrial hemp.

“It's devastating news. They f\*cked the California hemp industry big time,” said Boucher. “Big Marijuana will now grow and sell hemp CBD, CBG, CBN, CBDV and THCV, thus removing almost all hemp farmers from commerce.”

In addition to the Hemp Farmers Guild, opponents of the measure included the National Hemp Association, the California Hemp Association, the California Hemp Coalition, the National Industrial Hemp Council, the Cannabis Distribution Association, and StopAB45.com, a grassroots online initiative.

Organizations supporting AB45 include the U.S. Hemp Roundtable, the California Hemp Council, Vote Hemp, the U.S. Hemp Authority, and the Hemp Industries Association, the California Cannabis Industry Association, and the Cannabis Beverage Association.

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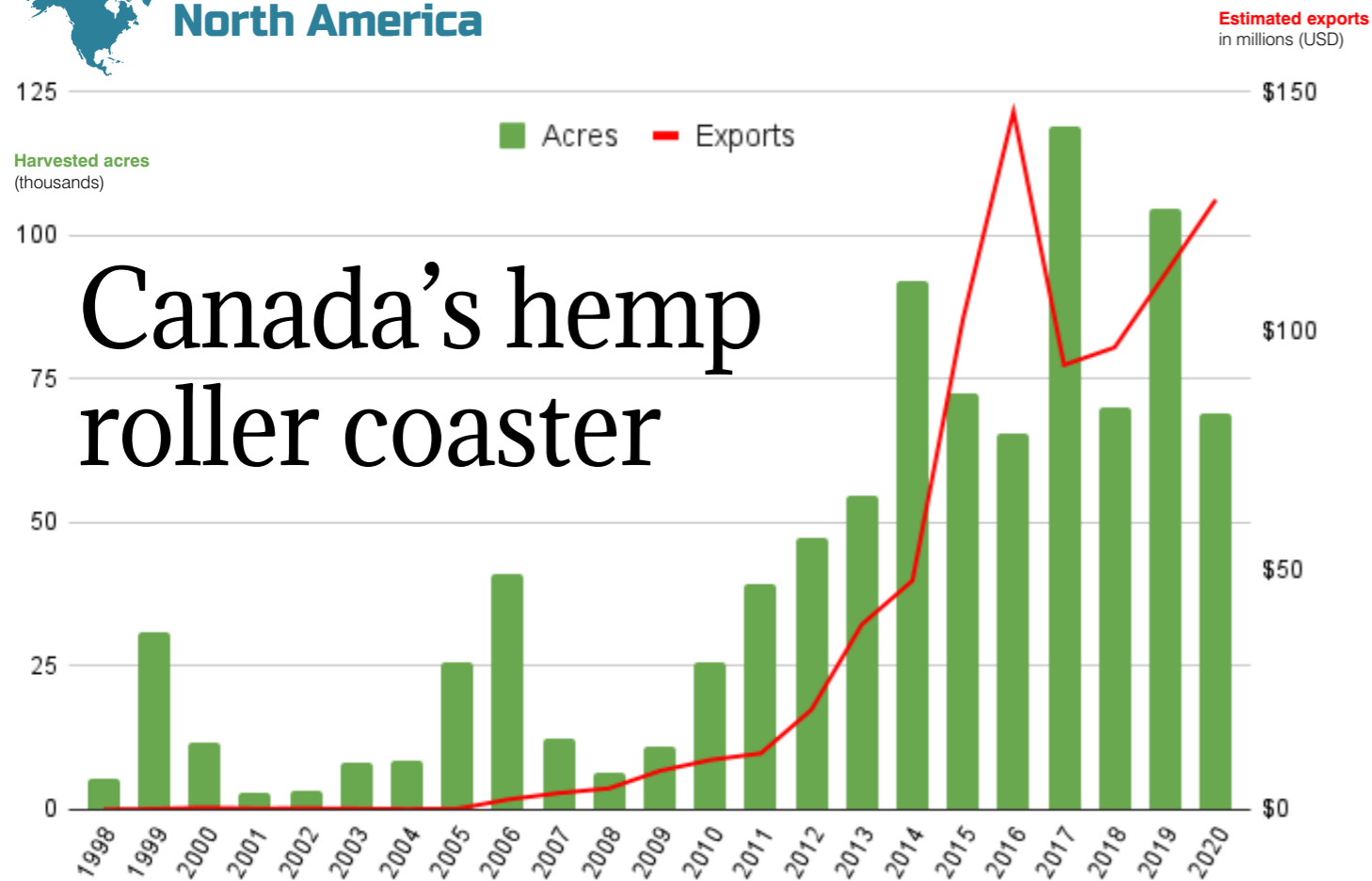
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# Canada's hemp roller coaster

Acreage dips in 2020, as long-term outlook is adjusted

Canada's hemp agriculture sector now says it will need another decade to reach 250,000 acres, a level that early rosy predictions suggested would be achieved three years ago. That comes as many farmers held off on hemp last year amid depressed prices, with total acreage reaching just 69,000 acres, a 33% decline from 104,000 acres in 2019, according to figures provided by the Canadian Hemp Trade Association (CHTA).

Stakeholders have said rising prices for canola and a corresponding dip in hemp grain prices from 70-80 cents per pound to 50 or 60 cents after the 2020 harvest has meant that many farmers also held back from planting hemp in 2021.

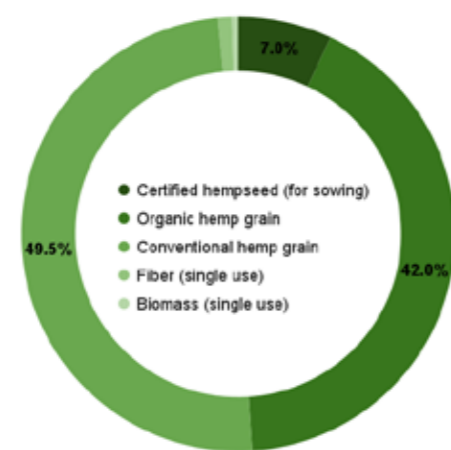
### Predicting is tricky

Projections back in 2014 held that hemp acreage in the country would reach the 250,000-acre mark in 2018 as hemp became more common in farmers' crop portfolios. But hemp acreage across the country has fluctuated wildly since that prediction. After reaching a high of 118,000 acres in 2017 amid a surge in demand for hemp food seed from Korea, total fields crashed to 70,000 in 2018 as China took over that market before the partial rebound in 2019.

While the country has been primar-

### Grain, and more grain

Fiber and biomass are dwarfed by grain categories in Canada. Outputs for 55,000 acres planted in 2020.



ily a hemp grain producer, with notable fiber production, Canadian growers jumped into CBD – just in time for the crash in that sector – planting for flowers on 16,000 acres in 2019 (the first year harvesting of flowers was legal), and then on 20,000 acres in 2020.

High-CBD hemp varieties, most from the USA, were approved for sowing in Canada earlier this year. Despite the current glut, that will help those producers who still have faith the CBD market will settle down into a period of growth.

Across Canada, most of the drainoff in hemp fields in 2020 was in Saskatchewan, where acreage fell from roughly 20,000 in 2019 to 6,000 in 2020, according to regulator Health Canada. Fields in Alberta, Canada's second biggest growing province, meanwhile were reduced to 8,332 acres from 9,119 acres for the analog year. Manitoba and Ontario fields remained steady at roughly 5,000 acres and 1,500 acres, respectively, in 2020.

### Ongoing challenges

Canadian stakeholders say demand for grain has failed to meet the expectation that big fast-moving consumer goods companies would embrace hemp seed as an ingredient for protein bars, healthy snacks and other foods.

Producers also say the U.S. market continues to be troublesome due to a developing regulatory environment as many individual states are still setting rules for hemp products, and the U.S. Food & Drug Administration is dragging its heels on setting rules for CBD.

Canadian hemp companies are also no doubt also under pressure from producers in the United States after the 2018 U.S. Farm Bill legalized hemp growing at the federal level. Chinese grain producers are also getting more aggressive globally, including in North America.

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# The Colorado Model



Colorado Gov. Jared Polis

## Hard-core stakeholders bolster state's hemp program

Ignoring the aberrant year of 2019, when hemp farming and licensing doubled in Colorado, registrations were still higher in 2020 than in 2018, before the CBD boom and bust. That means Colorado has a group of hard-core hemp stakeholders who are not giving up on the crop.

After the number of registered operators more than doubled to 1,947 in 2019, roughly half that number dropped out in 2020. Registered hemp acres, which were recorded at 88,743 in 2019, more than halved in 2020, dropping to 36,225.

With Colorado's hemp program now approved by the U.S. Department of Agriculture (USDA), state officials say they hope to build out from that hard core by continuing to advance the interests of family farmers and the industry's expansion.

### CDA's hemp goals

"We look forward to seeing how hemp can be further developed for fuel, food, and other uses while being a source of revenue for family farms," Gov. Jared Polis said in a press release from the Colorado Department of Agriculture (CDA).

In addition to its focus on small famers, the Polis administration has committed to implementing large-scale initiatives to support research, the development of processing centers, and financial bonuses for hemp farmers under the Colorado Hemp Advancement and Management Plan (CHAMP).

The governor's office said the state hemp program also puts environmental and renewable energy goals high on the agenda, including the Polis administration's goal to achieve 100% renewable energy in the state by 2040.

The CDA submitted its original hemp plan after publication of the USDA's Interim Final Rule (IFR) on hemp in 2019.

USDA requested changes, and the state then re-submitted the plan in August 2020 after revisions that resulted from extensive negotiations with the federal agriculture agency. Approval came last month.

Rule which went into effect in March of this year, he also took the occasion to notify USDA that "CDA will continue to advocate for additional rule revisions to create even more flexibility for producers."

Colorado's hemp program has grown exponentially and CDA's regulatory footprint has expanded along with registrations and acreage, the state noted in its hemp plan submitted to USDA, adding that authorization was granted to increase CDA's spending in fiscal year 2020-2021. The agency said it will continue to grow the regulatory program to scale with the industry.

"Importantly, the success of Colorado's hemp program is the result not only of the robust state regulatory environment, but also of the community of hemp cultivators, product manufacturers, and ancillary business operators and stakeholders who have helped drive the growth of the program," the plan points out.

### Challenges remain

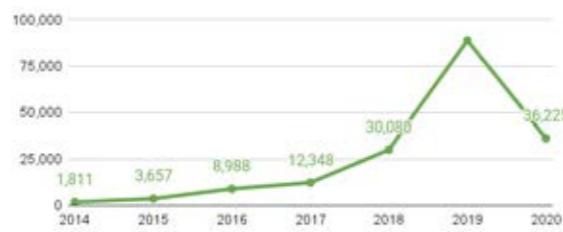
Since 2015 "the program has rapidly scaled up production, launched a certified seed program, diversified supply chains, and is establishing a statewide Hemp Center of Excellence, which will help direct research, outreach, and educational efforts for Colorado's hemp industry," according to the CDA release.

Still, Colorado's hemp industry faces the universal challenges of finding or developing technology for hemp farming and processing, and workers with technical skills for the modern agri-industry.

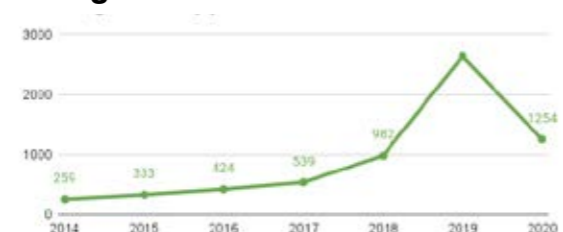
Pollen drift, in which female marijuana or hemp plants are inadvertently pollinated by a neighboring crop of male plants, is also a challenge. The phenomenon can affect both outdoor and indoor grows, and lead to crop losses in both types of cannabis. A Colorado House working group is considering measures to address that problem.

### Hemp fields shrink

Registered acres in Colorado by year

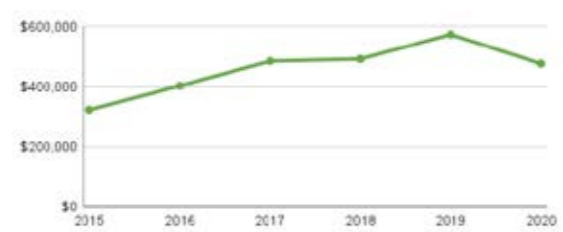


### Registrations fall



### Expenditures too

State hemp program spendings by year



"Colorado is the undisputed leader in the cannabis industry, and our hemp plan is a model for the country," Polis wrote in a letter that accompanied the final Colorado plan. And while the governor commended USDA for improving regulations in a revised Final

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## Hemp industry struggles to find its footing, and viable varieties

Researchers in Texas say they are still trying to find hemp fiber and grain varieties that will adapt to southern U.S. growing conditions, and report that some early entrants to the industry have suspended hemp operations amid questions over economic fundamentals.

While a few hemp varieties from China, Australia and Italy have shown early promise, according to the AgriLife Extension Service of Texas A&M University, most food seed and fiber varieties originating from northern climates such as those from Canada and Europe have proven unadaptable.

The Extension Service said some varieties trialed started flowering at 6-7 inches in height due to their sensitivity to light and the searing Texas heat, which triggered early reproduction. Such varieties would normally reach 6-7 feet in height before flowering, AgriLife noted.

Researchers have also reported that CBD varieties from Colorado and Oregon have not performed well in Texas climate conditions.

AgriLife said planting seeds for Texan farmers won't be viable from a cost perspective until they are reproduced locally. Cost of

planting seeds has been cited as a key limiting factor for the hemp industry in the state.

### Many challenges

Late plantings and low quality seeds that brought low germination rates also contributed to poor trial results in 2020, AgriLife reported, while hemp crops were beset by pests and weeds along with higher-than-usual temperatures and drought. The combination of problems prohibited large-scale outdoor field trials, AgriLife noted.

The Texas Department of Agriculture reported 2,078 acres of the 5,600 permitted acres and more than 15 million square feet of greenhouse space were planted in hemp in 2020, when the state licensed more than 1,000 producers.

The need for more research, an oversaturated CBD market, and the lack of processing infrastructure are also holding back widespread takeup of hemp after years of hype about the plant as a possible alternative to staple Texas crops such as cotton, corn and milo.

While some small, vertically integrated organic Texas operators were successful with

CBD production, they are now squeezed by a massive global oversupply, further cooling overall development of that hemp subsector in Texas, AgriLife said.

### Processing, buyers needed

Diminished interest in hemp following the CBD boom-and-bust could also mean reduced funding for research as AgriLife projects are nearing the end of their funding and privately funded research is also likely to take a hit.

Fiber might be a viable option for hemp production in Texas, but more research is needed to determine viable varieties and management practices to make that business profitable, AgriLife said.

Beyond the farming challenges for hemp as fiber or grain, there are no established processing facilities or consistent buyers looking for Texas-grown hemp fiber or grain.

Agriculture Commissioner Sid Miller, who grew hemp on his own farm this year, admitted Texas is behind other states in developing a hemp industry, suggesting the state needs five years to get the industry rolling.

## Maryland farmers urged to hold off on planting hemp

A research team in Maryland is recommending farmers hold off on farming hemp, citing the “chicken-and-egg” nature of the nascent industry, over-saturation in the biomass market, and the need for further studies.

The team, from the University of Maryland College of Agriculture & Natural Resources, noted that with production and research of hemp still in its infancy, it may not yet be an economically viable crop for the state's farmers.

The multi-year study, led by Andrew Ristvey, a commercial horticulture specialist at the University of Maryland Extension, and Nicole Fiorellino from the university's Department of Plant Science and Landscape Architecture, looked at hemp economics and agronomics in search of ways to maximize production under existing legal restrictions.

“I would recommend farmers hold off and not grow just yet,” Ristvey told the website [myeasternshore.com](http://myeasternshore.com).

Researchers cautioned farmers regarding the current bloated market for biomass, marked by prices that have dropped by roughly 80% over the past two years amid an oversupplied CBD market.

### Learning curve

The current limit of maximum 0.3% THC in hemp plants was also cited by the research team as a risk factor to farmers. Plants that go over that limit can mean crops must be destroyed.

Finally, researchers noted that while the study of hemp has advanced in Europe and other parts of the world, the industry in the USA still suffers from knowledge gaps attributable to drug laws that shut the industry down in the middle of the 20th century.

“We're struggling because we really lost the knowledge of hemp production. We really lost out on a valuable crop,” said Ristvey.

Funded with a grant from the Maryland Agricultural Experiment Station, the research initiative is part of a broader state effort among seven universities and 65 growers. The University of Maryland team worked directly with 11 of those growers, and grew hemp over two seasons at the school's Wye Research and Education Center in Queenstown in developing its report.

Maryland's state hemp program was approved by the U.S. Department of Agriculture in August 2020 after the state's Department of Agriculture adopted new regulations to comply with provisions of the 2018 U.S. Farm Bill.



Brian Ward of Clemson University

## South Carolina researchers say they've developed a stronger plant

Researchers in South Carolina say they have developed a hearty new hemp variety that can withstand weather that blew down crops tested in previous years.

A team at Clemson University's Coastal Research and Education Center (REC) said the new variety, “Hurricane Hemp-Florence,” produces massive stalk and root systems that can stand up to heavy windstorms, common in many parts of the hurricane-prone coastal state. The new genetics were developed through a two-year project.

Hurricane Florence leveled much of the South Carolina hemp crop in September 2018, with farmers losing up to 20% of their yields. Brian Ward, an organic vegetable specialist and assistant professor at REC said those trials involved hemp varieties that were not bred for South Carolina conditions, prompting researchers to probe the potential for developing stronger plants.

### Broad studies

The REC researchers are doing further studies to determine the most effective plant spacing, fertilization, and the best times to plant hemp crops, aiming to optimize farm economics.

Research with different hemp varieties in South Carolina so far has found that most perform best at 60-inch spacing, but some cultivars perform better at lower plant densities. Most reach peak biomass yields and CBD levels at nitrogen rates of 60-120 lbs. per acre,

preferring about 80 pounds of nitrogen per acre, research has also shown. A fertility study found that the most biomass was produced by plants fertilized at a rate of 75-95 lbs. per acre.

### CBD study

Clemson researchers say they also plan to study plant hormones to determine if THC production can be arrested as CBD in developing plants increases, which they say could help reduce the number of plants per acre, and give more control over when CBD is produced during the plant's life cycle. That study is to include Hurricane Hemp-Florence and one hybrid variety.

Other Clemson research teams are studying such things as diseases and insect and weed pressures in hemp crops.

### 213 growers this year

Industrial hemp was first grown in South Carolina in 2018 when the South Carolina Department of Agriculture's hemp pilot program licensed 20 farmers to grow the crop. That number ballooned to 265 in 2020, but dipped to 213 in 2021.

South Carolina hemp farmers now operate under a state plan that was approved by the U.S. Department of Agriculture last year. USDA works with the Clemson Cooperative Extension Service and Clemson Department of Pesticide Regulation in supporting South Carolina hemp growers. The state's Department of Agriculture has six full-time employees devoted to the hemp sector.



*“We know there was some Italian seed, and some Chinese.”*

# Tracking down hemp’s roots

Uncovering the sources of hearty feral hemp in the U.S. midwest

**SHELBY ELLISON** has directed the *industrial hemp program at the University of Wisconsin-Madison (UW-M)* since August 2020. An assistant professor in the Department of Horticulture, Ellison’s primary research interest is preserving, characterizing, and utilizing genetic diversity in alternative crops such as hemp to meet the needs of Wisconsin farmers. She holds a bachelor of science degree in genetics from UW-M, and a Ph.D. in genetics, with an emphasis in plant breeding and biodiversity, from the University of California-Davis. She previously worked as a plant geneticist for the U.S. Department of Agriculture’s Agricultural Research Service.

**Hemp Today: The state has a serious hemp history.**

**Shelby Ellison:** Wisconsin is interesting because it was a big producer in the 1930s and 40s. We were primarily a producer of rope and twine, and long bast fibers for canvas making. When we started growing again in 2018, there were still traces of a hemp culture. There are still people living who remember hemp being grown, and processing facilities.

We have a lot of feral hemp or “ditch weed” that has persisted since those times. I remember seeing it when I was growing up. Now it’s a great resource. I’ve been actively trying to collect that hemp with researchers in other states across the Midwest so we can preserve those genetics.

**HT: It sounds like the perfect situation for a researcher.**

**SE:** We’re a very diversified farming

state so there’s always a ton of interest in agricultural research. I’m fascinated by the challenge of figuring out where the feral hemp in this part of the country came from — that which survived or was not eradicated. If you trace it back to the original populations that were grown, we know there was some Italian seed, and some Chinese. That’s across a big section of the country, the western part of the Midwest — the Dakotas, Minnesota, Wisconsin.

We have tracked down some seeds and plant material from 1908 at the Wisconsin State Historical Society, which probably originally came from the University’s agricultural extension program. We know about breeding efforts in the 1920s and ‘30s, but that research certainly was not very high tech.

**HT: How are farmers feeling about the potential of this new old crop?**

Wisconsin has built up a lot of production fast. We’re in the top 10 in the United States after just three years. Nearly 1,200 licenses were granted in both 2019 and 2020.

People are coming back year after year, getting better and gaining efficiency. Those who stick with it and treat the first years as an educational experience will be well-suited to win once the infrastructure is in place. Things will be tricky this year. The situation in CBD will drive some diversification. A lot of people will try to grow fiber.

**HT: What’s the outlook for fiber in Wisconsin?**

**SE:** Given our climate, all indicators are that fiber will be Wisconsin’s main output from hemp. For things to be economical, we’ll need production facilities in every state in the USA. But large-scale facilities will need consistent supplies of feedstock. We have massive paper mills in Wisconsin, for example, but these kinds of factories require massive input.

**HT: What are you specifically studying at the University?**

**SE:** At UW-Madison, we’re looking at fertility, and exploring what production

practices and varieties work best in our northern climate, and collecting data on yield, CBD and CBG levels.

We’re also involved with the Midwestern Hemp Database, which is spearheaded by the University of Illinois. We’re collecting and sharing data from growers all across the region, and the project provides discounted laboratory services to participants.

We’re also working with the University’s Biological Systems Engineering program on a small decorticator so we can do research on fiberboard, bioplastics and textiles. We hope that will kickstart downstream product development.

**HT: How do you feel about GMO and gene editing of industrial hemp?**

**SE:** There is a time and a place for different types of technology. I’m not anti-GMO or gene editing. I just don’t think either is necessary immediately. We should first explore hemp’s natural genetic diversity and do what we can with natural cross pollination to get the desired traits for different end uses. If it’s for CBD, that’s different from large grain crops, for example, or fiber hemp.

Gene editing can be used to eliminate “bad” traits, and for such things as pest resistance. On the other hand it’s also possible to increase “good” traits such as added nutritional value. The most important thing is to think about the impact those traits can have on society and the planet.

**HT: Draw the connection between hemp and climate change for us.**

**SE:** It’s remarkable the amount of biomass hemp can produce in a week. It’s amazing compared to other crops. We also see strong preliminary evidence of hemp’s potential for phytoremediation and carbon cycling. It all comes down to how the crop is managed.

Let me also suggest that, as a cannabis community, we must be aware that controlled indoor growing can be very bad for the environment. We need to think of ways of growing that make a positive impact, holistically. We need to grow more and more crops, and in different ways. A diversity of crops is very beneficial.

**HT: Was there anything that surprised you in your recent survey of U.S. hemp farmers?**

**SE:** It wasn’t necessarily a surprise, but the overriding observation is that everything needs research! And a lot of respondents said they look for more research on the economic side. The survey results are important because they indicate an order for things to develop. It’s going to be very interesting to see how the hemp sectors play out across the USA.

# Wisconsin gives up on hemp; Farmers will work under USDA

The Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) has announced the official end of the state hemp program, leaving farmers to work directly with the United States Department of Agriculture’s (USDA) Domestic Hemp Production Program beginning in 2022.

Hemp processors will remain under DATCP’s authority for consumer and food products, the agency noted in a press release announcing the end of the state program.

The change was foreshadowed earlier this summer when the Wisconsin legislature declined funding that would have maintained positions essential to managing the state’s hemp farmers.

With hemp farming licenses falling from 1,301 in 2020 to 340 this year, and hemp processing license applications tumbling from 619 to 248 in the same period, the Wisconsin hemp program suffered a shortfall of nearly half a million dollars as fee income dropped 56%. The state attributed the falloff in hemp licensing to the coronavirus pandemic and an overheated CBD market that has had the sector in the doldrums for the past two years.

**Silver linings?**

With funds drying up, Wisconsin could not qualify to manage its own program under USDA requirements, so the state has relinquished regulation of hemp growing to the federal agency.

Wisconsin has operated under a pilot program established by a previous Farm Bill in 2014, and had been readying state rules to get USDA approval under the 2018 Farm Bill, which legalized hemp federally, before the funding reversal.

Despite the state’s unwillingness to invest in hemp, stakeholders point to what they see as advantages of working directly under USDA.

Once growers are no longer under the state pilot program, beginning Jan. 1, 2022, they will need to comply only with one set of federal rules with no state regulations layered on top; will pay no license or registration fees to USDA; and will be eligible for federal grant and research funds.

Also, USDA licenses are good for three years instead of one (the licensing period applied in most states), and federal oversight lets farmers use private labs to sample



and test their crops for THC levels.

Rob Richard, President of the Wisconsin Hemp Alliance, suggested the short-lived DATCP hemp program was not a total loss. “We learned a tremendous amount of information about the plant in that time,” he said.

Now, he said, it’s time to move on: “From day one we have argued that we just want hemp to be treated like any other crop, so it’s appropriate that we transition out of a state-centric program and federalize it like we do for any other commodity,” Richard said. “Now that USDA has finalized their hemp rule and we’re seeing signs of federal financial resources in hemp research and development, this is absolutely the right time to shift course from a state-centric focused program to a federal program.”

State officials said they will support hemp farmers in the transition. “We are collaborating with USDA for a smooth transition and providing hemp growers with the resources they need to understand any changes,” said Sara Walling, Administrator in DATCP’s Division of Agriculture Resource Management.

Many producers already work with their local USDA Farm Service Agency office to report their crops, so the transition aligns with processes already occurring, DATCP said.

**Licensing status**

The 2018 Farm Bill allows states and tribal nations to set their own licensing and regulatory schemes for hemp production as long as their programs are in compliance with USDA regulations. Hawaii, Mississippi, New Hampshire and North Carolina, and several Native American tribes have opted for federal oversight.

Twenty-four states currently have federally approved operational state hemp programs. Of the remaining 26 states that lack USDA-approved programs, 20 continue to operate under the 2014 Farm Bill’s pilot program, which expires at the end of the year.



Tony de Veyra, president, World Cannabis Foundation.

# A broad plan to bring back hemp

California grain, fiber trials are first since restart of industry in 2017

An initiative in California has planted five hemp varieties from four countries in the first extensive growing trials for hemp fiber and grain in the state since the 1990s. The project is a joint effort among the [World Cannabis Foundation \(WCF\)](#), legacy U.S. hemp wholesaler Hemp Traders, and Oklahoma-based processor Western Fiber.

In addition to checking the varieties' performance under different planting dates and sowing methods in hot-weather and cool-weather cycles, yields from this year's first farm-scale crops will be processed for sale, said Tony de Veyra, president at WCF.

## Factory in works

The group is also repurposing a cotton gin to process hemp that will be installed in a fiber production facility under Riverdale Hemp Factory, a new entity set up to process hemp stalks into technical fiber and hurd.

Larry Serbin of Hemp Traders said the Riverdale factory will source hemp from Canada, China, and Oklahoma and other U.S. states while California grown feedstocks develop, starting with the yield from this year's trials.

The fiber and grain trials in central California are also the first since hemp was legalized in California in 2017. Fiber varieties in the 2021 trials are Chin Ma, a Chinese strain, and the Polish variety Bialobrzskie. Grain varieties include Katani, Canada; Henola, Poland; and Hlesia, Ukraine.

## Biochar study

Western Fiber is also in a group that will study the effects of biochar on hemp cropping systems under a \$25,000 grant from the U.S. Department of Agriculture received by de Veyra. That project, financed under USDA's Sustainable Agricultural Research and Education program, is set to begin a two-year run in

October. It will examine crop yield and performance, and changes in soil nutrient and carbon levels as a result of applying biochar and compost to the soil.

Hemp has been identified as having high potential as input for production of biochar, charcoal produced by firing plant biomass in the absence of oxygen. It sequesters carbon and provides soil health benefits.

## Quantifying carbon

The project will also track changes in soil carbon levels in an attempt to quantify the amount of carbon sequestered through a combination of hemp, cover crops, no-till management and biochar compost.

Alan Hancock College, Santa Maria, California, and the Pennsylvania-based Rodale Institute, a nonprofit that supports research into organic farming, are also partners on the USDA-supported biochar research project.

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A 31-year veteran of the hemp industry, **LAWRENCE SERBIN** is president of California-based *Hemp Traders*, which he founded in 1994. He started *Cannagrove*, a producer of engineered hemp "wood" particleboard in 2018 after having researched such material since 2005. Serbin is past national director of the *Business Alliance for Commerce in Hemp* and past president and director at the *national Hemp Industries Association*. He served as chair of the *California Hemp Advisory Board* for the *California Department of Food and Agriculture* from 2017-2020. He is currently working to bring decortication, processing, and spinning facilities online to support the U.S. hemp construction and textile sectors.

# Larry Serbin's long hemp road

Hemp veteran still optimistic after three decades in the fight

**HempToday:** You have a wide, wide assortment of hemp products at [Hemp Traders](#). What kind of products are trending now?  
**Lawrence Serbin:** We have always sold hemp textiles, but at this moment, there is definitely a surge in the interest to use hemp as an environmental alternative to other fibers in textiles.

**HT:** You've mentioned that *Hemp Traders* now imports yarns from China since the machines don't exist in the U.S. Won't yarn from China always be less expensive?  
**LS:** Perhaps. China has lower production costs due to a lower standard of living, so there is going to be a cost benefit to working with China. And it is fairly inexpensive and environmental to ship things to and from China by boat. But we do have an opportunity to grow the hemp in the United States.

**HT:** How is your work going with respect to bringing farmers and processors online to support the development of a U.S. supply chain for textiles and building materials? How do you see the investment picture shaping up there?  
**LS:** Very well. We are growing our first farm size test crop in California's Central Valley. The information we are getting this year will allow us to grow on a commercial scale in 2022. We have also set up a fiber processing facility near to where the hemp is grown.

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**HT:** What are the economics of the hemp particle board you developed at *Canna-*

*grove*? Is it even fair to ask, at this point, for price comparison with conventional wood-chip particle board?  
**LS:** The first boards we made were more expensive than regular particle board mainly due to having to ship the raw materials around the country to the factory who could produce it. The shipping costs were half of the cost of making the board. But when the hemp is made at a facility which is near to where the hemp is grown, it become much less expensive. And now with the higher costs of regular wood particleboard, hemp is going to be a less expensive alternative.

**HT:** What's happening with hemp building materials in general? Do you see any significant movement in that market?  
**LS:** One main problem with the hemp building market has been a lack of raw materials. Mostly we have had to import them. As we begin to grow more hemp in the United States for fiber, there will be much more material available at a lower cost. This will be what kick starts the hemp building industry.

**HT:** How do you see the arc of production for such biocomposite products going forward the next five years?  
**LS:** I think we will see 2021 and 2022 begin to establish the markets for hemp fiber products and grain. After that, there will be a huge increase in demand with farmers increasing acres devoted to fiber and grain.

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**HT:** Some parts of California don't seem

very friendly to hemp. What's up with that in your state?  
**LS:** There are two things going on. Some areas of the state have a history of marijuana production. Those areas are concerned that high CBD hemp flower varieties might cross pollinate with their crop and lower the value. In other areas where people have grown for CBD, a pungent odor of cannabis around harvest time has had people complain. Overall there is overregulation of the hemp industry, especially when it comes to fiber crops, which don't even produce a flower.

**HT:** When you started in hemp three decades ago, did you think the industry would develop faster than it has?  
**LS:** In the beginning in the early 1990's I thought we would first see industrial hemp legalized, followed by medical cannabis and then recreational cannabis. I thought this would all happen by the end of the decade. In reality we first saw medical marijuana legalized, followed by recreational, and then industrial. And it took over 25 years.

**HT:** Thirty one years is a long time in hemp. You must have one or two heroes.  
**LS:** There are a few people I admire. Canada legalized industrial hemp in the late 1990's and two companies emerged to fill the demand for hemp foods. *Hemp Oil Canada* founded by Shawn Crew and *Manitoba Harvest* founded by Mike Fata. Those are good examples of what a professional hemp company should look like.

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*“The bees that visit hemp are also important pollinators of many other crops.”*

# Begin with the bees

U.S. researcher is focused on hemp and pollinator communities

**HEATHER GRAB** is Senior Lecturer at Cornell University’s School of Integrative Plant Science where she teaches and mentors students in the [Hemp Science Master’s Program](#). As a researcher in the school’s hemp research program, her interests include hemp production and processing, agroecology and how insects interact with plants. Her recent work looks at the role of hemp in supporting diverse, native and managed pollinator communities; and how hemp can promote the pollination of other specialty crops.

**HempToday: We can’t remind too often of the critical situation with the bee population, and the risks implied. Please summarize the challenge.**

**Heather Grab:** The problem of bee declines is quite complex for several reasons. First, there are many species of bees. People often think of the honey bee, *Apis mellifera*, but there are as many as 20,000 species of bees across the globe. Some bee species are doing just fine while others are experiencing population declines and frequently the factors associated with the decline of populations for one species are different from those that impact another species. For example, climate change is a major risk factor for bee species that live in high elevation alpine habitats while loss of floral resources and pesticide exposure are risks for farmland species.

**HT: What role does hemp have to play in addressing this problem?**

**HG:** Hemp plays an important role because the male flowers of grain and fiber hemp provide an abundant pollen resource for bees during the mid summer when there are few other floral resources available. The bees that visit hemp are also important pollinators of many other crops. By supporting bee populations during this critical period, hemp can help to sustain pollinators that are critical to the production of other crops like apples, blueberries, strawberries, squash, and tomato. In fact, tomato shares more than 60% of its pollinator community with hemp!

**HT: Your work with hemp and bees is a natural fit with agroecology, one of your other interests. How can we best take ad-**

**vantage of what hemp offers for cleaning up farming, and the overall environment?**

**HG:** For farmers, hemp provides a valuable new rotation crop so that they can diversify their farming systems. Diverse farms help to suppress pests and disease and benefit farmland biodiversity. After harvest, hemp crops can help to build a more sustainable supply chain by replacing less sustainable products like cotton, plastics, fiberglass and cement that are used in our clothing, automobiles and homes.

**HT: Hemp-derived biochar specifically seems to hold a lot of promise for many, many applications. Any thoughts on that?**

**HG:** Thermally carbonized hemp fibers offer many promising applications for replacing mined products like graphene in capacitors and batteries as well as in remediation of pollutants like phosphorus from wastewater.

**HT: What’s the status of development in specialized equipment needed for processing hemp stems? Where are we now with decortication? What’s still needed?**

**HG:** The mechanized process of decorticating fiber hemp is a well developed technology but a major hurdle is in buildout of large scale processing facilities as well as in the adoption of small scale equipment that can enable smaller cannabinoid hemp producers to reduce their waste and capture new value streams. On the fiber side, one area that I think has high potential for improvements is in the retting and degumming processes that happen before and after decortication.

**HT: How do you see the markets for hurd and fiber outputs from that production unfolding? It’s the chicken-and-egg question.**

**HG:** In the US we have been slowly building fiber hemp supply chains starting with specialty products that have higher margins. By demonstrating the viability of the supply chain with these small projects we are starting to see interest from large companies that would require higher volumes of production.

**HT: The Cornell hemp program is a very broad one. Give us an idea of the scope. How many researchers are involved in hemp-related initiatives at Cornell?**

**HG:** Our mission at Cornell University College of Agriculture and Life Sciences is to deliver purpose-driven science. The Cornell University Hemp Group works across disciplines to tackle the challenges of this new industry through our world-renowned research as well as in our education, and outreach.

The Hemp Group has more than 40 experts who work on topics including insect and disease pests of hemp, hemp’s place in crop rotation, hemp genetics, seed science, cultivation practices, production economics and hemp product development. We are proud to house one of the first graduate degree programs in Hemp Science where students can leverage our world-class resources and expertise to develop their knowledge and gain hands-on experience across the supply chain.

Through our Hemp Science degree program as well as our research and industry outreach we hope to support the developing hemp industry to make effective decisions based on the latest science.

**HT: Cornell is making great contributions in research, but also in education through that master’s level program. Give us the overview of that program.**

**HG:** The Master of Professional Studies (MPS) in Hemp Science is an accredited, course-based, one-year Master’s degree program that emphasizes professional development and intellectual investigation in the hemp industry.

Students interact with industry leaders as well as a multidisciplinary team of researchers, faculty and extension educators

to develop specific skills in plant breeding and genetics; controlled environment and field crop production; processing; food, fiber and medicinal applications; and product development. Our coursework is designed so that students graduate as knowledgeable professionals educated in the scientific principles, market trends and the evolving cannabis regulatory environment and ready to enter the workplace with a broad range of skills to succeed in this dynamic industry.

Our curriculum includes Cannabis Biology, Society and Industry, Hemp Production Systems, Hemp Breeding and Genetics, Chemistry and Pharmacology of Cannabis, and Hemp Processing as well as the flexibility to take courses tailored to a student’s interest. Students are paired with a faculty advisor to complete a capstone project that showcases the skills and knowledge developed during their degree program.

**HT: Cornell is the host of the Industrial Hemp Germplasm Repository, the national industrial hemp seed bank. Talk about the importance of this initiative.**

**HG:** I cannot underestimate the critical importance of this key resource to all areas of the hemp industry. One of the most important messages that I impart in my courses on Hemp Production and Hemp Processing are that you need to begin your production with the end product in mind. This means selecting or even developing the right cultivars for your end product.

Hemp is a fantastically diverse crop in terms of its gene pool. Yet, the cultivars currently available on the market are frequently not well adapted to new growing environments, are not stable in their traits or not ideal for a particular end product. For example, we see in the southern US that fiber cultivars that were developed in other regions of the world for textile production flower very early, exceed THC limits, or produce low proportions of hurd which have been a key part of our emerging hemp market.

As a publicly available resource, the USDA Industrial Hemp Germplasm Repository at our Cornell AgriTech campus can help both University and private breeders to develop new cultivars to meet the diverse needs of the industry.

**HT: Tell us a bit about your homestead at Full Circle Farm?**

**HG:** My husband and I have been very lucky to steward our small homestead where we raise chickens, ducks, turkeys, dairy goats and pigs on a formerly abandoned dairy farm. We use regenerative farming practices and rotational grazing to remove invasive species and create a diversity of forested and open habitats for wildlife. Although I am a full-time academic, working the farm helps me stay grounded in the challenges that farmers must tackle.

## \$300,000 grant supports Canadian hemp initiative

**T**he Alberta Hemp Alliance has received a two-year \$300,000 grant from the Canadian Agricultural Partnership, a federal-provincial initiative aimed at strengthening the country’s food and agriculture sectors.

AHA has said hemp can be a billion-dollar industry in the Canadian province, which this year is growing just under 40,000 acres of the crop.

AHA has a goal to increase hemp fields over the next decade as it works to convince farmers to grow the crop while advocating for supply chain development in the province and exploring export opportunities.

### Opportunities in hemp

“Supporting the burgeoning hemp industry is important because it will provide producers new market opportunities and a way to diversify their rotation with this alternative crop,” federal Minister of Agriculture Marie-Claude Bibeau said in a statement by the Alberta government.

“From seed to straw, the opportunities to sell this crop are growing, with value-added products ranging from food to biofuel to bioplastics and construction materials,” Bibeau said.

In addition to hemp seed for food and animal feed, AHA sees promise in such products as insulation, building materials, textiles, and animal bedding – all made from processed hemp stalks.

### Current production

Alberta already boasts an industrial scale maker of auto dashboards and door panels from hemp-based biocomposites, which can replace petroleum-based plastic in such car components. BioComposites Group Inc. (BCG), Drayton Valley, claims to have the biggest hemp processing hub in North America after setting up a hemp decortication line late last year.

That has cleared one bottleneck in the local hemp fiber value chain, the company has said. BCG also plans a new facility to decorticate hemp and flax for the production of insulation and green building products.

The province is also home to Canadian Rockies Hemp Corp. (CRHC), which is building a factory in Bruderheim. CRHC said private equity firm Merida Capital Holdings has invested \$14 million (CAD\$18 million) in that project. The processing complex could be finished as early as this summer, the company has said.

# A better-behaved best friend

U.S. pet owners say broad spectrum CBD treats helped their dogs

Dogs from across the U.S. who were given a broad spectrum, CBD-nutraceutical made by [Okoa Pet](#), a Colorado USA animal health company, benefitted from a 14-day trial, with 98 pet owners recruited for [the study](#) reporting improvement regarding a number of potentially worrisome behaviors.

The CBD, contained in a soft chew “dosage-form treat,” was administered to dogs whose owners volunteered to place their pets in the study and answered 20 numerically-scaled questions after the CBD was administered.

Significant differences showing improvement in the pre-treatment versus post-treatment scores were determined in answers to questions regarding anxiety levels, destructive behavior, fear at the veterinarian office or groomers, hyperactivity and fear of meeting other dogs, fear of loud noises, thunderstorms, and car rides, as well as restlessness during day or at nighttime.

## Calmer, more playful

Improvement was also observed in dogs that engage in excessive scratching, have issues with food or appetite, and suffer separation anxiety. The study also reported that behaviors such as playfulness and calmness increased after the 14-day treatment period, although those gains were not to the same degree of statistical significance as the arresting of negative behaviors.

The study was led by Okoa Pet Veterinary Science Officer Dr. Robert Silver, a 35-year holistic veterinarian, and author of *Medical Cannabis & Your Pet — The Definitive Guide*, who designed the dog-owner survey, and Nancy Retzlaff, a pharmaceutical biotech industry veteran who is CEO of the company which makes “Hush, Puppy,” the chew used in the research.

The hypothesis of the study was that a zero-THC, broad spectrum, proprietary CBD extract blended with three nutraceuticals and one herb already known for their “calming” qualities, can improve canine behavior when administered at a relatively low dosage based on a dog’s weight.

“We decided to manufacture a high-quality dog and cat chew infused with broad-spectrum CBD distillate with the THC removed, rather than full spectrum hemp distillate, because of the risk of adverse effects associated with THC and dogs,” said Retzlaff. “This proved to also be a sound business decision as our CBD pet chews can be sold in Europe under the Okoa Pet name



Dr. Robert Silver:  
Designed study



Nancy Retzlaff,  
CEO, Okoa Pet

or private labeled.”

“[Hush, Puppy](#)” calming dog chews contain CBD and other cannabinoids including Cannabichromene (CBC), Cannabigerol (CBG), Cannabidiol (CBDV), and Cannabinol (CBN). The hemp extract also contains cannabis plant terpenes such as linalool, which produces the calming effect of lavender essential oils. Terpenes, like cannabinoids, cross the blood-brain barrier, and thus can affect behavior.

The synergy among those derivatives from the hemp plant work more effectively when combined as opposed to individually, what cannabis experts call the “entourage effect.”

“Working together, these synergistic supplements augment each other’s effect to

produce a more substantial relaxation and a calm state of mind, as has been clearly indicated by the results of this study,” the report indicated.

The CBD study findings bode well considering reported behavior problems in dogs account for the highest percentage of pet relinquishments to animal shelters. Many of those dogs are not able to be sufficiently rehabilitated to be adopted and are then subsequently euthanized, the report notes.

## Second study planned

Okoa Pet is doing a second, larger CBD dog study in conjunction with Dr. Lori Kogan, professor and a published researcher at Colorado State University in Fort Collins, CO. That study will serve to validate the initial research findings that CBD helps calm anxious dogs, investigate how specific behaviors are affected by hemp derived CBD, and look at general views of CBD held by the public. Canines participating in the study will receive two weeks of the company’s “Hush, Puppy” CBD calming dog chews infused with 5 mg. of broad spectrum hemp per chew plus ingredients for calming such as German Chamomile, Tryptophan, and two types of choline. Pet owners will fill out a pre- and post-chew online questionnaire. [Signup](#) for the second study is open to the first 200 participants.

## In brief

### Study will look at life cycle of hemp building materials

A two-year study in Pennsylvania will look at the life cycle of hemp derived building materials from the field to the build by collecting plant growth and supply-chain data. The research, funded with \$70,160 from the state’s Specialty Crop Block Grant program, will track hemp yields and carbon capture achieved through different farming methods, then monitor indoor air quality and other performance variables in a 140-square foot timber-framed model structure.

The model, to be built at Reading-based Alvernia University’s Bog Turtle Creek Farm in Kenhorst, Pennsylvania, is being supplied by Coexist, an architecture firm that sells a do-it-yourself hempcrete-based cabin kit, and makes hemp blocks and hemp blanket insulation.



Coexist and Alvernia University are partners on the study.

A previous round of funding in Pennsylvania gave grants totaling \$160,000 to two hemp-oriented projects. The most recent award brings the total for hemp initiatives to roughly \$230,000 from the block grants program.

### Washington state will begin to certify hemp extracts

Washington state’s Department of Agriculture will begin to certify hemp extracts, in a move officials say will help producers sell products in other states. CBD and other hemp extracts are illegal as food additives in Washington but can be sold in interstate commerce. Producers have said the lack of a state licensing program has hindered such sales.

Gov. Jay Inslee in April signed a law that sets a framework for hemp processors under the Washington Department of Agriculture. The state allowed hemp processing before but had no licensing program. Under the new program, processors who want to produce hemp extract for use as a food ingredient may apply for a hemp extract certificate that assures compliance with Washington’s inspection and good manufacturing practices requirements. But those products may only be sold out of state.

### Bahama’s government warns hemp is not a gold mine

Cannabis officials in The Bahamas say they still back hemp, but the commonwealth’s fortunes in the sector will depend on strategies to separate hemp and marijuana fields to avoid cross pollination. At the same time, Bahamas National Marijuana Commission (BNMC) Co-Chair Quinn McCartney cautioned that hemp may not be the gold mine some in the islands have suggested.

The BNMC has looked at both marijuana decriminalization and the cultivation of industrial hemp and issued a preliminary report last year. Among 24 recommendations, the commission advised the government to allow those prescribed medical cannabis to be able to grow their own plants; let tourists obtain medical cannabis by prescription; and allow imports of regulated cannabis health products.

### Pennsylvania company will turn old mill into hemp factory

A Pennsylvania company said it will turn part of a former textile mill into a factory to turn out hemp-based biodegradable plastic food containers, cups, plates and straws. Sivana Converting LLC said it purchased 350,000 square feet of industrial space in the former Sunbury Textile Mill. Sivana, based in Mountain Top, Luzerne County, estimated the factory will provide 50 jobs for technicians, operators, packers, customer service and sales representatives, and office administration in its first year. The company said it hopes to grow the workforce to more than 125 in its third year.

### Canadian group buying land and water rights in Colorado

Vancouver-based Global Hemp Group (GHG) said it has contracted to purchase a 664-acre plot of land in Colorado to grow hemp and eventually build housing units from hemp-based materials.

The land fits into GHG’s Colorado Hemp Agro-Industrial Zone (HAIZ) project, which is under the company’s Innovative Hemp Technologies (IHT) subsidiary. The initiative aims to prove the viability of hemp-based construction materials to build sustainable, affordable houses, according to Global Hemp Group’s website.

GHG said that the purchase is the company’s third such acquisition this year, and brings its total land holdings to ~874 acres for a planned complex near Hayden in the northwest part of the state. GHG announced in May it had acquired nearby water infrastructure in Colorado through a private, third party transaction with Prescient Strategies Group, LLC, Steamboat Springs, giving it control over water assets of Western Sierra Resource Corporation valued at more than \$40 Million.



### Florida commissioner backs MJ to help hemp industry

A lack of clarity in federal cannabis laws is suppressing growth of the legal hemp industry, Florida Agriculture Commissioner Nikki Fried recently wrote to U.S. Senate leaders. Fried said the current arbitrary line defining when a product is deemed hemp and legal versus marijuana and illegal often means hemp farmers have problems with access to capital, federal research funding, insurance protections, disaster relief, federal trade promotion programs, and employment protections.

Fried wrote to Senate Majority Leader Chuck Schumer (NY), Senator Ron Wyden (OR), and Senator Cory Booker (NJ), sponsors of a legalization bill. She also emphasized the need for the Food & Drug Administration (FDA) to classify hemp as a food ingredient.

### Canada’s BFTi invests in fiber processing in Hungary

Victoria, British Columbia-based Bast Fibre Technologies Inc. (BFTi) said it is developing a manufacturing process at a facility in Hungary, with the goal of producing compostable disinfecting wipes from European-sourced fiber. The company eventually intends to source bast plant material in Canada and the U.S. to produce wipes at facilities in North America.

BFTi said it will use some of the \$7 million it recently raised earlier this year to develop the European manufacturing site as it focuses on ramping up production of fibers for non-woven products.

U.S. based private equity firm Merida Capital Holdings, New York, and existing investors provided the series A financing, which the company said will allow it to advance business beyond the R&D phase to full commercialization of its intellectual property in natural fiber processing.

### Montana experiences steep decline in 2020 hemp fields

Total hemp fields in Montana plunged to 12,000 acres in 2020, which saw Montana farmers switching to hemp fiber and grain. State officials estimated that while 80% of hemp grown in 2018 and 2019 was mainly for CBD flowers, only 20% of those growing hemp last year and this year are cultivating them for CBD flowers. Montana farmers planted 22,000 acres of hemp in 2018, more than any other state that year. An oversupply had already become apparent in the global CBD market when Montana farmers drastically ramped up hemp farming to 60,000 acres in 2019, resulting in more crops that went unsold.

### \$65 million awarded farmers in case against business execs

A group of Canadian and American business executives committed negligence, fraud and deceit when they left a group of Montana farmers stranded with 2018 hemp crops, a jury in Montana found. The jury awarded \$65 million in compensatory and punitive damages to 25 eastern Montana farmers – an amount larger than the plaintiffs had sought in the case. The judgment is the second-largest award ever granted by a jury in Montana’s civil courts.

After a company named USA Biofuels contracted with the farmers to grow hemp for CBD flowers, delivery of seed and down payments of \$100 per acre promised to the farmers was delayed, according to the plaintiffs. Those obligations were later met by a company called Vitality CBD Natural Health Products Inc., a Canadian company that eventually merged with LiveWell Canada Inc., and a company called Gatineau to form a new entity, Eureka 93. But the farmers never received payments for the crops they grew, after being promised \$400-\$600 per acre for the total 20,000 acres of hemp contracted.

### American CBD cultivars are approved for Canadian farmers

Nine American CBD cultivars from four breeders are now listed among approved hemp varieties in Canada, giving Canadian farmers more options for flower production. American companies gaining listings, and their CBD cultivars are: Charlotte’s Web – CW Ambassador; CW Duchess; and CW1AS1; Davis Farms of Oregon – Eighty Eight; and Painted Lady. Three cultivars from Arcadia Biosciences – Rogue, Santiam and Umpqua – are listed as “under observation” this year, as is NWG 2730 from New West Genetics.

Also newly listed is a no-THC CBG variety from Spain, HURV19PAN (trade name “Panakeia”), and: Pembina, T3H2006 and Bountiful, of Canada (unidentified as to output); and Henola (grain) and Bialobrzskie (fiber), both from Poland.



# Moving forward

PHOTO: HEMPOINT

## Europe makes critical advances in CBD, THC

Europe's hemp industry has seen significant advancement in the normalization of laws and rules over the past year. Developments in the CBD sector, allowable THC levels in industrial hemp crops, and initiatives aimed at clearing hemp extracts for use in food have combined to spark lights at the end of the tunnel for European stakeholders.

Most importantly, the EU stands on the verge of a legal CBD market. Member states are now in the process of adjusting their laws and regulations after an industry defining decision last year by the European Court of Justice, which ruled in a French case that hemp-derived CBD should not be considered a narcotic, and that the compound should be free for trade among EU member states.

### Defining moment

That ruling later led the European Commission to change its previous position that CBD should be considered a narcotic in EU states, and may be considered a food – a defining moment for the sector.

If clear rules for CBD are established, and proper safety assessments and standards are developed, it is sure to set off further investment, research, entrepreneurship and a thriving consumer market in Europe over the next several years.

It could take at least three years to work through what would be the remaining hurdle to a fully open market: Hemp's status under the EU's food safety rules. Stakeholders are already moving, with several having joined in a consortium to push forward applications, now pending, for CBD under the EU's Novel Food guidelines.

### THC

The important advancements in CBD were preceded last autumn by the European Parliament voting to increase the authorized EU THC level for industrial hemp “on the field” from 0.2% to 0.3%, putting Europe on a par with most countries around the world.

The 0.2% THC barrier has specifically proved a hindrance to CBD producers because CBD in hemp rises in proportion to THC. European scientists and researchers have not been incentivized to develop the high-yield seed varieties and high-CBD strains that are now in great demand.

Raising the THC limit in hemp also helps the fiber sector, where Europe has long dominated in hemp genetics.

The change can be expected to immediately spur development of more advanced fiber varieties, and lead to the re-animating of a number of existing high-yield cultivars from northern and eastern Europe that have been dormant because they express THC

levels beyond 0.2% (but less than 0.3%).

The European Commission is also expected to set a binding THC limit value for hemp food of 7.5 mg/kg by the end of the year, a move urgently needed to give producers security in their business planning and, again, giving Europe's producers an even chance in the global marketplace.

### Sustainability

If European hemp stakeholders can get the message across, the hemp industry has a huge role to play in meeting the EU's sustainability goals, and can benefit from funds to support the ultimate mission of making Europe climate neutral by 2050.

Hemp can play a key role in the transition towards a regenerative growth model that creates thousands of new green and highly-skilled jobs in manufacturing while uplifting rural areas, other key EU long-term goals.

That will require a clear playing field in which producers are allowed to maximize the income from all parts of the plant, especially the flowers and leaves.

Hemp's ability to capture and store CO<sub>2</sub>, its promise in cleaning heavy metals from European soil, and its potential as a replacement raw material in such diverse industries as construction and cosmetics, plastics, cotton and wood, could lead the continent's sustainability initiatives.

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# A 'quiet revolution'

Now is the time for the UK government to push a framework advancing CBD

**ANDY YATES** is Pharmacy Associate at the UK-based Association for the Cannabinoids Industry (ACI), which assists companies looking to enter the UK and EU markets. He has more than 15 years' pharma experience in medical, commercial, business development and strategy. A UK pharmacist, Yates received his PhD in cannabinoid medicinal chemistry from the University of Nottingham. He has extensive experience in all aspects of medicine development programs and has been responsible for multiple collaborative initiatives among academia, the biotechnology sector and peer pharma. In addition to his responsibilities at ACI, Yates runs an independent pharmaceutical consultancy. He holds an Honorary Lectureship at Keele University.



**HempToday: You've referred to the situation in the UK as a 'quiet cannabis revolution.' What's quiet about it?**

**Andy Yates:** The cannabis revolution that has happened within the UK has happened either serendipitously or in response to a specific event, rather than through strategic or planned interventions at a government level. The legal cannabis industry has therefore grown almost silently in the background to the significant presence we now see.

**HT: ACI expects UK CBD sales to hit £690 million (£800 million) this year. What's behind the numbers?**

**AY:** Prior to 2019 the size of the market within the UK was effectively unknown. Therefore the ACI in partnership with a global market insight and forecasting agency did a bottom-up analysis of the UK market to provide the first accurate estimate. We surveyed thousands of consumers and captured their reported usage of CBD; we benchmarked against known constants in similar markets (i.e. use of nicotine vaping and use of other supplementation) to apply discount factors; and surveyed average spend per month which was benchmarked against known price points for CBD products to produce a robust model leading to a marketplace forecast of £314 million (£364 million) in 2019.

By asking current consumers and consumers yet to try CBD what their predicted usage and spend would be going forward we were able to calculate a double-digit

growth rate year-by-year. Given the impact of COVID-19 (particularly as we were hearing spontaneous reports that usage was increasing) we felt that in 2021 it was important that we checked our forecasts again and did further consumer survey work among thousands of participants to understand current usage patterns.

The headline figure of £690 million (£800 million) was indeed higher than the £526 million (£609 million) predicted by the 2019 data model, which aligned to what we were understanding from our members, that usage had increased during the COVID-19 pandemic.

**HT: ACI has noted that UK regulation of CBD specifically is evolving. What's still needed to set a level playing field?**

**AY:** We believe the time is right for the UK Government to recognize the significant value and benefits that the industry brings to the UK. They need to provide a framework and regulations that encourage and support the established industry and foster new growth within our shores.

There are three regulatory areas in which the UK still needs to level up:

Short term, the FSA needs to rapidly assess the dossiers of the companies that have submitted a novel food authorization, by their deadline earlier this year, to provide certainty to those companies that have submitted a valid dossier (and likely to lead to approval) and those that haven't (and therefore have not complied with novel food guidance and should be removed from

the shelves).

Medium term, the Home Office needs to provide a workable definition of a maximum threshold for controlled substances (i.e. THC) in consumer CBD products that avoids any doubt that the finished product falls under the misuse of drugs laws within the UK. The current "zero" and "exempted product" definitions are too vague and not easily achievable. Working with our members, we have sent recommendations that a 0.03% (or maximum of 21 micrograms in a container) is functionally equivalent to "zero" and would avoid any of the current ambiguity.

Long term, we wish for UK CBD manufacturers to be able to use CBD that is extracted from crops grown in the UK as it currently has to be imported. Our "Green Shoots" report to the Taskforce for Innovation, Growth and Regulatory Reform (TIGRR) that has made the argument for this situation to change. It was great to see our recommendations adopted in the TIGRR report as one of the stand-alone recommendations to stimulate growth in the UK economy.

**HT: How do we "avoid any doubt" on the matter of THC in consumer products?**

**AY:** The ACI has conducted a data-driven review of the literature and subsequent safety assessment (led by a toxicologist) of acceptable THC levels within CBD consumer products which we have submitted to the Advisory Council for the Misuse of Drugs (ACMD) who advise the Home Office to support a change in the current law

and guidance. We are currently publishing our findings in a peer-reviewed journal. Our findings made the following recommendations to the ACMD:

- That the Home Office issue guidance and amend existing legislation, to exempt from control products designed for the oral administration of cannabidiol, containing not more than 21 micrograms of controlled substances (THC and CBN compounds and their derivatives) or with a total concentration of not more than 0.03% controlled substances in undivided preparations.
- That 0.03% is established as the "threshold of zero controlled impurities" for CBD products, based on our safety assessment that lifetime exposure to contaminants at this limit would be indistinguishable from exposure to contaminants at 'true zero' in terms of toxicological and other relevant markers of drug action in humans.

There would be no requirement to report on controlled cannabinoids as may be present only as trace contaminants in products for consumer sale, as is also the case in regard to the presence of traces of opium alkaloids in poppy seeds. The cultivation of low-THC cannabis would continue to be controlled under license, monitored, and reported to the International Narcotics Control Board (INCB) as required under the 1961 and 1971 UN Drug Conventions regarding imports and exports.

**HT: How does that level finally get set, in practice?**

**AY:** Setting a permitted maximum level for controlled cannabinoids in consumer goods could be established through legislative change, such as by means of a statutory instrument amending the Misuse of Drugs Regulation 2001 after consultation with the Advisory Council for the Misuse of Drugs to exempt CBD-based products at defined thresholds. A maximum level could also be established simply by means of guidance from regulators without new legislation, as is presently the case in regard to the target level of 10 mg/kg agreed for the presence of morphine in poppy seeds.

**HT: One of the recommendations in the "Green Shoots" report is that a dedicated agency be named to license and oversee the industry. What's the best scenario there?**

**AY:** We believe that in order to become a world-leading jurisdiction for all cannabinoid business activities it would be best served by a single dedicated cannabinoids regulator – a "National Cannabinoid Control Authority (NCCA)" – built upon expertise from several departments of state including the Home Office, Department for Environment, Food and Rural Affairs (DEFRA), Department of Health and So-

cial Care (DHSC), and the Department for International Trade (DIT), combined with regulatory skills from the Medicines and Healthcare Regulatory Agency (MHRA), FSA and the Environment Agency (EA).

The NCCA would develop the experience to provide a single "front door" to the cannabinoid sector for applicants of all kinds. Consideration should be given for this agency to be a non-ministerial department so it could operate independently and without political interference, as the FSA or Forestry Commission do. The NCCA could provide a dedicated licensing branch and a surveillance and inspection function, with annual reports to Parliament and the sponsoring department. A dedicated licensing body could also be required to publish all applications and the full details of the licenses granted on a regular basis, as they are in Canada.

*"Awareness is good here in the UK and currently growing."*

**HT: The ACI safety consortium is at the heart of your novel food advisory services. Talk about the critical functions of the consortium.**

**AY:** The ground-breaking safety consortium put in place by the ACI recognized that the CBD industry needed to step up to the increasing regulatory scrutiny that we asked for in relation to novel foods. Simultaneously we recognized that the financial and skill-based barrier to entry for increased regulatory rigor was going to be too high for many individual manufacturers of CBD products to achieve on their own.

Working directly with the Food Standards Agency (FSA) and with scientific partners, with the expertise to carry out the specific work required, the ACI was able to put in place a series of studies using a representative CBD extract that supports the submission of multiple novel food dossiers that contained the vital safety data to enable the FSA to validate and ultimately approve our members' products.

By syndicating this work the price point was significantly reduced, allowing CBD manufacturers to confidently produce relevant data for their individual dossier by sharing the cost with other consortium members.

**HT: What has come out of the human clinical studies so far? What specifically was studied?**

**AY:** The area of human clinical studies looking at CBD is vast. What I will

highlight is there are already two licensed medical products that contain CBD on the market for childhood epilepsy (Epidyolex) and spasticity in multiple sclerosis (Sativex) which shows that for the right dose, in the right disease, the benefit-risk profile of CBD is sufficiently positive for medical regulators to approve it as a medicine.

Out of the many studies already completed, the strongest clinical evidence so far is for pain, anxiety and sleep. Importantly there are over 139 active human clinical trials ongoing in 21 different medical indications and 83 of these are in larger Phase 2 or Phase 3 trials; so the future looks bright for CBD in medical conditions.

**HT: What is the level of awareness and understanding of the British consumer regarding CBD and CBD products? What's needed to normalize CBD as a food in the UK?**

**AY:** Awareness is good here in the UK and currently growing, with between one and two people in 10 having purchased a CBD product; and of those that have not used a CBD product, over half of them have expressed a willingness to try a CBD product in the future.

The most common reasons given for not trying a CBD product were related to a lack of certainty on the legal status of CBD and a perceived lack of regulation around the products. Initiatives outlined above will be clear drivers of awareness and normalization of this sector.

**HT: Talk about the range of companies among your membership. Who is really looking seriously into the UK?**

**AY:** We have members from all over the globe working in partnership with us at the ACI. All of them have a common interest and goal; to participate in the thriving CBD market here in the UK. I believe it is safe to say that all of our members are very serious about the UK CBD market, both for the short and medium-term value, but longer-term with the UK being seen as a global leader in consumer CBD regulations.

**HT: How would you characterize ACI's effectiveness so far?**

**AY:** The ACI has been instrumental in establishing the importance of the market to consumers and business with our pivotal 2019 and 2021 reports into CBD usage, and has been on the front foot in working with UK regulators, particularly Food Standards Agency and the Home Office, to evolve the regulations in a fit-for-purpose way. This ensures consumers get access to the safest and highest quality products and the industry can operate in an environment with clear rules and regulations.



*“With the commitment of the state of Baden-Württemberg in Germany, the state is sending the right signal to sustainable, plant-based and regional products.”*

– Florian Pichlmaier, CEO  
Signature Products

## Innovation ‘Made in Germany’

Grant will let Signature Products develop regional hemp protein value chain

German hemp company **Signature Products** has received a commitment for ~€800,000 in funding from the state of Baden-Württemberg for the development of a regional hemp protein value chain.

The Pforzheim-based company and the University of Hohenheim joined in applying for state innovation funds that will be used to develop processes, technologies and recipes for the production of protein-rich tofu, pasta and other foods from regionally grown hemp. The university’s Institute for Crop Sciences provides research in ongoing cooperation with Signature Products.

### Uniting sectors

The company said the initiative, which is supported by the Baden-Württemberg Ministry of Food, Rural Areas and Consumer Protection, is aligning farmers, processors, the restaurant sector and food retailers in developing the regional supply chain.

“The project contributes to meeting the strong demand for high-quality, protein-based, regionally produced food, to increasing the self-sufficiency of the population in Germany, and to creating sustainable jobs in the field of agriculture and food production,” said Signature Products Managing Director Florian Pichlmaier.

Pichlmaier said the initiative recognizes changing global dietary trends are bringing an increase in demand for plant-based foods in place of animal-based foods. Developing such regional chains can be a key to improving human as well as planetary health, Pichlmaier observed.

### Commitment

“With the commitment of the state of Baden-Württemberg in Germany, the state is sending the right signal to sustainable, plant-based and regional products and, above all, to the very versatile hemp plant,” Pichlmaier said.

Signature Products is a vertically integrated company that offers trade in hemp raw materials such as hemp seeds, hemp protein, extracts and the extraction of cannabinoids.

The company, which employs more than 20, has launched more than 40 private label products for German customers, and said it is expanding to Spain, France and other EU countries under a “Made-in-Germany” strategy.

### Broad portfolio

Signature Products works with hemp farmers in Europe to provide high quality

hemp products. The biomass, hemp seeds, hemp protein and flowers, in addition to extracts, distillate and isolate, are sourced from controlled cultivation or certified organic operations.

White label and private label services are offered for such products as high-quality CBD and CBG oils, cosmetics, hemp seed oils and other liquids. The company’s bottling plant is certified organic, and Signature Products offers complete component sourcing, on-site laboratory services and contract packaging.

Signature recently started selling CCELL products in Europe as an official distributor, complementing the bottling of e-liquids with the distribution of high quality vape products.

### At-a-Glance



**Profile:** Hemp seeds, hemp protein, hemp food, extracts, isolate & private label oils

**CEO:** Florian Pichlmaier

**Headquarters:** Klumpensee 2  
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[www.signature-products.com](http://www.signature-products.com)

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# Hemp held hostage in Greece

Greece was recently in the international spotlight due to legal reforms aiming to further regulate production and exports of medical cannabis products. A big fuss followed as 160 applications were submitted, 100 or so installation licenses were granted, and much was made of the millions of Euros expected to be invested, and the hundreds of new jobs that could be created.

But in Greece, everything is in the future tense, since only three projects are up and running so far and little progress has been made.

Greek hemp producers remain hostages of the Greek State although hemp cultivation has been legal and regulated since 2016. The previous government left many issues unresolved and open, especially regarding processing and final products. The current conservative government that took power in 2019 has followed a rather restrictive approach with the hemp sector, although it dramatically changed its policy and public stance towards medical cannabis.

## Half-regulated, on purpose

The hemp industry in Greece has remained half-regulated – on purpose – to this day, even though it is an established industry with dozens of farmers and producers trying to position themselves, and hundreds of families living off the commercial services of the many dedicated hemp shops that have been established all over the country.

Although hemp cultivation is fairly but strictly regulated, processed hemp products, especially food, food supplements and flowers remain in legal gray zones and suffer from misconceptions, bias among public servants and unfair competition practices.

According to the 2016 law that regulates hemp cultivation in Greece, a Joint Ministerial Decision should have followed immediately to regulate processed hemp food and cosmetics. That never happened. In 2018 an Experts Committee, where we actively participated as producers, was appointed by the Ministry of Agriculture for setting THC limits in food, but its findings and proposals (including one that would set THC limits based on Denmark's model) were never transposed into a legal document due to the change in government a few months later.

As a result, hemp processed goods produced in Greece cannot be officially registered as food because they contain traces of THC and consequently cannot receive organic certification and all the legal documents needed to place them into the market and export them. Furthermore, absurdly, the same restrictions apply to non-THC containing hemp products from Greece such as



Michalis Theodoropoulos

seed oil, flour, protein, beer and essential oil. **Unfair, 'surreal'** At the same time, similar products are imported from other EU countries and sold in the Greek market with no restrictions or obstacles, under freedom of trade provisions within the EU. That means substantial profits for local traders and foreign producers. Some traders even import certified organic raw material from other EU countries that they package in Greece and sell as Greek organic hemp food, whereas local pioneer organic producers such as KANNABIO Hemp Cooperative cannot receive organic certification for their locally grown and processed products.

It's surreal: KANNABIO can import certified organic raw material from another EU country, and put the processed products on the market as certified organic products; but if we use organic raw material that we cultivate in the Magnesia region, we cannot receive the organic certification in the final product.

The Greek government shows a clearly prejudiced attitude against Greek hemp producers, and favors traders over producers by setting an unfair competition environment with barriers to entry only for the latter. This has resulted in loss of income for the Greek producers, increased burdens, disappointment and finally, in many cases, withdrawal from the sector.

Moreover, the previous Minister of Agriculture and Food, just before leaving office in January 2021, introduced a new law amendment where only EU cultivars can be cultivated and all batches sampled and tested above 0.2% THC must be destroyed under the expense of the farmer. That restrictive measure, the economic impact of the COVID-19 pandemic, and various unlawful arrests of hemp producers and traders over the last couple of years, have resulted in decreased numbers of farmers and acreage for the 2021 season, especially for outdoor operations.

## Keeping up the fight

Nevertheless, Greek hemp producers do not stand idle. We are constantly sending policy proposals to the government and we are forming a Panhellenic Hemp Producers Union to fight collectively for the future of

our sector. We believe that we have a strong case for legal action against the state for unfair competition practices that we will pursue if the new Minister of Agriculture does not provide solutions soon.

Things don't necessarily look promising. For the moment, the minister has not even replied to our request for a meeting.

Unfortunately, in Greece, hemp falls under the same jurisdiction with cotton in the Ministry of Agriculture and there are certain economic actors that still perceive cannabis as a threatening and competitive activity. Establishing an independent Cannabis Agency that will take care of all issues related to medical cannabis and hemp will be an important step towards a healthy sector.

## Incentives needed

Despite the obstacles, the hemp industry already supports hundreds of families in Greece. Setting reasonable THC limits in food and allowing the processing or sale of hemp flowers and biomass up to 0.6% THC, will not only attract foreign investment but will provide incentives for Greek farmers to move into hemp cultivation and support existing hemp producers on the way to becoming sustainable businesses. The decriminalization of cannabis possession for personal use is a very important horizontal measure that would favor the sector at the EU level and increase competitiveness, especially with the across-the-Atlantic markets.

Gray legal areas only favor shady businesses and do not provide fertile ground for a vibrant and competitive sector. We strive for a transparent, open, fully regulated but unrestricted industry that takes into consideration international best practices and explores all the commercial aspects of the hemp plant without prejudice and ideological constraints. Hemp should be treated like any other agricultural commodity and should not suffer discrimination.

With the proper support, hemp can become the "new olive oil" or the "new wine" for Greece, and the industry can set quality benchmarks such as products of origin and establish a solid market share worldwide. That's not to mention the direct environmental benefits hemp offers in the fight against climate change.

Instead of keeping hemp producers as hostages, the Greek government should utilize its expertise and knowledge to build a sustainable and profitable industry while at the same time promoting a crop that can heal the planet.

*Michalis Theodoropoulos is co-founder & President of the Board at the KANNABIO Social Cooperative.*

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Maciej Kowalski  
of Kombinat Konopny

# Poland wants faster growth

PHOTO: KOMINAT KONOPNY

## Outdated crop zoning system needs to be overhauled

While Polish hemp fields could grow by as much as 40% in 2021, knocking down the country's outdated crop zoning system could lead to even faster growth, a leading Polish hemp company has suggested.

Hemp farming in Poland is expected to approach 5,000 hectares (~12,355 acres) this year as more farmers, producers and investors stream into the sector. Poland's hemp farmers recorded about 3,600 hectares last year, after planting 3,000 hectares in 2019.

By clearing bureaucratic hurdles, growth could be even more dynamic, said Maciej Kowalski, founder and CEO at leading Polish hemp company Kombinat Konopny.

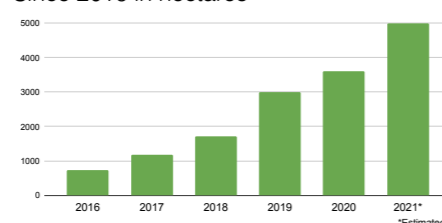
With the government generally favoring development of cannabis industries, "all analyses show that if legislation does not put significant obstacles on farmers' feet, agriculture and hemp processing will develop at a staggering pace," Kowalski said. "Farmers will undoubtedly play the most important role here because they are responsible for the local raw material supply chain."

### Antiquated system

Under Poland's regulations, hemp zoning requirements oblige regional governments to take into account "local demand for raw materials, local traditions and local level of drug-dependency risk" – that last factor a vague nod to past paranoia regarding marijuana. Farmers must declare their hemp fields by total area in autumn before the next year's planting season. But "there is no rational justification for the requirement of annual crop zoning," Kowalski said. The system, he said, which has its roots in central planning from Poland's communist times,

### Polish hemp fields

Since 2016 in hectares



should be abolished.

Also under the rules, farmers are not obliged to actually plant hemp in fields declared; may state their intentions at the local or regional level; and can declare fields anywhere in the country. Demonstrating the lack of logic in the hemp zoning system, while actual hemp fields this year are projected to be 5,000 hectares, data collected by Kombinat Konopny from all 16 of Poland's administrative regions showed more than 100,000 hectares are declared for hemp this spring across the entire country – a staggering number.

### Tool with no meaning

"It has absolutely no meaning as a forecasting tool," said Kowalski, who himself declared several thousand hectares but will farm only 40. "Nobody really knows what it is for." Kowalski said he also declared small hemp fields in several places where he sells seed for gardeners and those who want to run small trials, giving them legal cover and "so as to limit the clerical nonsense that makes it difficult for beginner growers to grow cannabis."

If nothing else, the outsized declarations indicate the level of interest in Poland's emerging hemp sector, Kowalski said: "It

shows a number of people were at least dedicated enough to write and submit a piece of paper."

Poland's Ministries of Health, and Agriculture & Rural Development have expressed no major objections to abandoning the zoning system when asked about it in public forums.

Kombinat Konopny also published a "list of shame" that named 210 of Poland's total 2,477 municipalities where farmers are not allowed to apply for a permit to grow hemp. "We have encountered resistance from several hardliners against whom we are considering a civil action for damages," Kombinat Konopny said.

### Other growth indicators

Also indicating the dynamics of hemp in Poland, 472 growers applied for farming subsidies in 2020, up from 85 applicants back in 2015. Polish hemp farmers received only about €100,000 in support last year, but can tap into other support programs for which they are eligible, such as those for single area payment, greening, and support for young farmers, Kowalski noted.

Cannabis and hemp specifically have been points of discussion in parliamentary sessions over the past couple years in Poland, as public support has grown steadily.

Poland produces straw for fiber and hurd, seeds, and flowers for CBD-based products. In addition to cutting bureaucracy, Poland, like all emerging hemp nations, needs modern solutions. "Unfortunately, the technology for hemp is not yet as mechanized and modern as for other plants," Kowalski said. "While producers are ingenious and go to great lengths to catch up, the 60-year downtime in hemp production still leaves its mark."

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## Doğatek

Hemp Bridge To Technology

# The problems in Portugal

Farmers struggle with police, and government bureaucrats

Several Portuguese farmers have found themselves on the wrong side of the law after they pushed back against a bureaucracy that has been slow to issue licenses – even to long-time growers.

Hemp stakeholders have continually criticized the country's General Directorate of Food and Veterinary Medicine (DGAV) for delays in awarding authorizations for hemp growing they say have put farmers at risk. The problems come even as industry representatives have repeatedly tried to get clarity on hemp from the DGAV over the past two years.

Some have plunged ahead and put in their crops anyway, drawing police attention that resulted in raids, seized materials and products, and arrests on drug charges.

## Decisions needed

In addition to the licensing problems, industry representatives say forthright decisionmaking by the DGAV is also critical in light of changes brought by a European Court of Justice case last year which settled key questions about the legality of CBD. That started the process among EU member states of making their national rules comply with Union-wide regulations.

Portuguese hemp companies say their challenges are grounded in rules in a new law covering medical cannabis and hemp that put undue burdens on the industry. They have repeatedly called for changes.

The law, which covers licensing for the cultivation, manufacture, wholesale trade, transport, distribution, import and export of cannabis-based substances for medical and industrial uses, was published in April 2021.

## Problems with planting seeds

While the government this summer removed a requirement that hemp farmers must employ a technical manager, questions remain about the distribution of EU certified seeds and related costs, a rule that producers must report highly detailed data on their hemp operations to the Directorate-General for Food and Veterinary (DGAV), and questions over which parts of the plant may be used.

Industry representatives said the government failed to consider the concerns of hemp stakeholders when the law was drafted, despite their many efforts to help shape reasonable rules.

The now-canceled requirement that



hemp operators hire technical managers was a spillover regulation from rules for medical cannabis, which is also covered by the recently enacted law. While the government realized its mistake and rectified the situation, stakeholders say a regulatory path for farmers and producers is still not clear due to confusion with the medical cannabis rules.

A key concern is how the country's hemp rules treat the matter of certified seeds. Producers say the government has unrealistic expectations of seed certification systems across EU nations, not all of which treat certification of hemp varieties in the same manner.

## Double jeopardy

While France and Italy have national certification schemes for their locally produced cultivation seed, in addition to holding listings in the EU seed catalog, not all countries have such national certification programs.

Under Portuguese rules as now written, both national and EU certifications are needed for cultivation seed imported into Portugal. That means Portuguese hemp farmers are technically blocked from planting hemp varieties from member states that do not have national certification bodies, despite the fact that seeds from those countries are EU certified. Hemp producers also take issue with a regulation that would require farmers to pay any costs related to laboratory analysis for THC control.

And stakeholders say the rules fail to properly sort out the parts of the hemp plant. While the regulatory language

specifically mentions seeds and hemp stalks, it fails to explicitly mention whole-plant biomass and flowers, leaving a wide gap for interpretation because it doesn't specifically indicate that all parts of the plant can be sold.

## Overly strict rules

Also of concern, requirements for identification of farm fields under the rules go against guidance from DGAV, which administers the hemp side of Portugal's hemp program. While DGAV has only required an address and geographic location for hemp fields, rules under the new law mean farmers must track and report on plant development, indicate quantities to be sown and harvested by variety, identify buyers of their crop, and give locations of storage facilities — all requirements imported from the medical cannabis licensing process.

For farmers, the troublesome rules represent possibly the strictest requirements for the cultivation of industrial hemp in Europe.

## Long-time growers victimized

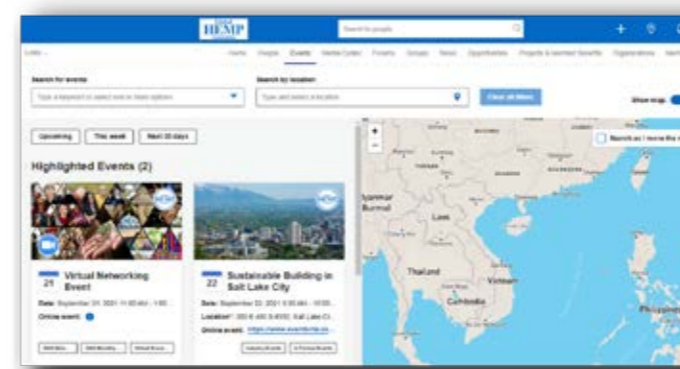
Prominent hemp entrepreneur and activist Hugo Monteiro is among those who were arrested on drug charges this year. His episode followed a raid and arrest of Barry McCullough, another long-time hemp grower, earlier in the year. In both cases, law officials admitted that they didn't know if the material seized in the raids was hemp or marijuana. Both raids, by the National Republican Guard, took place in the central Portuguese region of Alentejo.

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# France floats plan to ban flowers

Stakeholders push back against draft decree submitted to EU

French hemp stakeholders say they will appeal a proposal that would ban the sale of raw hemp flowers after the government issued a draft decree on hemp to the European Commission.

Under provisions in the decree, the French government would open up the country's potential €700 million CBD market as it makes legal all parts of the hemp plant and hemp-derived products. Growers could harvest flowers to be processed into CBD and other extracts. But the sale of smokable hemp products and loose hemp leaves and flowers to consumers would be illegal, based on "public order" and "public health" considerations.

The provisions would revise a 1990 decree that addresses cannabis in France's public health code.

## 'Suffocating'

"By excluding the raw hemp flower from marketable products in France, the government deprives the operators of the most important part of the revenues generated by the CBD sector and abandons the tax revenues from which France could benefit in the current context of crisis," said Aurélien Delecroix, president of trade association Syndicat du Chanvre. "Numerous appeals against this new decree are already in preparation," Delecroix said.

The Union des Professionnels du CBD, another trade group, said the ban on raw hemp flowers reflects "the desire to suffocate the sector by the French authorities"

Under the draft decree, "the sale to consumers of raw flowers or leaves in all their forms, alone or mixed with other ingredients, in particular as smoking products, herbal teas or potpourris, their possession by consumers and their consumption are prohibited," the draft decree says. "Flowers and leaves may only be harvested, imported, or used for the industrial production of hemp extracts."

## Getting EU compliant

The decree is essentially an outline indicating how France intends to comply with a landmark ruling by the European Court of Justice late last year. The EU court ruled that hemp extracts from leaves and flowers and the CBD they contain are not narcotic drugs and may be freely traded among EU member states. The EU high court ruling eventually led the European Commission to



reverse its previous position that hemp should be considered a narcotic in EU states. Those developments have prompted member states to revisit and adjust national laws and regulations.

In justifying a ban on raw hemp flowers, the French government cited a footnote to the ECJ ruling in which the court said such a policy could be justified to protect consumer health.

## Opening the market

Otherwise, the draft rules authorize the cultivation, import, export, and industrial and commercial use of all parts of the hemp plant with less than 0.2% THC, the current EU limit. France, Europe's leading hemp producer, previously had allowed only hemp seeds and stalks to be cultivated and processed. The country's hemp industry has mainly been based

on products from the hemp stalk, and in cultivation seeds. French planting seeds dominate the European Union's catalog of certified hemp seed varieties.

"The objective of this decree is both to allow the development of new sectors in France, to protect consumers and to maintain the capacity of internal security forces to combat trafficking in narcotics," the decree reads.

Union des Industriels pour la Valorisation des Extraits de Chanvre (UIVEC), another CBD trade group, said the decree "is only a first step in the French regulations on CBD, but it goes in the right direction and should dispense the debate." UIVEC has estimated France's CBD market could be worth as much as €700 million in 2022.

The final decree is expected to be published sometime around the turn of the year.

## Europe in brief

### Renowned Czech medical cannabis expert passes away

Tomáš Zábanský, who spearheaded efforts that resulted in the legalization of medical cannabis in the Czech Republic and enjoyed wide respect in international medical circles, passed away at age 52 in July 2021.

Zábanský's work in research and legalization established him as a leading global figure in medical cannabis, where he worked as an expert in drug epidemiology and monitoring of the drug situation in at the United Nations and European Union.

He was named by the EU Parliament as an independent member of the Management Board of the European Monitoring Centre for Drugs and Addictions in 2015.

Widely published in cannabis circles, Zábanský was the main author of the first annual report



on the state of the drugs problem in the Czech Republic prepared in accordance with standards of the European Monitoring Center for Drugs and Drug Addiction, and served as editor and contributor at a number of scientific journals.

### Finola fights back after Polish authorities block subsidies

The producer of FINOLA cultivation seed is fighting back against a decision that would eliminate subsidies to farmers who cultivate the popular hemp variety in Poland.

Poland's Agency for Restructuring and Modernization of Agriculture (ARiMR) issued a statement last spring declaring that supports for Polish farmers planting FINOLA this year would be blocked because the variety was found to be above the European limit of 0.2% THC in tests over the past two years.

Popular with many Polish farmers, FINOLA, which was developed in Finland, was the first industrial oilseed hemp variety to be registered in Canada and the EU. FINOLA produces abundant seed in a short, auto-flowering and early maturing crop. The variety, which grows best in continental and temperate regions, has thrived in Polish conditions, farmers have said.

### Holland & Barrett introduces CBD oral strip in Netherlands

European health and wellness retailer Holland & Barrett has introduced Elevar Leafs CBD Oral Strips. The product debuted on the company's online store, and is planned for rollout in 200+ retail stores across the Netherlands. Each strip offers 25mg of CBD in Fresh Mint, Berry Mint and Lavender flavors. Holland & Barrett is one of Europe's leading health and wellness retailers, offering a wide range of own brand and other vitamins, supplements, specialist foods, sports nutrition and beauty brands. The company has more than 1,300 stores worldwide.

### Dutch plant brokerage inks agreement for hemp clones

Dümmen Orange North America said it has secured a distribution agreement for hemp clones from Colorado-based Dutch Heritage Gardens. Under the partnership, Dutch Heritage's Royale Botanicals division will have access to existing distribution assets through two Dümmen Orange national plant brokerage firms, Vaughn's Horticulture and McHutchison. Dümmen's participation in the agreement is through its Quick Plug division, which produces professional horticulture systems.

The two companies said they have a long-term plan to produce clones at Dümmen Orange's Guatemalan facility pending changes in laws that presently do not differentiate between cannabis and hemp. Until that time, Dümmen Orange's Quick Plug technology will be used to produce the clones in the USA, the companies said. Holland-based Dümmen Orange, with U.S. headquarters in Columbus, Ohio, is an international specialist breeder of cut flowers, bulbs, tropical plants, pot plants, bedding plants, and perennials. The new hemp clone initiative with Dutch Heritage Gardens is Dümmen Orange's first entry into the U.S. hemp industry.

### Swiss, German, Canadian firms among 57 licensees in Zimbabwe

Investors from Germany, Switzerland and Canada are among those who have received cultivation and processing licenses under Zimbabwe's cannabis program. A total of 57 licenses were handed to both foreign and local enterprises, the Zimbabwe Investment and Development Agency (ZIDA) announced this week. The Ministry of Lands and the Medicines Control Authority of Zimbabwe are working with ZIDA in administration of the cannabis business, and share authority for regulatory requirements. ZIDA said some farms are already operating. The foreign entities licensed this week "own 100% of their investment," ZIDA said.

### UK-based company acquires Sanoid Isolates of Spain

UK-based Grow said it has acquired 100% of Spain's Sanoid Isolates, letting the company expand into an integrated cannabis production, R&D, and distribution company. Grow said the deal means it can increase its portfolio of cannabis medicines through a sustainable and cost-competitive supply chain. The Sanoid facilities, based near Seville, include eight hectares of outdoor production capacity and four hectares of greenhouses. The transaction also gives it a presence in Spain, where it anticipates favorable changes in the law, the company said.

Grow announced earlier this year it is in a deal with U.S. liquid cannabis company Advanced Liquid Technology (ALT) to market and distribute that company's products in the UK and Germany by early 2022. The company has existing marketing and distribution partnerships in the UK with leading medical cannabis brands such as Aurora, Tilray and Columbia Care.



### Small farmers optimistic, but not as much as bigger ones

Europe's small hemp farmers are optimistic, but less so than larger agri-concerns and cooperatives, according to a report from commodities trading platform CanXchange. While rating farmer attitudes as "fairly optimistic" overall, CanXchange suggested a number of factors have put pressure on smaller players that may be giving them pause.

CanXchange said smaller operators struggle to get distribution and are challenged by sheer economy of scale, which makes it tough to compete on price. That means many often sit on high levels of stock. Smaller players may also have been hit harder by the COVID-19 pandemic due to low cash on hand and weak cash flows when the global lockdown began, CanXchange suggested.

### Portugal authorizes 20 of 60 applications to grow hemp

Portugal's Directorate-General for Food and Veterinary (DGAV) authorized 20 of 60 requests submitted to grow industrial hemp this year, according to the Ministry of Agriculture.

The agriculture ministry also announced that Conceição Canas Serra Carvalho has replaced Teresa Maria Pais Nogueira Coelho as the head of the Variety and Seeds Division, which issues hemp authorizations. Coelho had been in the position since 2016.

Carvalho previously was Senior Technician in the Plant Health and Certification Division at the Directorate of Agriculture, Food and Rural Development Services. The Ministry said Coelho has moved to another agency in the Ministry of Agriculture.

### New body in UK will support patients, push to cut red tape

A newly launched UK cannabis body, CanIndCou (CIC), says it will work on behalf of patients while promoting reduction of red tape it says is restricting the growth of the medical cannabis and CBD sectors. The Council brings together clinics, patient access groups, doctors, insurers, producers and other cannabis groups. CIC said in a press release.

CIC said it intends to work with the UK government to push for legislative and bureaucratic reforms, and has reached out to government departments to establish dialogue.



### Epidiolex approved in UK for treatment of rare disease

CBD-based Epidiolex has received approval in the UK as an adjunctive treatment for seizures associated with tuberous sclerosis complex (TSC), the drug's maker, GW Pharmaceuticals, announced.

The UK's Medicines and Healthcare Products Regulatory Agency (MHRA) signed off on the new application for the drug, known by the spelling "Epidiolex" in some markets, for patients two years of age and older.

Epilepsy is the most common neurological disorder caused by TSC, which produces mostly benign tumors in vital organs including the brain, skin, heart, eyes, kidneys and lungs. The condition, a rare genetic disorder typically diagnosed in childhood, affects 1 in 6,000 persons. It is suffered by an estimated 3,700-11,000 people in the UK, GW Pharmaceuticals said.

# Man of Hemp

German entrepreneur Daniel Kruse recently marked his 25-year anniversary in industrial hemp. HempToday talked with Europe's busiest hemp executive about the past, present and future of the industry.

**DANIEL KRUSE** is the founder of Hempro International GmbH, a vertically integrated, Düsseldorf-based producer and wholesaler of hemp food products and raw materials, textiles, accessories and cosmetics. HempConsult GmbH, his independent consulting firm, advises entrepreneurs, start-ups, investors and other industry stakeholders worldwide. Kruse is also a principal and takes active roles in Hanf Farm, a farming, CBD and food company; cannabinoids producer and medical cannabis trader MH medical hemp; and Hemp Factory, a solar powered hemp food factory. He has served on the European Industrial Hemp Association (EIHA) board of directors since 2013, and as president of EIHA since 2019.



“The next big wave of success in our industry is just starting. The demand for sustainable and healthy products has never been so strong.”

**HempToday:** Your first hemp company was famously born in a former Düsseldorf police station more than 25 years ago. What was the business?

**Daniel Kruse:** I started with the hemp retail Hanf Haus (hemp house) in the center of Düsseldorf's old town.

**HT:** What do you consider your biggest professional achievement through your two and a half decades in the business?

**DK:** Opening our own factory, the Hemp Factory, for food production, which is solar powered and has highest possible quality standards. Also supporting the development of the MultiCombine Harvester.

**HT:** What are the biggest misconceptions about getting into and running a successful business in the hemp industry?

**DK:** While hemp provides unlimited chances, business life provides unlimited challenges. The hemp industry is almost like every other industry - it takes time to become mature. And it needs patience to get your business established.

**HT:** Where do you see the industries in five years? Which outputs will rise and fall?

**DK:** The next big wave of success in our industry is just starting. The demand for sustainable and healthy products has never been so strong. Even large retail chains and multinational companies are discovering hemp. Food and feed products will rise strongly for sure.

Fiber and construction material will have unforeseen success. Even the textile industry will take a closer look at hemp. The CBD sector should stay stable until we finally have achieved the novel food registration and that will be the starting point of the second upswing for those outputs.

**HT:** What battles are ahead and how many more lawsuits will it take to normalize industrial hemp in Germany?

**DK:** For years the German and European authorities have put up obstacles or failed to move these out of the way. The latest

rulings by the European Court of Justice and the BGH (Germany's Federal Court of Justice) on industrial hemp products strengthen our legal position. Most recently, the city of Düsseldorf also had to back down on a CBD-containing food sales ban. Politicians are finally seeing the commercial hemp industry as a partner, and especially with regard to the goal of EU climate neutrality by 2050.

**HT:** What's the status of fiber hemp farming and processing in Germany? Do you see enough of a local market to support such products as building materials and animal bedding? Are there potential markets for technical fibers? In Germany or abroad?

**DK:** Fiber hemp farming, processing and the marketing of products such as building materials, technical applications and animal bedding will increase tremendously. But of course, for this we need the whole plant approach. Fibers can only be competitive when seed and leaves can be marketed at the same time. And vice versa - seed and leaves will be available on the market for reasonable prices as soon as fiber production increases.

**HT:** How do you see carbon credits for farming shaping up in Europe, and how big a role can hemp play in those markets?

**DK:** I believe carbon credit will be a major change for the farming landscape of Europe and hemp will play its major role. The goals for sustainable and carbon neutral agriculture and bio-economy are set on a political level and very soon industry will see this as a new opportunity and align with this approach.

One of the partner companies of my company group, Hanf Farm GmbH, is already gearing up and preparing to be able to cover all three main areas of industrial hemp production in the future.

**HT:** Looking at it from abroad, China seems to be moving quickly on hemp. How much of that is real, and how much is hype?

**DK:** From my personal experience on site and from the intel I receive, I'm very sure that the Chinese approach and development regarding hemp is real. China understood long time ago how important hemp, hemp raw materials and products will be in the future.

**HT:** You're leading companies in farming, food, cannabinoids, clothing and accessories and consulting while also serving as president at EIHA. What are the keys to successfully managing such a broad portfolio?

**DK:** Quality and reliability. And, of course, you need legal and planning security granted and decided by the legislature and administered by the executive branches of governments. Europe, and especially Germany, have to get rid of the arbitrariness of authorities that has hindered the development of our market during recent years.

As you know, at EIHA, I am particularly active in my specialty of cannabinoids in food. I have been involved in the topic of THC in food for 15 years and CBD for 10 years. My cooperation with internationally renowned hemp experts as well as the advisory committee of the EIHA summarizes the well-founded know-how from practice and science in the hemp and food sector. In the course of our joint work, various position papers and studies on THC and CBD in food have already been prepared and published. Now, finally, after many years, our positions are taken into consideration on the political and administrative levels.

**HT:** As you look back over your two and a half decades in hemp, what moments are seared in your memory?

**DK:** In 25 years one does have a couple of those moments: Launching our first own-brand products, opening my own factory, speaking to European Commission, and traveling around the world meeting business partners and other dedicated hemp stakeholders in other countries.

# HempConsult



[www.HempConsult.com](http://www.HempConsult.com)

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Europe's leading Industrial Hemp Group





**At-a-Glance**

**Profile:** Producer and wholesaler of a wide range of hemp products including food, clothing, accessories and cosmetics. Direct-to-consumer sales through its online shop.

**CEO:** Rebecca Kruse  
**Founded:** 2002  
**Headquarters:** Düsseldorf, Germany

**CONTACT:**  
 marketing@hempro.com  
 hempro.com



Hempro Int. CEO Rebecca Kruse

# Foods lead way in Hempro Int.'s broad portfolio of products

Legacy European hemp company Hempro International GmbH said demand for its hemp foods are on the rise as the company marks its 19th year in business in 2021.

That means the company is shipping greater volumes of its HANF FARM-branded packaged foods this year along with high-quality bulk raw material. Hempro Int.'s HANF FARM line of products has been a major driver in the company's emergence as Europe's leading hemp player.

Next to its own-brand products, Hempro Int.'s main business is industrial scale hemp foods production and bulk distribution, through which the company is meeting demand for raw materials in the fast-growing hemp foods sector in Europe and around the world.

Hempro Int., based in Düsseldorf, is a vertically integrated producer and wholesaler of hemp foods, textiles, accessories and cosmetics products.

**Cosmetics sales strong**

While hemp food hit its stride over the past few years, the company says sales of cosmetics products from Hempro Int.'s The Hemp Line family of high-quality creams, soaps, shampoos and lotions are also moving up.

Hempro Int. also sells a line of affordable, durable, casual hemp fashions – also branded as The Hemp Line – with men's and women's

collections from both 100% hemp and hemp/organic cotton blends. That division of the company was launched in 2008.

With its acquisition of the PURE brand of bags and accessories in 2017, Hempro Int. strengthened its position in hemp textile-based accessories.

While the company had been selling PURE bags since 2005 under a license, its knowledge of the brand, and bringing it fully in house, opens broader marketing and product development possibilities, Kruse says.

As Hempro Int. has carefully added more and more products through the years, the deal with PURE was a special one. "We have a long history with these products, their creators and the brand," Kruse said. "So it was a natural fit. We know the owners personally, and it all went down as deals like this should, with both sides really happy in the end."

**Facing the challenges**

HanfHaus Düsseldorf, which opened its doors in 1995, was the foundation stone for founder Daniel Kruse's hemp career, he said. Since that time, the company has successfully navigated the sometimes treacherous path through hemp, overcoming the obstacles through determination and collaborative decision making at the strategic and management levels.



Protein sales are on the rise



**FOOD**



The HANF FARM brand portfolio, marketed and sold under Hempro Int. unit, includes powder products, blends of oils for wellness, cosmetics, food and feed, as well as feed from native proteins & phyto-nutrients.



HANF FARM-branded products are sourced from Hanf Farm GmbH, a specialist in cultivation, processing and worldwide marketing of high-quality hemp products, and a HempHolding company.

All products are derived from controlled organic cultivation without the use of pesticides or other chemicals.

HANF FARM products contain essential, rare, easily digestible polyunsaturated fatty acids optimal for the human body. Vitamins such as B1, B2, folic acid and vitamin E as well as calcium, iron, potassium, magnesium and trace elements of other beneficial elements are all present in HANF FARM products.



# The Hemp Line

**COSMETICS**

The Hemp Line brand high-quality personal care products – creams, body lotions, foam baths, shower gels and massage oils – are all made of natural raw materials.

Based on cold-pressed hemp oil, ideal for skin care due to the physical and biochemical effects of its fatty acids, the formulas are complemented by herbal extracts and essential oils.



The high proportion of unsaturated fatty acids in these products (80 percent) helps the skin retain moisture. Thanks to the combination of the essential fatty acids linoleic acid and alpha-linolenic acid with the rare gamma-linolenic acid, the products can also be used for skin diseases such as neurodermatitis or psoriasis. With their slightly acidic pH value sitting between 4 and 6.5, the cosmetic products from The Hemp Line support the skin's natural acid mantle and prevent it from drying out.



No animal testing is conducted in the manufacturing of cosmetic products from The Hemp Line. The majority of the products are certified according to the guidelines of International Cosmetic and Detergents Association e. V. (ICADA). As far as possible, plants from controlled organic farming or certified wild harvesting are used, and the protection of animal species is always respected.



**FASHIONS**



Only fabrics made purely from hemp or a mixture of hemp and organic cotton are used for the constantly evolving collections in The Hemp Line fashion portfolio.

Durable, breathable, antibacterial and, most importantly, comfortable, fashions in the collection respect nature. Environmentally friendly dyes used in the garments are completely degradable and tested for harmful substances. Attention to sustainability extends to such details as the garment labels, for which only biodegradable paints and water-based inks are used.



From the raw material to the weaving of fabrics to the finished product, The Hemp Line garments are produced under guidelines of the International Association of the Natural Textile Industry (IVN), where Hempro Int. is a member. IVN guidelines guarantee the responsible treatment of workers and respect for nature in the manufacture of textiles in The Hemp Line garments.

The production site is also certified under Global Organic Textile Standards (GOTS). All subcontractors work in accordance with the socially responsible guidelines of the International Labour Organization (ILO). That guarantees The Hemp Line garments are ethically produced in addition to being of highest quality and good for the earth.



**ACCESSORIES**

Functional design, quality and durability – backed up by a guarantee – are the hallmarks of the PURE brand of bags, backpacks, rucksacks and other accessories.

The PURE brand dates to 1995, when the PURE HF Collection of bags was first introduced to the market – well ahead of its time. Because Hempro Int. has been selling PURE accessories since 2002, the company is intimate with the brand values that have driven the products' success.



Beyond Hempro Int.'s focus on the highest quality, brand personality and character, a key consideration for the PURE brand, its suppliers and customers is the sustainability of the products. All materials that go into PURE accessories are traceable back 100% to ecological sources.



Because the company has been selling PURE bags since 2002, later becoming a licensee in 2005 and then purchasing PURE operations in 2019, its knowledge of the brand and bringing PURE fully in house opens broad marketing and product development possibilities.





**At-a-Glance**

**Profile:** High-tech, solar-powered factory making certified organic products for the food processing industry. Producer of a wide range of products including cold-pressed hemp oil, hemp flour, protein and dietary fiber, shelled and unshelled hemp seeds, and animal feed.

**CEO:** Daniel Kruse  
**Founded:** 2014  
**Headquarters:** Borken, Germany

**CONTACT:**  
 info@hempfactory.com  
 hempfactory.com



Hemp protein powder and, below, solar panels that power the facility

# Hemp Factory boosts capacity as demand for protein picks up

**B**orken, Germany-based [Hemp Factory](#) has increased production capacity at its fully solar-powered food processing facility near the German-Dutch border. The biggest hemp food manufacturer in Central Europe, the company said the upgrades come as sales of dehulled hemp seed and hemp protein are picking up.

Development of the facility was guided by HempConsult GmbH, the Düsseldorf-based hemp industry advisory. HempConsult founder and CEO Daniel Kruse also serves as CEO at Hemp Factory.

The highly efficient, clean-energy factory is the company's way of doubling down on its commitment to sustainability, and is intended to serve as an example to the hemp industry that it can lead the process of reducing carbon in the atmosphere.

"We all know hemp food can contribute to environmentally friendly and healthy nutrition for the growing world population," said Kruse.

**Product range**

Hemp Factory produces hemp foodstuffs for the processing industry from certified organic hemp crops, with a strong emphasis on quality.

The company employs germ reduction technology in its production facilities, in addition to systems for cleaning and sorting to produce highly cleaned whole hemp seeds;

dehulling technology for hulled or shelled hemp seeds; and a milling and sieving operation for hemp protein and dietary fiber.

Another production line turns out fodder, concentrated feed stuffs and feed oil for the animal feed industry, and supplies livestock businesses with high-quality feed concentrates from by-products such as oil, oil cake and coarse meal.

**Quality control**

With careful quality control, Hemp Factory offers comprehensive analysis, continuous improvement of production standards, and certification under Organic, Kosher, HACCP and GMP+ standards. The plant's quality management

system is to be extended to FSSC22000 in the near future.

Hemp Factory's no-emissions, cost optimized complex features a solar roof that provides electrical power for all facilities, production and heating. The plant optimizes waste separation, and the enterprise is using electric forklifts and electric vehicles in its transportation fleet.

Hemp Factory's customers include well-known food and baked goods producers as well as leading wholesalers. The factory turns out a variety of bulk hemp food products for sister company Hempro International GmbH, which has been selling hemp foods since 2002.



Hemp Factory CEO Daniel Kruse



**At-a-Glance**

**Profile:** Vertically integrated industrial hemp grower; developer of hemp harvesting and processing technology; producer of a wide range of hemp food, and flower and leaf material for extraction; and fiber.

**CEO:** Rafael Dulon  
**Founded:** 1997  
**Headquarters:** Melz, Germany

**Contact:**  
 info@hanffarm.de  
[www.hanffarm.de](http://www.hanffarm.de)



Hanf Farm GmbH CEO Rafael Dulon

# Hanf Farm will double seed output, launches carbon projects

**H**anf Farm GmbH, Central Europe's leader in organic hemp cultivation and processing, said it has doubled its output of planting seed and made its first moves into the hemp-based carbon sector.

Hanf Farm also said it is on track to triple its output of hemp grain in 2022 to meet growing demand in the food sector.

A long time multiplier of EU certified planting seed, Hanf Farm has well-established relationships among international partners and seed banks. The company also develops hemp genetics from approved European hemp breeds, can deliver food, fiber and CBD varieties suitable for dual cropping, and even turns out genetics adapted to individual customer requirements. In addition, Hanf Farm has extensive experience in the registration and approval processes required to introduce new hemp cultivation varieties.

All seeds from Hanf Farm are developed without genetic engineering, and the company employs advanced separation technology and a state-of-the-art automated cleaning system in its cultivation seed production line.

Hanf Farm's recently launched initiative in carbon farming is on two tracks. First, the company is studying the effects of hemp cultivation and monitoring carbon in the soil, in hemp plants and in products. As a part of this sustainability initiative, Hanf Farm recently signed a cooperation agree-

ment with HempConnect, a Hamburg-based startup that is working on methods to certify carbon credits for hemp agriculture and the hemp supply chain.

Hanf Farm is also researching the potential for organic biochar produced from hemp stalks, envisioning potential markets in such materials as activated carbon, Terra Preta and graphene.

Meanwhile the company is also advancing its core business in hemp foods and biomass. Hanf Farm recently added organic high-quality tea leaves in different sizes, powder products from plant leaves and blossoms, and a hemp root powder to its production portfolio. In addition to those products, the company turns out hemp premium flower, CBD

and CBG extracts and oils, broad spectrum distillates, isolates from natural cannabinoids, flower and leaf fodder for animal feed, and hemp feed for fish, birds, cattle and horses.

As Hanf Farm steadily expands its footprint and activities in the development of sustainable hemp agriculture near its operations in village of Melz in the state of Mecklenburg-Vorpommern in northeast Germany, the company is well-positioned to play its part in the broader regional economy. Access to certified organic agricultural land in the area is particularly suitable for Hanf Farm's mission to grow and harvest industrial hemp for all of the plant's potential.



Hanf Farm's farming and processing complex in Melz, about 1.5 hours north of Berlin.



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**SEED SOWING SEED FOOD GRADE FEED GRADE PROTEIN HEMP OIL**



**FLOWER TEA QUALITY EXTRACTION CANNABINOIDS CBD CBG PREMIX OIL**





**At-a-Glance**

**Profile:** Specialist in cannabidiol (CBD) extraction, production and worldwide marketing of hemp-based cannabinoids and cannabidiol-containing products. Producer of bulk cannabidiol-rich hemp extracts, CBD oils and CBD isolate for the food, cosmetics, nutraceutical and pharmaceutical industries. Own-brand CBD aroma and cosmetics products.

**CEO:** Joscha Krauss  
**Founded:** 2014  
**Headquarters:** Düsseldorf, Germany

**CONTACT:**  
 info@medicalhemp.com  
 medicalhemp.com



Joscha Krauss, CEO of MH medical hemp

# MH medical hemp strongly positioned as rules advance

As the regulatory system for cannabinoids in Europe advances, [MH medical hemp GmbH](#) is well positioned to serve the medicinal cannabis, CBD and cosmetics markets in Europe and beyond.

With the European Court of Justice (ECJ) ruling CBD is not a narcotic and may be freely traded in EU countries, and recent changes in cosmetics safety rules, Düsseldorf-based MH medical hemp, a veteran cannabinoids company by European standards, has established internal controls critical to further development of large-scale manufacturing processes that employ safe and environmentally-friendly methods. That lets MH medical hemp keep pace with the market, according to Joscha Krauss, the company's CEO.

With a clearer horizon for CBD and other cannabinoids, MH medical hemp can put more emphasis on hemp's potential in its portfolio. The company continues to probe hemp's potential uses in skincare products, recently joining with the Technical University of Braunschweig to apply for R&D funding from ProPharm, a German national innovation platform that is supporting development of the pharmaceutical supply chain. The joint project would look at hemp's potential in cosmetics for use on stressed skin.

ProPharm is funded by the German Federal Ministry for Economic Affairs and Energy as part of the Central Innovation Program, which supports SMEs that are advancing manufac-

turing processes, products and technical services for the pharmaceutical industry.

On the wholesale side of the business MH medical hemp offers hemp whole-plant Co2 extracted CBD oil that features the full range of cannabinoids, terpenes, flavonoids and phenols from EU certified hemp. The company's high-quality CBD can be added to a number of products, allowing for the creation of custom CBD-infused brands simply and effectively.

Besides its core business as a supplier of raw materials for the nutraceutical/cosmetics industry, MH medical hemp continues to develop its pharma branch. The company expanded its sources for medical marijuana by securing contracts with two additional Euro-

pean suppliers in the past year after having obtained Wholesale Trading Authorization for human medicinal products as well as a Narcotic Drug License. That gives the company a strong foothold in Germany's medical marijuana sector, where demand is strong, and prescriptions are covered by insurance companies.

In other recent developments, MH medical hemp GmbH has added CBD Gold 2% in oil as a natural flavouring preparation to its Phytalize line of products. The Phytalize portfolio also includes a face cream, balsam and body lotion, all of which incorporate CBD into the formulas.



Phytalize CBD Gold 2% aroma in vials



Your reliable and competent partner  
 for Cannabidiol and Cannabinoids  
 in B2B and B2C

# Highlights in the development of HempHolding companies

1995

- HanfHaus Düsseldorf founded as a retail store.



1996

- First farming operations established as precursor to Hanf Farm GmbH.

1999

- Daniel Kruse becomes Sales Director and Co-Shareholder of HanfHaus GmbH in Berlin.

2001



- Hempro International (Hempro Int.) founded as a distributor, wholesaler and online shop.
- Hempro Int. adds hemp clothing for distribution in Germany and Europe.

2003

- Hempro Int. acquires assets in the hemp food raw material business.



- Hempro Int. launches The Hemp Line cosmetics brand.

2004

- Hempro Int. strengthens distribution of clothing and textiles in Germany and Europe.

2005



- Hempro Int. becomes licence partner of the PURE brand for bags and accessories.

2007



- Rebecca Kruse joins Hempro Int.
- Hempro Int. expands its into branded food products.

2008

- Hempro Int. launches its own The Hemp Line brand of clothing.

2009



- Hempro Int. launches The Hemp Line brand underwear collection.
- Hempro International's legal form is changed to Hempro International GmbH & Co. KG. (Hempro Int.).

2012



- Hempro Int. launches food products under the HANF FARM brand.

HempConsult

- The HempConsult GmbH advisory firm is founded.

2014

- Existing organic farming operations come under the Hanf Farm GmbH name.



- Hemp Factory GmbH is founded; cleaning, dehulling and protein machines are installed for hemp food production.



- MH medical hemp GmbH is founded in Berlin for the distribution of CBD products.

2015

- Rebecca Kruse joins the management board of Hempro Int. as Co-CEO



- Hanf Farm develops and builds the MultiCombine HC 3400 hemp harvester.

2016



PURE®

- Hempro Int. acquires the PURE brand of hemp-textile accessories.
- Hemp Factory purchases second protein machine.

2017



- Hempro Int. is certified according to HACCP, ISO 9001 and GMP+.
- Hemp Factory establishes food and feed production.
- MH medical hemp begins planning of BTM approval and GMP certification.

2018



- Hemp Factory receives HACCP and GMP+ certification.
- MH medical hemp gets a safe room built into its Düsseldorf warehouse.

2019



- Hanf Farm moves operations to Melz, in the state of Mecklenburg-Vorpommern.

2020

- Hanf Farm founds an enterprise for Agricultural and Forestry Operations with up to 1.000 ha.
- Hemp Factory purchases and installs additional oil presses.



- MH medical hemp debuts „Phytalize“ CBD cosmetics line, and launches „Phytalize“ food flavouring preparations.
- MH medical hemp receives GDD certification and narcotics license.

2021

- Conversion of Hempro International GmbH & Co. KG into Hempro International GmbH.





Argentinian farmers bringing in hemp in the 1930s.

# Argentina's edge

Tradition, climate, latitude and a hemp law on the way

**A**rgentina's Senate has overwhelmingly approved a law that would establish a regulatory framework for the development of the medical cannabis and industrial hemp sectors.

The proposed law, which backers say could quickly generate 10,000 jobs in the hemp production chain, passed the Senate 56-5 with one abstention. While all signals are now positive in Argentina, elections scheduled in November mean the country's legislative progress is moving slowly.

"We expect good news in a few months but right now the elections are stopping everything," Diego Bertone, one of Argentina's leading cannabis activists who has worked with the government's Agriculture Commission in developing Argentina's cannabis laws.

Regulated medical cannabis and hemp industries in Argentina could bring as

much as \$500 million in domestic sales and \$50 million in exports annually, Argentina's Ministry of Development has estimated.

"It would be a start-up scenario with a strong federal economic impact," Minister of Development Matias Kulfas said in presenting a draft bill to guide the sectors this summer, calling the bill "the result of a long and coordinated effort."

Kulfas said Argentina's position as a global leader in agricultural production, its scientific research expertise, structure of laboratories and broad network of suppliers make the country a potential medical cannabis and hemp powerhouse.

## Sweeping legislation

The new law aims to establish a legal framework and regulations for sowing, cultivation, harvesting, production, storage, transport, marketing, import, export and

possession of cannabis seeds and cannabis derivatives. It would also encourage public, private or mixed investment projects in the medical cannabis and hemp sectors.

According to the draft bill, "the development of hemp is an excellent productive alternative to diversify and energize the agricultural sector . . . from large companies as well as small producers and cooperatives of family, peasant and indigenous agriculture."

## 1% THC

Importantly, the law retains an earlier proposal that would set the THC limit for industrial hemp at 1.0%. Establishing the 1.0% THC limit would put Argentina on a par with other countries in Latin America and elsewhere which are abandoning a long-observed international 0.3% THC standard. The limit is important primarily

for the CBD sector as CBD rises in proportion to THC in hemp plants, meaning more efficient production.

Other Latin American countries, including Uruguay, Ecuador, Colombia and Mexico have opted for the 1.0% THC standard, as have several Asian countries.

## New Agency

A new agency, the Regulatory Agency for the Hemp and Medicinal Cannabis Industry (Ariccama), would supervise a number regulatory bodies which have relevant responsibilities in hemp and medical cannabis. Ariccama, which would have national jurisdiction, in turn would be under the Ministry of Development.

Cannabis proponents have said Argentina's position as a global leader in agricultural production, its scientific research expertise, structure of laboratories and broad network of suppliers make the country a potential medical cannabis and hemp powerhouse. Hemp can serve as a replacement for a shrinking tobacco sector, and lead to innovation in technology and product development, the development ministry has said.

Argentina has had a semi-operational medical cannabis access law on the books since 2017, but rules were released only in November 2020. That set the stage for

expanded imports. If the proposed bill on medical cannabis and hemp production becomes law, companies importing into Argentina will have to compete with domestic players.

## Whole-plant exploitation

Proponents envision exploiting the hemp plant for its full range of possibilities – to produce food & drinks, cosmetics, textiles, bio-fuels, paper, bio-plastics, construction materials and animal bedding, suggesting the industry can boost the fortunes of the agricultural sector. The measure pays particular attention to Argentina's small farmers, Bertone said.

Those backing the hemp initiative in Argentina have underscored that a national hemp industry can also support the country's alignment with the United Nations Sustainable Development Goals as well as the Escazú Agreement, an environmental human rights treaty among the nations of Latin America and the Caribbean.

## Latitudinal advantage

The Latin American Industrial Hemp Association (LAIHA) also cheered the developments in Argentina. "We are very happy to see Argentina moving forward with this project," LAIHA President Lorenzo Rolim da Silva told HempToday.

"It presents the largest opportunity for hemp production so far in Latin America, considering that the country has most of its agricultural land at latitudes where hemp varieties most commonly planted in North America and Europe can readily adapt while remaining compliant on THC levels."

"Like all countries in the region, Argentina is suffering deeply with an economic recession and currency devaluation, so hemp can come as the bearer of good news for the agricultural and industrial sectors," Rolim da Silva added.

## 3 million organic hectares

Seventy-five percent of Argentina's farms are family farms, accounting for 18% of the country's total 40 million hectares (98 million acres) of arable land, and 27% of total agricultural production. Argentina is a major producer of soybeans, with other agricultural output in wheat, maize, dairy products, sunflower seed, sugar cane, grapes, pears and apples. Nearly 3 million hectares (7.4 million acres) are farmed organically for sugar cane, fruits, vegetables and beans.

Hemp has a long history in Argentina, which produced the crop for more than a century before the global war on drugs interrupted the industry in the 1970s. Much like in the United States, the government urged farmers to plant hemp in the 1930s in the national interest.

## Ecuador: 'A day that will remain engraved in our memory'

**E**ccuador has set the stage for development of the country's hemp industry with the release of regulations from the Ministry of Agriculture that will guide such things as seed production, farming, processing, marketing, export and other links in the hemp production chain, among others.

For Ecuadorian hemp advocates, "Agreement 109," the 48 pages of detailed rules will be a document to remember.

Cañamo Industrial Ecuador, a non-profit agricultural organization, in a tweet, praised "a historic milestone . . . with the signing of Ministerial Agreement 109."

## 'A new era'

The day the regulations were issued "will remain engraved in our memory as the beginning of a new era for agriculture in Ecuador," EcuaCañamo, the Ecuadorian Association of Medicinal and Industrial Hemp, said in a statement on its website. The groups said they hope hemp production will give a boost to the Ecuadorian economy.

The regulations specify requirements under various categories of licenses, which will be valid for 10 years and can be renewed 90 days in advance of the expiration date.

The Ecuadorian National Assembly cleared the way for the hemp industry when it decriminalized the cultivation and production of cannabis products in September 2019, setting the limit for THC in hemp at 1.0%

## Other key regulations:

- The Undersecretariat of Agricultural Production will issue technical standards and protocols for application of the regulations, and control the industry.
- Producers of industrial products must obtain the corresponding licenses to be able to market in Ecuador and abroad.
- The national agriculture information agency is to create a National Register of Licensees that contains information on licenses that have been issued, suspended, revoked or not renewed.
- Importing of hemp seeds must be authorized by the Ministry of Agriculture. Seeds must be used by the importers directly or traded to other authorized parties who will plant them.
- The export of seeds will be regulated under the Organic Law of Agricultural Health. The export of derivatives will be done only by those licensed for that activity.



Brazil's President Jair Bolsonaro

# Hemp hopes are dashed in Brazil

Political turmoil could set the industry back by up to two years

After much optimism following developments last year, hemp stakeholders in Brazil have turned sanguine as political turmoil under the Jair Bolsonaro government has all but derailed progress for the present.

"There is no Horizon for cultivation in Brazil under the Bolsonaro Government," said Lorenzo Rolim da Silva, "President at the Latin-American Industrial Hemp Association (LAIHA). Rolim da Silva nonetheless said Brazilians are enthusiastic about cannabinoids.

"For the next two years, we'll continue to be an import and distribution market only, which is not that bad in the end as the public seems to be learning and enjoying using cannabinoids for therapeutic purposes," he said. "And that will create a better market for whenever we actually can produce."

### Hopes dashed

Companies in hemp and medical marijuana were optimistic late last year as a proposed law that would have set rules for the two cannabis sectors moved through the legislative process.

The bill would authorize the production and marketing of products made from industrial hemp as long as they are not intended for medical use or marketed for "prophylactic, curative or palliative purposes." It would clear the way for products in health and beauty, cellulose,

fibers and non-medical veterinary as long as those products contain no more than 0.3% THC. Only seeds would be allowed in foods.

But hemp's future looks clouded now. While some observers have suggested that Bolsonaro would open up the market based on a high number of farmers among his supporters, the president is on record "multiple times" as being opposed to cannabis cultivation in any form, Rolim da Silva said.

Current rules already allow for the import and sale of cannabis-derived medicines in three categories: 1. Those registered as pharmaceuticals; 2. Products with "sanitary authorization" which don't require clinical trials; and 3. "Compassionate use" authorization which lets patients import cannabis products on an individual basis.

### Big players move in

Under the proposed law, CBD would be considered "plant medicine," and therefore relegated to the "sanitary authorization" category, requiring a prescription.

The largest country in South America, Brazil is the fourth biggest pharmaceutical market in the world. Observers say the potential for medical cannabis could surge if the proper legislation is ever enacted. Estimates hold that the sector could reach turnover of \$4.7 billion in the next three years.

Several importers have already established beachheads in Brazil, including GW Pharmaceuticals of the UK, which sells its Sativex CBD-based medicine in pharmacies; Colombia's Clever Leaves and Canopy Growth of Canada are both developing medicinal cannabis products for sale in Brazil. Drug giant Merck announced its entrance into the market last year.

### Support for patients

Brazil has several million epileptics and patients with other ailments like autism and chronic pain who could benefit from CBD. Estimates are that 7,000 patients are registered and receiving government-approved CBD oil for medical purposes, but the black market could make that figure much bigger. Under medicine subsidies in Brazil, the government offers generous support to patients. At least one CBD seller estimated it gets as much as half its revenue from such subsidies.

From the beginning of Brazil's colonization until the early 20th century, Brazilians legally cultivated hemp in various regions of the country, as did the government, primarily harvesting for fibers to be used in textiles. Historical documents also show that up until 1932 extracts and other remedies derived from hemp were considered legitimate and recommended by doctors for various ailments. Brazil's hemp industry led all agriculture sectors in the late 1800s.

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Paraguay's President President Mario Abdo Benítez

# ‘A crop of national interest’

Hemp gets priority in Paraguay, and is out of the starting blocks

Paraguay's hemp industry is up and running, with hopes it will live up to government expectations as a “crop of national interest,” as decreed by President Mario Abdo Benítez.

The national program supports development and commercialization of industrial hemp and advances research, with emphasis on helping the country's many small farmers and cooperatives.

The decree, issued last autumn, is a major landmark in the advancement of hemp in Latin America, and probably in the world, according to Lorenzo Rolim da Silva, President of the Latin American Industrial Hemp Association.

“By declaring hemp as a plant of national interest and assuring companies and farmers that hemp will be given priority and be incentivized, Paraguay is taking solid steps towards consolidating itself as a leader in the region,” Rolim da Silva said.

Signaling the pace of developments in the newly opened market, Healthy Grains SA, a Paraguayan maker of superfoods, recently made a first export shipment of hemp-based products to Europe. Paraguay is believed to be only the third country to export hemp seeds into the European Union, which has been importing seeds from Canada and China for several years. Healthy Grains is also

exploring other exports markets.

The company last year was approved by Paraguay's Ministry of Agriculture (MAG) to import 17 seed varieties from Hungary, France, China and the United States, and is studying those varieties.

Healthy Grains, which has a production facility in Nuestra Señora de la Asunción logistics park in the City of Luque, said it is also launching “Hemp Guarani,” a “social seal” that is part of an effort to establish a country brand for hemp from Paraguay.

The government has recognized a seven-member association, the Paraguay Industrial Hemp Chamber (CCIP), and interest is growing among large scale operators reproducing seed for future cultivation.

Not everything has gone smoothly. Paraguayan regulators have suffered criticism. A group of stakeholders earlier this year complained that the country's hemp program is favoring large business interests to the disadvantage of peasant farmers, in contravention of President Benítez' decree.

The Paraguayan Chamber of Industrial Cannabis (Cannapy), another industry group, complained in April after a shipment of planting seeds intended for small farmers was held up by customs in a dispute regarding official clearance. Meanwhile, a handful of large agricul-

ture concerns started business without bureaucracy or other problems, and with government authorization, Cannapy charged at the time.

## Decree specifics

Paraguay's new rules limit farmers to growing hemp on 2-hectare (~5-acre) plots, but many may be able to raise two crops every 12 months for the production of food, oils, fiber and other raw materials.

Specifically, the hemp decree declares the national program will:

- Promote the benefits of hemp and facilitate diversification in production among cooperatives and associations.

- Generate greater added value with appropriate technology.

- Ensure quality control.

- Coordinate supplementary regulations and recommendations for such things as phytosanitary and biosafety issues related to hemp cultivation.

- Promote the introduction and registration of varieties of cannabis in the National Register of Commercial Cultivars (RNCC); commercialize and manage quality control of seeds.

- Develop strategic alliances with companies, associations and others, establish cooperation agreements with national and international entities, and set strate-



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gies for national and international marketing for Paraguayan hemp producers.

### Agriculture booming

A boom in agricultural commodity prices and sound macroeconomic policies have led Paraguay to an overall average growth rate of more than 4 percent in the past 15 years. While transitioning cannabis to a legitimate industry could have a further positive effect on Paraguay's economy, the crop faces major challenges along the way.

Well known as the biggest producer of illegal marijuana in South America and a major supplier of weed to Brazil, Argentina, Chile and Uruguay, Paraguay's cannabis economy has traditionally been in the grip of drug traffickers and corrupt politicians. Observers have said the issuing of first-ever medical cannabis licenses in February 2020 and recent approval of personal cannabis cultivation for therapeutic purposes mark positive steps toward legitimacy for the industry. The elevation of hemp is only the latest step forward by the government.

### Incursion of soy

Meanwhile, large landholders in Paraguay, where one percent of the population owns about 75% of the land, are reported to be selling their landholdings to Brazilian and European companies to fuel a booming soy industry — which could compete with hemp for fields.

Critics have said environmental diversity in Paraguay has been hurt by the country's growing soy fields, which produce 32 percent of Paraguay's exports. Forests once covered 85 percent of eastern Paraguay, but it is estimated that less than 8 percent of the forest remains after clearcutting for soy fields. Soy farming, which has led to deforestation in the Amazon, also has expanded rapidly in neighboring Brazil, where 10 million hectares were brought into soy production between 2000 and 2010; an estimated half of that land is believed to have been deforested. Brazil and Argentina account for almost half of global production of soybeans.

### Cotton interests too

In Paraguay, hemp also competes as a crop with cotton, which has been an important export throughout much of the country's history, and which has attracted Brazilian and Italian investment in the country's cotton factories.

Cotton proponents say development has brought jobs along with income for farmers.

But cotton, an economic mainstay of low- and middle-income countries around the globe, is a notoriously unsustainable crop, requiring excessive amounts of water; more than half of global cotton production — 57 percent — takes place in areas under high or extreme water stress, according to data compiled by the World Resources Institute. And cotton cultivation currently uses 4 percent of all world pesticides and 10 percent of insecticides, according to the Institute.

While the soy and cotton sectors argue that their strategies offer the way forward for agriculture in Paraguay, critics have argued the development comes at too high a social cost. Nearly half of Paraguay's population relies upon subsistence farming. Mechanized farming equipment puts many farmers out of work, say some critics, while others worry about the environmental and economic impact of mono-cropping soy and cotton. Proponents say hemp can be a sustainable replacement for both.

### General investment picture

With a reputation for government corruption, private foreign investment is considered rare and risky in Paraguay. Until recently, poor infrastructure has hindered the growth of the industrial sector, but low labor costs have prompted some Brazilian companies to move their factories to Paraguay nonetheless.

In 2016, a report by the European Union indicated that the trading bloc saw that the risk of entering business in Paraguay was both necessary and advantageous, and funds were issued for agriculture, food security and environmental projects. Much of the current EU funding to Paraguay focuses on improving the sustainability of cattle farming and beef exports.

The United States is one of the largest foreign direct investors in Paraguay. More than a dozen U.S. multinational firms in the computer, agro-industrial, telecom, banking, and other service industries have subsidiaries in the country. U.S. imports from Paraguay include sugar, food oils, animal products, and wood products. Paraguay and the United States also have a Trade and Investment Framework Agreement, a bilateral mechanism to discuss common investment and trade objectives.

## Guyana's cabinet signs off on plan to spark hemp industry

**G**uyana's Cabinet of Ministers green-lighted the cultivation and processing of industrial hemp, saying the sector could create thousands of jobs and create new industries.

The government was swayed to support an initiative to develop a national hemp industry by a report from the Guyana Defence Force, the Guyana Police Force and other stakeholders who analyzed the country's hemp potential after examining global best practices.

Vice President Bharrat Jagdeo said both Cabinet and the Defence Board reviewed recommendations made by Attorney General Anil Nandlall, who was tasked last year with looking into the viability of legalizing of industrial hemp.

### Economic boost

President Dr Irfaan Ali said the hemp industry could help boost Guyana's economy but said a national consultation is necessary ahead of establishing a regulatory framework. It is likely that a new agency would be established to monitor the industry.

"It's an industry that I think is viable once the management is there. But of course, this is an important national issue that would require also some national input," the president told the media after the cabinet's recent approval to move forward.

"Based on the report from the Defence Board, there are possibilities there that I think would be helpful from an economic and a financial perspective that does not in any way, shape or form affect the wellbeing of the people," the President noted.

### Optimistic projections

Proponents see economic benefits not only from hemp farming and processing, but noted knock-on potential commerce in the marketing, banking, insurance and retailing sectors.

Supporters have cited studies they say show that planting 100,000 hectares (~250,000 acres) could create 40,000-50,000 sustainable jobs, bringing economic development through carbon credits and output from seed and hemp stalks.

The proponents suggest that initially 500 Guyanese families be allocated 10 hectares (~25 acres) of land each for industrial hemp. That estimated total of 5,000 hectares (~13,350 acres) could produce 50,000 tons of hemp stalk which could be processed into 15,000 tons of fiber and 35,000 tons of hurd. Once established, those hemp farms could then scale up, hemp advocates suggested.

## Latin America in brief

### Puerto Rico needs infrastructure to get industry moving

**P**uerto Rico needs to attract private investment to develop infrastructure for the hemp sector or the U.S. territory risks missing out on the growing industry.

Secretary of Agriculture Ramón González has said the sector could face problems if it cannot attract private capital to build hemp processing factories.

Puerto Rico established a hemp pilot program in 2019, following approval of the 2018 U.S. Farm Bill, which legalized hemp federally across the U.S. and its territories.

Puerto Rico's Department of Economic Development & Commerce (DEDC) said last year it had interest in projects adding up to 18,000 acres of land to be developed for industrial hemp farming and processing, not including other private initiatives. Local incentives for registered farmers growing hemp were reported to be in place, and government owned land and manufacturing facilities were available for rent, DEDC said at the time. But those private initiatives have apparently failed to develop so far.



González warned that if investors appear who want to develop hemp production facilities, he sees little future for the sector. Licenses already granted for hemp growing by the Department of Agriculture have led to trials, González said, but he questioned what would be done with any hemp produced in significant quantities.

Puerto Rico operates under U.S. jurisdiction and the 2018 U.S. Farm Bill. The United States Department of Agriculture approved Puerto Rico's hemp plan in 2020.

### Canada's Global Hemp Group, Mexican University collaborate

Global Hemp Group of Vancouver signed a Collaboration Agreement with the National University of Mexico (UNAM) to cooperate on research, teaching and technological development in all aspects related to hemp cultivation and applications. UNAM has facilities in every of the 32 States of Mexico as well as in San Antonio TX, Tucson AZ, Los Angeles CA, Seattle WA, Chicago IL, Boston MA, San Jose Costa Rica, Buenos Aires Argentina, London UK, Madrid Spain, Paris France, Berlin Germany, Johannesburg South Africa and Beijing China.



### Canadian company entering Central America with drink

Toronto-based Flora Growth Corp., said it is poised for entry into Central America, starting with distribution of a drink product in Costa Rica. Flora Growth signed an agreement with GMD Latin America, a food and beverage distributor. Initial plans call for marketing of the Mambe drinks, which combine CBD with native Amazonian fruits, in Puerto Viejo, at Limón.

Also, former Miss Universe Paulina Vega of Colombia, who developed the Mind Naturals brand, is to lead the company's push into Europe, where it will introduce its Mind Naturals CBD cosmetics. Almost Virgin-branded sex oil and mouth spray with CBD, along with Mambe CBD drinks in the UK. Flora Growth absorbed Vega's company and named her as a founding partner in charge of its cosmetics division in 2020.

Flora Growth is traded on the U.S.-based Nasdaq exchange.

### Proposed law in Costa Rica would cover medical MJ, hemp

Proponents are optimistic that a proposed law that would establish a framework for medical cannabis and industrial hemp in Costa Rica could be in place by the end of 2021.

The new law would legalize production including sowing, cultivation, harvesting, storage and transport of cannabis products.

Jurisdiction would be under the Ministry of Agriculture and Livestock (MAG) and the Ministry of Health. Those agencies would oversee inspection, production, industrialization and commercialization of hemp for industrial purposes and food, and psychoactive cannabis exclusively for therapeutic medicinal purposes. The proposed law does not seek to legalize recreational marijuana.

MAG would control licensing for the import and reproduction of cultivation seeds with the Costa Rican Social Security Fund (CRSS), which is responsible for most of the country's public health sector, or authorized laboratories or entities. Those licenses would only be available to organizations such as cantonal agricultural centers, associations of small and medium producers, cooperatives and indigenous development associations.

Deputy Zoila Rosa Volio, who first proposed the law, said it could spark development of the pharmaceutical industry, and pre-market value chains starting in agriculture.

Costa Rica's Ministry of Agriculture and Livestock (MAG) started of hemp cultivation trials at two sites where scientists will observe the plant's performance in the country's agronomic and agro-ecological conditions.

The trials, which represent the first authorized planting of hemp in Costa Rica, aim to check how hemp varieties will adapt to climate, rainfall, length of daylight hours, soil conditions and susceptibility to pests and diseases.

A total of 12 hemp varieties were to be planted in greenhouses at the Los Diamantes experimental station at Guápiles in the northeast part of the country, and at the Enrique Jiménez Núñez experimental station in Cañas, 200 kilometers to the west. The two sites are in different micro-climates — humid tropics and dry tropics.

### YVY of Uruguay, Canadian firm team up in Colombia

YVY Life Sciences of Uruguay said it signed an agreement with Vancouver, Canada-based Blueberries Medical Corp. to jointly develop cannabis genetics, and to replicate YVY's small-farm cultivation model in Colombia.

YVY said the deal marks a first step in its international strategy, bringing together initiatives in two of Latin America's leading cannabis nations.

The partners said they plan to develop genetics in Colombia, and then register them in both countries.

YVY makes cannabis lifestyle products and supports small farmers in Uruguay. The company was founded by Kruchik Krell and Kevin Nafté, a former head of operations at California-based Flow Kana, in 2018.

Blueberries Medical Corp. has interests in agriculture, genetics, extraction, medicine, pharmacology, and marketing of CBD and THC-based medical cannabis, and has sales operations in Colombia and Argentina.



### German bud harvester enters Latin-American markets

HHH Hemp Harvesting Technology (HHH) of Germany named a representative for specific Latin American markets as the company manages strong demand for its breakthrough cannabis bud stripping technology.

HHH named Juan Levrero as the company's sales representative for Uruguay and Paraguay and is pursuing arrangements to serve other Latin American markets, said Heinrich Wieker, owner of the company and developer of the patented HHH-700 technology.

Wieker said the company has strong potential to tap into business among 40 major cannabis companies and the Uruguay's large number of legal cannabis clubs, which are looking for harvesting solutions.

As sales expand, HHH is also adding manufacturing partners to serve key markets, focusing first on North America.

### Panama legalizes medical MJ; hemp still under study

The government in Panama is reportedly looking into hemp through the ministries of Health, Foreign Trade and Agricultural Development. A proposed law has been put forth in the National Assembly, and has the support of both ministries. Lawmakers and government officials have formed a committee to study the potential of hemp. About 582,000 hectares (~1.4 million acres) of land in Panama is farmland; key crops are bananas, cocoa, beans, coffee, corn, potatoes, rice, soybeans and sugar cane.

Panama's National Assembly voted in August 2020 to legalize medical marijuana, sending the bill for President Laurentino Cortizo's signature, which was expected.



Drones spray fertilizer on Chinese hemp crops.

# High-tech hemp for textiles

## Doubling down in China's Heilongjiang Province

A single county in China's Heilongjiang Province expects to harvest hemp from 40,000 acres (~16,200 hectares) in 2021 as the government increases its support for development of high-tech solutions in the world's capital of hemp textile production.

The planting area for industrial hemp in Qinggang County has steadily grown from 1,500 acres (~607 hectares) in 2016 to feed a robust field-to-shelf industrial supply chain. Qinggang County officials say 6,600 acres (~2,600 hectares) of hemp were planted for research purposes alone in the county this year.

Heilongjiang Province accounts for half of the world's production of hemp fiber, and Qinggang County makes 70% of that output; all hemp yarns exported from Heilongjiang Province come from Qinggang, according to provincial officials.

### Robust R&D

Now the national government is doubling down in the county, aiming to make it a prototype "one county, one industry" model that will accelerate high-quality development of the hemp fiber sectors. The National Hemp Industry Technology System (NHITS) and the Qinggang Agricultural Center are working jointly

on a number of initiatives in cultivation, textiles and a wide range of applications for hemp hurd.

Most recently NHITS's Harbin Hemp Test Station and the Qinggang ag center jointly deployed drones with AI-based binocular vision technology to spray fertilizer on hemp crops. The technology can enhance the growth of fiber hemp and improve disease resistance through what the Chinese call a "world leading" mist spray nozzle that saves 15% of the fertilizer comparing to traditional application methods. The partners have also carried out a comparative test of fine fiber varieties and a demonstration of high-yield cultivation techniques in Qinggang.

### Key developments

The county also:

- Expanded its fleet of large-scale precision planters, unmanned plant protection technology; and self-propelled harvesters to a total of 120 sets;
- Now boasts five long-hemp spinning operators;
- Added a new short hemp textile production line;
- Reached 60,000 spindles in textile processing capacity;
- Started up factories to turn out particle board and pallets from fiber hemp material.

Meanwhile, research continues into high-quality fiber hemp varieties, pest control, disease prevention, and retting techniques, the county said.

Heilongjiang province has embarked on massive research and development efforts to make fine hemp fibers a large-scale alternative to cotton, aiming to overcome environmental problems caused by cotton's enormous need for water, and by soil salinization and pesticides.

### International cooperation

A comprehensive research program involving universities from Heilongjiang Province and partners from the Ukraine and Canada is developing high-yield hemp varieties, optimizing combine harvesters for stalks and seeds, and introducing bio-tech methods that allow production of hemp textile fibers in an environmentally friendly way using enzymes; the fibers can then be processed alone or together with other fibers on existing cotton gins.

Heilongjiang's efforts have not only attracted attention and support from Chinese government and scientists, but some of the biggest investment funds in China are also placing private money in the sector. Also, the province is welcoming to foreign partners and continues to seek out deals in Europe and the USA.

## Chinese giants form hemp association in Yunnan province

Fifteen major Chinese hemp companies have joined to anchor a new association in Yunnan as hemp interests in the province continue rapid expansion and extensive research & development, looking to build on China's growing strength in the global CBD market and other hemp sectors.

The Kunming Industrial Hemp Association (KIHA) will promote development of new hemp varieties, CBD extraction technology, and product development in all hemp applications while helping to set standards for the industry, according to an announcement made in August 2021.

### 65 members

The new association aims to strengthen Yunnan's hemp industry amid rising international competition by developing self-regulation and industry policy while serving as a forum for the exchange of information and knowhow among members, the association said.

In addition to the 15 founding members, led by Yunnan Industrial Hemp Industry Investment Co., Ltd., 50 additional companies joined the association as members at its inception, marked by a recent ceremony in Kunming, the provincial capital.

Yunnan is one of two provinces where the hemp infrastructure is concentrated in China, and a growing number of hemp enterprises are reported to be active in the province. Most are units of massive state-run industrial conglomerates that have strong backing from the Chinese government.

### Major CBD supplier

The province has grown to be a major CBD supplier to world markets. Twelve enterprises are reported to be authorized for CBD extraction and processing in Yunnan, while more than 60 companies have obtained pre-approval for that activity across all of China. Industry sources indicate that the majority of China's CBD production is exported to the United States.



## Thai authorities hope to move tobacco farmers to hemp

Tobacco, food, and health & beauty interests in Thailand are quickly moving to establish hemp operations under rules that took effect in late 2020.

The state-held Tobacco Authority of Thailand (TOAT) said it has a plan to transition 13,500 tobacco farmers to industrial hemp and marijuana for the country's legal medical cannabis market. TOAT said it will start its cannabis operations first by farming hemp, noting it could begin in August pending a ruling by the Council of State regarding its eligibility to take a role in the cannabis industry.

Meanwhile, two leading Thai industrial concerns said they are developing new foods, beverages, supplements, and health & beauty products containing hemp. Those products, under Thai Food & Drug Administration (FDA) rules, may not contain CBD or other cannabis terpenes, which are limited to controlled prescription cannabis drug markets in Thailand.

### Better deal for farmers

TOAT's governor, Panuphol Ratanakanjanapatra said farmers could more than supplant income lost when TOAT cut its purchases of tobacco leaves from farmers to roughly 14,000 tons a year in 2020, down from 22 million tons in 2019, and saw its market share drop from 70% to 55%. The Authority blamed the production slowdown on a tobacco sales slump caused by a new tax that can be as high as 40% depending on the cost of a pack of cigarettes.

But TOAT said it has done a study that shows those farmers can nearly triple their income by growing cannabis. The Authority plans to offer a price guarantee for participating farmers, and will first focus on the production of medical and industrial hemp, with plans to plant up to 1,000 rai (~400 acres/160 hectares), Panuphol said.

TOAT said it has already held discussions with domestic and international parties regarding development of cannabis supply chains, including financial institutions to support farmers.

### Big players move fast

TOAT also works with the Government Pharmaceutical Organization and the Chulabhorn Research Institute in



sorting out hemp and cannabis issues for medical applications.

Meanwhile, major Thai companies have signaled their plans for hemp. CP Foods, a subsidiary of Charoen Pokphand Group, Bangkok, said it is partnering with Maejo University in developing a hemp-based ready-made food line it expects to launch this year. The parent company operates across a wide range of industrial and service sectors in eight business lines, and has investments in 21 countries.

Under a notification published by the Ministry of Public Health, hemp can be used as an ingredient in food products, including breakfast cereals, bakery products, beverages, snacks, butter and food supplements. Hemp seed and hemp seed protein can be used in supplements and hemp seed protein powder with a maximum THC limit of 2mg/kg and CBD at 3mg/kg is permitted under the rules.

### Legal considerations

Another leading Thai company, publicly traded DOD Biotech, said it is developing supplements and skincare products with hemp, partnering with leading retailers including Rojukkiss International Beauty Community, and 555 Shopping Company. Manufacturers in Thailand can produce and sell cosmetics with hemp seed oil or hemp seed extract if they do not contain more than 0.2% THC by weight.

Specifically, Thai law allows the use of cannabis stalks, stems, fibers, branches, roots, seeds, seed oils & extracts, and leaves, but prohibits the use of flowers ("tips and inflorescences").

Thailand's general cannabis law as it affects investment, sales and imports is highly restrictive. Cannabis permits in Thailand are granted only to the government and its partners, and hemp products cannot be imported for a period of three years.

The Thai FDA is also pushing to have cannabis included on the National List of Essential Medicines.

“Both consumers and industries don’t yet know what hemp can do in terms of sustainability.”

— Yosuke Koga, Director Prossimo

## In Japan, ‘a whole lot of room to fill’

**INTERVIEW:** Yosuke Koga is Director at Japanese hemp company Prossimo, which is developing a broad portfolio of hemp-derived products and recently embarked on retail operations in CBD and hemp footwear. An entrepreneur and researcher, Koga previously worked for Notomi Hospital in an initiative to introduce cannabinoid therapy to Japanese medical society. He is also Editor in Chief of HempToday Japan.

**HempToday:** There seems to be some recent movement on cannabis issues in Japan. What does the current landscape look like?

**Yosuke Koga:** First of all, Japan is an extremely conservative and bureaucratic society. Drastic social change regarding such things as cannabis requires a lot of time and work. There’s some schizophrenia right now. First, thanks to the internet, interest in cannabis and hemp is growing rapidly because people are now getting real information. Younger generations are less biased. The Ministry of Health and Labor is currently having a series of meetings about cannabis, which includes considering the approval of Epidiolex as a prescription drug. This is a good sign.

At the same time, law enforcement is pushing really hard on cannabis arrests because they are aware of the global trend toward liberation of cannabis; they

are afraid of losing their power over it. The number of arrests for non-violent cannabis possession was at a record high last year in Japan. Also, at the current Ministry meetings, which look positive for medical cannabis, they are at the same time talking about making cannabis use a crime (currently, only cannabis possession is a crime). Unfortunately, it seems like this further criminalization of cannabis was predetermined because the meetings are hosted by the Narcotics Control Department (Japanese DEA). Law enforcement is putting a lot of pressure on these meetings.

**HT:** What can you say about the status of CBD in Japan?

**YK:** Of course CBD is leading all hemp sectors, and the market will continue to grow. A few years ago there was only a handful of CBD brands in the Japanese market. Now there are more than 100. Introducing CBD into cosmetics, food and beverages has just started. There is a whole lot of room to fill, with no doubt.

But due to the lack of well established regulations, the future of the CBD business in Japan is a bit uncertain. At Prossimo, we’re mitigating risk by not depending on CBD sales too much. Still, we need to keep raising awareness about the CBD sector, and that is the reason why we started our CBD bar.

**HT:** Which are the most promising sectors for hemp products in Japan. How do you expect the introduction of hemp-based products to proceed?

**YK:** It depends on what time frame you are talking about. CBD is the king so far, but other sectors will rise soon. We expect there will be a huge demand for bio-based plastic and natural fibers. Unfortunately we are the second largest plastic waste producer in the world. We love plastic too much, and we are facing the consequences of our actions. That can be said about fiber as well. Japanese are fashion animals. We are responsible for a whopping 1 million tons of annual fashion waste. Our fashion industry is facing a big challenge in switching from cotton to materials with lower environmental impact.

**HT:** How does hemp figure in Japan’s goals for the environment?

**YK:** Both consumers and industries don’t yet know what hemp can do in terms of sustainability. Japan is way behind the rest of the world in dealing with environmental issues. The government has just become aware that any kind of product development doesn’t make sense without Sustainable Development Goals in mind. Here’s the most promising signal: We are getting more and more inquiries from industries such as construction and

textiles about how to switch their materials from petroleum-based sources to hemp.

Recently China stopped importing plastic waste from Japan. We are not capable of recycling all of that plastic waste, so we are simply burning 70% of it now. Bio-plastic with a low carbon footprint will be much needed throughout the society sooner or later.

**HT:** Prossimo seems to be looking into all things hemp. Tell us how the company got its start.

**YK:** We are strong believers in a “media first” strategy. We joined the HempToday franchise in 2017. The strategy was to provide hemp related information in Japanese in order to educate and bring in stakeholders from other industries that can use hemp. We believe that’s the foundation for expanding the hemp industry overall, and that’s been our goal from the very beginning.

Our strategy put us into a unique position as the hub for the industry, and started a constant flow of inquiries and interesting contacts. We have been running the media for three years, and established great relationships with people in the industry. Now we have entered the retail and wholesale business with their support.

**HT:** What’s the next big thing for Prossimo? What is front-and-center with you now in your role as Director?

**YK:** More generally, we are building out a broad portfolio, from raw material to final products such as CBD and hemp shoes, our most recent ventures. Prossimo is getting serious inquiries about quality cottonized-hemp fiber from some major apparel companies. They are eager to find someone who can supply them, so we are pursuing the possibilities there. At the moment, running the Bohempia retail store smoothly is also a major priority.

We will continue to move up the supply chain, connecting companies and people inside and outside of the hemp industry, and working together in R&D. As soon as the COVID-19 lockdown is lifted, we will team up with farmers, processors and material manufacturers to help develop new products.



Science & Technology Minister Fawad Chaudhry

## Pakistan sees a hemp future in high-tech farms, biotechnology

**H**emp can play a key role in Pakistan’s future, which depends on the development of the technology and biotechnology sectors, according to Federal Minister for Science and Technology Fawad Chaudhry.

The government envisions high-tech farms focusing on non-traditional agriculture including hemp, which can be a replacement crop for cotton in Pakistan’s textile industry, and has said it hopes to capitalize on CBD production and by turning hemp fiber residue into bio-energy.

In government efforts to revive manufacturing, “it is important to keep an eye on technological advancements besides observing which businesses have a good scope in the market and which are getting obsolete,” Chaudhry said recently in comments marking the launch of a new app and website for the Lahore Chamber of Commerce.

**\$1 billion market?**

Pakistan approved hemp farming and processing under government control last September, suggesting the sector could result in a \$1 billion market over the next three years. Farms for cannabis production are being established in Jhelum, Peshawar, Chakwal and Islamabad.

The government has said hemp can be a sustainable replacement for cotton production, which is in decline in Pakistan; the country was once the fourth biggest cotton producer in the world behind China, India and the USA, and the world’s largest exporter of cotton yarn. Pakistan’s farmers are shifting from cotton to other crops due to low prices and a lack of high-quality seed. Growing hemp for textiles is an obvious alternative, the government suggested.

A first hemp license in Pakistan has already been given to Ministry of Science and Technology and the Pakistan Council of Scientific and Industrial Research (PCSIR) to analyze such things as local cultivars, plant chemistry, and potential industrial and other applications. “Things can’t really move forward unless proper rules are defined,” said Muhammad A.

Qayyum, an adviser to the Pakistani government, and a director at Medics Laboratories Pvt. Ltd., Karachi, a producer of herbals and nutraceuticals.

With the obvious first business being in CBD imports to Pakistan, Qayyum said for that to happen:

The Ministry of Narcotics must remove the word “hemp” from definition of “narcotics” or define it separately as “industrial hemp.”

CBD must be declared a non-controlled substance or given permission for import under specific conditions, and customs informed that CBD is not a controlled substance.

Specific rules for the import of CBD need to be established.

The Drug Regulatory Authority of Pakistan must give market authorization for CBD products either as a pharmaceutical, herbal or nutraceutical product.

**Investor signals**

Not much progress is reported yet regarding rule making needed to set up the hemp industry in Pakistan, where such processes tend to unfold slowly. Nonetheless, key strategic licensee PCSIR likely already is moving forward asking for expressions of interest from the private sector. And foreign companies are already taking notice of developments in Pakistan.

One early mover is Australia-based nutraceuticals maker Creso Pharma Ltd., which recently announced a distribution agreement with Route2Pharm Pvt Ltd, Lahore. Route2Pharm is reported to be pushing hard for approval of CBD in Pakistan itself, but the company’s agreement with Creso goes beyond Pakistan to include Cambodia, Afghanistan, Azerbaijan, Bangladesh, Georgia, the Maldives, Myanmar, Tajikistan, Turkmenistan, Uzbekistan and Vietnam – markets totaling a population of 750 million.

Pakistani Prime Minister Imran Khan’s government has pushed for development of a cannabis economy as one way to improve Pakistan’s foreign exchange position amid the country’s economic challenges.

### Pakistani mills begin production of hemp/cotton fabrics

Three Pakistani textile makers say they have begun producing new denim fabrics blending cotton with hemp. Artistic Milliners (AM), Karachi; US Denim, Lahore; and Farooq Spinning Mills, Faisalabad, all say they have embarked on denim production that incorporates hemp, according to South Asia Investor Review.



AM's IntelliJeans collection features cottonized hemp sourced from China for now. The line is being marketed as both sustainable and naturally antimicrobial. A global conglomerate that originated as a vertically integrated denim manufacturer, Artistic Milliners operates a consumer experience center in Dubai and an innovation incubator in Soho, New York City, as well as a manufacturing facility in Los Angeles. US Denim is a fabric mill supplying denim

to the fashion industry through partnerships with such leading international brands as Levi's, H&M and Marks & Spencer. Its collections focus on sustainability and feature recycled and biodegradable fibers such as hemp. Other products use recycled cotton, elastane and polyester; aniline-free dye; and water-safe dyeing methods.

### Tasmanian crop destroyed after Chinese seeds top 1.5% THC

A Tasmanian hemp farmer destroyed his entire hemp crop after seeds he planted from China went beyond Australia's legal THC limit of 1.0%. Farmer Tim Schmidt said the plants expressed 1.5% THC when tested. The same variety of seeds planted by the company last year produced plants within the 1.0% THC limit, said Konrad Chung, a consultant assisting Schmidt. Chung said weather and genetics may have played a role in the plants exceeding the limit. Schmidt, who is also President of the Tasmanian Hemp Association, estimated his losses at about AU\$5,000 (\$3,800).



### Fiji government adopting hemp-only cannabis strategy

Fiji intends to take a hemp-only approach to cannabis, Attorney General and Minister for Economy Aiyaz Sayed-Khaiyum has told the country's parliament.

The government said it has already started a study aimed at developing hemp as an agricultural crop throughout the archipelago under funding in the 2021-2022 budget.

Sayed-Khaiyum said the strategy specifically does not include growing high-THC recreational marijuana or cannabis for medicinal purposes. Rather, the program will focus on producing products from hemp fiber, such as rope, and seed for food.

The government hopes development of a hemp sector can eventually replace a fast-growing trade in illicit marijuana, Sayed-Khaiyum said. The Fiji Police Force in 2020 seized marijuana plants with an estimated street value of more than \$321 million. That's up from \$68 million in 2018.

### Thailand sets rules for seed oil and extracts in cosmetics

Under Thailand's most recent refinement of hemp rules, manufacturers can produce and sell cosmetics with hemp seed oil or hemp seed extract if they do not contain more than 0.2% THC by weight, according to the Ministry of Public Health.

Producers are banned from using brand names and marketing images associated with hemp flowers or narcotics. Brand names containing "inflorescence," "flower," "CBD," "THC" are specifically not allowed. The FDA is to approve or deny applications within three days of filing.

To register hemp-containing cosmetics products with the Thai Food & Drug Administration (FDA), applicants must indicate the amount of hemp seed extract or hemp seed oil used in the product, and submit a certificate of analysis, safety data, and a sample label for the agency's review.

### India's BOHECO to supply food, fabric to Australia's SSA

Bombay Hemp Company (BOHECO) of India will be an exclusive supplier of its products to Spring Sciences Australia Pty. Ltd. (SSA) under a cooperation agreement.

BOHECO products will be marketed under the SSA brand, and the partners are to explore establishing an R&D platform to make new products for both the consumer and pharmaceutical markets, the companies said. The deal also involves BOHECO's hemp-based textiles.

SSA, part of the Michigan, U.S.-based Spring Sciences Group, said it is licensed by Australia's Office of Drug Control to cultivate and manufacture medical cannabis products, and is working to establish a network of medicinal cannabis growing and manufacturing facilities in Queensland, Australia.

BOHECO makes hemp hearts, hempseed oil and hemp protein powder, as well as hemp fabrics and a clothing line.

### Chinese foodmaker says it has 'elevated' CBD extraction tech

Chinese foodmaker Chenguang Biotech Group Co., Ltd. said it has reached elevated extraction yield levels that give the company a significant edge in the production of CBD, allowing it to make margins even at current low prices.

Chenguang claims output from its extraction operations is significantly greater than that of its peers, leading to cost advantages that are allowing the company maintain sound profitability despite estimates that CBD has dropped in price from ~\$6,000 per kilogram to ~\$1,000 in the past 18 months. Further planned expansion is expected to lead to even greater efficiency gains, the company said.

Long-term investment in raw materials research, and internal development of core plant extraction technology give the company a decided edge in global markets, where Chenguang has experience in overseas factory management. The company said it maintains robust monitoring of hemp markets around the world, and constantly tracks regulatory policies.



### Japanese hemp firm opens shop selling Bohempia shoes

Japanese hemp company Prossimo has opened a boutique retail outlet under Bohempia, the Czech shoe brand, and an adjacent HempToday Japan-branded CBD bar. The shoe store and CBD bar are located in Fukuoka, the capital city of Fukuoka Prefecture on the northern shore of Japan's Kyushu Island.

A consultancy and trading company, Tokyo-based Prossimo started selling Bohempia shoes online last November, and has already completed one wholesale deal as it works to set up national distribution for the brand. The Fukuoka store is to serve as the flagship for an eventual chain of Bohempia shops in Japan, the company said.

Bohempia, based in Prague, makes sustainable hemp shoes, apparel and accessories in craft workshops in the European Union. The company also has distribution in the USA through Cannabis-Now of Los Angeles.

# If the language is hemp, we've got it covered.



### Shenzhen Datong introduces diapers from hemp paper

China's Shenzhen Datong (Datong) has developed a range of diaper and feminine hygiene products as the company gears up a full industrial supply chain for hemp paper based production. Datong debuted the new products at the recently held 21st CBME Maternity, Infant and Child Exhibition.

The products were developed at Datong's research institute where applications for hemp textiles, CBD and other hemp-based products are being studied.

Shenzhen Datong has established production operations and extensive sales assets to market its products and services. The vertically integrated company has divisions for cultivation, extraction and research & development in addition to its several lines of production.

Datong also makes functional skin care products, pet products, health foods, functional foods and beverages, and offers hemp genetics for medicine and food. The company launched a series of CBD-based cosmetics last October. Its textile division makes towels, T-shirts, underwear, socks and golf attire.

Datong, which is listed on the Shenzhen Stock Exchange, also develops blockchain technology, and offers financial and big data services.

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Africa

# South Africa looks to 2023

## Master Plan follows the government's industrial strategy to develop public-private partnerships

South Africa could have a hemp program in place by 2023 under the country's draft National Cannabis Master Plan (NCMP), which sees the plant as a potential economic driver that can lift up small-scale growers from poverty stricken areas of the country.

The master plan is underpinned by the "Re-imagined Industrial Strategy" of President Cyril Ramaphosa's government, an initiative that promotes industrial development of the country with a specific focus on public-private sector partnerships.

The NCMP sets out eight pillars necessary to support the emerging legal cannabis economy, and serves as the framework for a legislative initiative covering both industrial hemp and marijuana under oversight of the Department of Agriculture, Land Reform and Rural Development.

The much anticipated plan follows a number of studies going back two decades in South Africa that showed the domestic cannabis industries can thrive if current legal restrictions can be amended or removed altogether.

### Landmarks

The release of the NCMP follows the government's rescheduling of CBD and THC in May 2020 through the amendment of previous drug laws, and exemption of industrial hemp from medical control under a (relatively low) 0.2% THC guideline. Those changes came after a landmark Constitutional Court judgment in September 2018 that ruled the use, possession and cultivation of cannabis in private dwellings for personal use was not illegal and should be allowed in South Africa.

The draft NCMP was leaked a few days before a recent virtual workshop

that attracted more than 300 stakeholders at the end of March. Though the plan has been lauded as progressive in many ways, some have criticized the late start of public participation in drafting the much anticipated legislative guidance.

"While it is great to see that the different departments have come together to make some progress towards enabling legislation, I feel it would have been much better to properly engage the industry sector experts and civil society earlier on as there are some issues that have been glossed over or missed entirely," cannabis activist and businessman Tony Budden of Cape Town-based Hemporium told HempToday.

"It is progress though, and hopefully will bring us closer towards seeing sustainable cannabis industries in South Africa," Budden added.

The NCMP suggests the country achieve three key things by 2023: Declare hemp as an agricultural crop; make

amendments to the Drugs and Drug Trafficking Act; and develop new policy and legislation for the commercialization of hemp and "dagga" (the colloquial term for marijuana).

"With South Africa's economy facing sluggish growth and society facing the impacts of COVID-19, the commercialization of cannabis (can have) a net-positive impact on the country by potentially creating new jobs," the plan says. The government estimates that the cannabis industries can create up to 25,000 jobs and generate \$1.9 billion in revenue per year.

"Enterprise and supplier development are important in terms of ensuring sustainable growth and development of the cannabis industry," the plan suggests, envisioning the formation of cooperatives of small farmers that can participate in the larger cannabis value chain.

### Market potential

With current net imports, South Africa is a proven market for hemp products, the plan notes, suggesting the growing demand for locally-produced hemp products can be met by domestic companies

## Pillars of South Africa's Cannabis Master Plan

Among other key considerations, South Africa's National Cannabis Master Plan calls for:

- "Communicating a clear and unambiguous message about the cannabis industry and related matters to all stakeholders and the general public. The core messages will be around demystifying some of the negative perceptions about hemp, dagga (marijuana) and their products."
- Investment from the government, state-owned companies and the private sector in manufacturing facilities for food, medicine, beverages and other value-added products.
- Support for research and development through the Indigenous Knowledge-(IK) Based Bio-Innovation Programme, which comprises science councils, universities, partner government departments, traditional health practitioners and rural co-ops.
- Establishment of incentive programs and other support from government departments and financial institutions, including grants, soft loans and blended financial instruments to support growth and development.
- Establishment of formal and informal training in cannabis cultivation practices, manufacturing, product development, marketing and other related skills.
- Setting up Master Plan Task Teams which will be responsible for implementation of various aspects of the NCMP.
- Establishment of provincial cannabis committees to provide local support.
- Establishment of an industry association to coordinate matters relating to the hemp industry on behalf of all stakeholders.

on a lower cost structure, which can also enhance the country's export possibilities.

But the legal status of hemp needs to be sorted out in order to unlock the full economic potential of the industry, the plan says, calling on government departments to enact amendments to existing laws that prohibit hemp production.

"It is important to establish a new legal regime that must be clear to the general public, industry stakeholders and law enforcement agencies, with enforceable rules" the plan suggests. "This includes amendment of existing legislation by removing existing constraints that are hindering commercialization."

The plan also admits other challenges, including the lack of manufacturing capacity, limited investment in R&D, and a highly fragmented market. High entry barriers are also highlighted as a big challenge within the South African context, as well as, according to the government, the "threat of takeover by big corporations and pharmacy groups with big money."

### Seed is critical

The NCMP notably emphasizes devel-

opment of cannabis seed genetics. Observing the lack of a formal seed supply system, the plan suggests South Africa's Agricultural Research Council (ARC) and other research organizations expand breeding programs for new marijuana and hemp cultivars. ARC will be responsible for researching native land races, and for importing and trialing potentially suitable cultivars from other countries before they are released for use in South Africa.

Managing cultivation seed is critical to overcoming the current grey market in which growers are at risk of being sold poor quality seed with low germination percentages, the plan points out. The current market status "creates a regulatory challenge in that it is virtually impossible for the government to regulate and guarantee the quality of seed that is traded."

The NCMP recommends a compulsory seed regulatory system in which permits are issued for breeding, multiplying and sales of cannabis planting seed, and a system to track those seeds through the value chain.

In management of cultivation seeds, the plan suggests development of import and export control systems and protocols; that all marijuana and hemp cultivars undergo testing to ensure their distinctiveness, uniformity and stability before they are released for sale on the South African market; and that seed destined for both domestic and export markets be tested for quality and viability.

To this end, the national plant breeders act has already been amended to include hemp and open the market for approved varieties, according to Thabo Ramashala, director of Plant Production at the Department of Agriculture, Land Reform and Rural Development.

### Other considerations

Though having had a hemp program since 1999, South Africa has failed to make needed amendments to the laws or establish any meaningful hemp industry, with the police often violently persecuting indigenous cannabis growers. Now it seems the government has a fresh approach to the plant, and intends to celebrate and actively build the "entire" South African cannabis value chain. The government has even hinted at the protection of the word "dagga," using appellation of origin legislation.

Though the master plan has only started the public participation phase, it is hoped that with further public participation the NCMP will be even more progressive and the government will emerge as a key enabler of the South African Cannabis industry.

— With reporting by Arne Verboef

# A need for expertise, and money



Malobi Ogbechie, PHA founder

‘We’ve got a lot of land, and a lot of good weather’

**A**frica can build a hemp industry based on locally owned and operated supply chains, but the continent’s many diverse nations need expertise and investment from abroad, a newly organized PanAfrican Hemp Association (PHA) has suggested.

As governments across the continent expand legalization of cannabis in some form, and investments begin to flow into African cannabis operations, the excitement isn’t all about marijuana, said Malobi Ogbechie, founder and Managing Director of the recently launched association, based in Lagos, Nigeria.

“I know through speaking with different African stakeholders that the most excitement is for the industrial properties – using hemp fiber, using hemp in construction, in the automotive and textile industries,” Ogbechie said.

#### Who will invest?

While the U.S. and European countries can surely provide expertise – and markets – for African hemp companies, it’s yet unclear who will invest the intel-

lectual capital and financing the industry needs to develop in Africa.

“There’s a lot of expertise and investment reaching out from North America, and there will be close ties to Europe because of the proximity to market and shared time zones,” Ogbechie said.

“If Africans are not going to build the industry, someone else is going to. If the diaspora is not going to invest in Africa, someone else will,” said Ogbechie. “Obviously China is dominating the market, so in terms of machinery, seed supply and knowledge, there will be a lot of collaboration. We’re not necessarily averse to it.”

The new association hopes to build a strong industry framework that’s nimble enough to be able to respond to the diverse needs of Africa’s many, varied markets. “Things work differently in Africa, and each country has its own laws and ways of doing things,” said Ogbechie.

#### Africa’s edge

From genetics and farming to processing and innovation, African hemp growers will need a lot of help to get the

industry going. But the continent has significant advantages. “We’ve got a lot of land and a lot of good weather,” Ogbechie said. “And the great thing about Africa is that we can skip a lot of steps. We can jump directly to solutions that have been proven to work. This means our industry is going to go from zero to 100 very quickly.”

#### Development boom

With Africa experiencing an overall development boom – six out of the top 10 leading high growth countries are located on the continent, according to the International Monetary Fund – Ogbechie and others like him see hemp as a tool to develop even faster, but more sustainably.

“It’s the environmental aspects and the versatility of the crop, the fact that it’s sustainable and that a single plant can provide so many end-products. It has the potential to industrially transform economies,” Ogbechie said.

Ogbechie said it was seeing the value of formal hemp associations in the UK, Europe and North America that inspired him to start the PHA. “They bring a lot of value to their industries, and we’re going to need similar structures and good organization if we are going to do hemp in Africa,” he said.

But the PHA doesn’t simply want to replicate how others are doing things, or even define itself pre-emptively. “On the one hand we’ve got the structure of an association, but because the association is in its infancy, we want to stay open, we want to stay flexible and we want to understand the different needs of countries, and the needs of particular businesses or projects,” said Ogbechie.

#### International outreach

PHA is hoping to develop relationships in African nations, but also abroad. “We’re looking for international partners and educational institutions, hemp companies, cooperatives and consultants,” Ogbechie said. “We get a lot of requests for technical expertise and guidance and would love to add them to our database”

The young association is already active, holding group chats and hosting webinars as it tries to connect interested parties to hemp projects. Ogbechie said the next year will see a push to expand membership, which is open to anyone with an interest in the African hemp industry. Interested parties can join for free online.



# Zimbabwe shifts gears

Government abandons state monopoly to drive investment

**O**fficials in Zimbabwe say changes that loosened rules for cannabis production have translated into initial investment interest from Canada, Germany and Switzerland, as it awarded 57 licenses for medical marijuana and industrial hemp in September 2021.

Scrapping regulations that would have put all cannabis under state ownership, the government says, will let private players begin to develop hemp as a replacement for the country’s falling tobacco exports.

“It’s most relevant now considering the threat that the tobacco industry faces and knowing very well that Zimbabwe heavily depends on tobacco production,” said Zorodzai Maroveke, who heads the Zimbabwe Industrial Hemp Trust (ZIHT), a development initiative set up to assist farmers in starting up hemp operations, and to look for new export markets for their hemp outputs.

#### Looking for alternatives

“Our economy has to start looking for alternatives. And I think industrial hemp tops the list,” said Maroveke. “It’s a green crop and there is a lot of social impact

in comparison to tobacco. I think in ten years you will see the value chains that will come out of this sector are way more than tobacco.”

Zimbabwe is Africa’s largest tobacco producer, but the country has seen that sector shrink in light of global trends away from smoking. That has contributed to stagnation which has beset the country’s economy for nearly two decades despite the African nation’s vast wealth of natural resources. Tobacco makes up roughly 20% of Zimbabwe’s exports.

The government had said it intended to manage Zimbabwe’s hemp industry under state ownership when it embarked on hemp trials two years ago. But it has now abandoned that strategy to encourage private investment in hemp and medical marijuana, the only subsectors in which operators can open legal businesses under the country’s cannabis laws.

#### Licenses and leases

Zimbabwe, which recently began awarding licenses and providing 99-year leases on state-owned farms to kickstart cannabis farming, harvested its first crop of legally cultivated industrial hemp in February 2019 after decriminalizing

cannabis growing in 2018. Regulations to guide the industry were released in October 2020.

“Zimbabwe has gone a little step further to show that it is willing work with its partners and investors by coming up with an investor agreement which further protects you against anything like expropriation and change or changes in law, which is quite great,” said Tino Kambasha of the Zimbabwe Investment Development Agency.

#### High risk investments

Despite those policies, businesses operating in Zimbabwe face high legal risks, limited access to international capital markets, foreign currency shortages and significant challenges repatriating profits, according to groups that monitor the investment environment.

Such groups also report that market volatility makes most transactions highly time-sensitive, especially those involving domestic currency conversions. High operating costs due to infrastructure gaps, electricity interruptions, onerous taxes and expensive financing costs are also cited as challenges to doing business in Zimbabwe.

# Ghana policymakers call for rules that favor local investors

**P**olicymakers in Ghana should implement hemp rules that favor local investors and farmers under a well-equipped agency that will spearhead production and research into developing the sector, Chinese researchers say in a new paper.

The conclusions were reached in “Industrial hemp as an agricultural crop in Ghana,” a study by researchers from the Zhongnan University of Economics and Law published this month in the *Journal of Cannabis Research*.

The paper, which looks at the economic prospects of industrial hemp, suggests that the legislation passed last year can pave the way to a new agricultural cash crop for Ghana’s farmers. Notably, the conclusions of the Chinese researchers differ from earlier studies that discounted hemp’s advantages by primarily arguing against the general legalization of all cannabis on narcotics grounds.

## Applications limited

Ghana’s Parliament last spring passed a law that legalizes the use of cannabis for health and industrial purposes but gave the country’s Narcotics Control Board (NA-COB) oversight of industrial hemp. The legislation allows for industrial and medical purposes only, and draws the line between marijuana and hemp at 0.3% THC.

Applications of industrial hemp such as biofuel and construction might not be currently feasible in Ghana due to technology disadvantages, the report notes, but the country can nevertheless grow hemp as a raw material for export and make some semi-finished products for the domestic market, the report suggests.

While CBD is presumably not legal over the counter as the law reads, the report nonetheless suggests that “the legalization and commercialization present a new opportunity for the Ghanaian pharmaceutical industry to research into CBD and possibly produce CBD-related drugs for the local market.” Also, herbal medicine producers should explore the potential of hemp for medicinal and therapeutic products, the report suggests.

## Reviving textiles

Hemp could also revive Ghana’s flagging textile industry, which has tailed off in recent years, according to the Chinese researchers. That means an opportunity for fiber hemp as a rotational crop, the report suggests.

“The introduction of textiles made from hemp, which is gradually gaining popularity



in the modern fashion industry, will likely increase the prospects of the struggling textile industry. Therefore, legalization and commercialization provide new opportunities for farmers and hope for the textile industry,” the report notes, also mentioning the specific possibility that hemp fiber can be turned into materials for acoustic absorption.

## Other observations from the report:

- Licensing fees should be flexible and in a framework that will allow local entrepreneurs to get a foothold in the hemp industry first. The report suggests that Ghana avoid rules such as those in Lesotho, through which only big corporations can afford licensing fees that can reach as high as \$37,000. Hemp fees in Ghana should be suitable for small-scale farmers.
- The legalization and commercialization of industrial hemp can create significant new foreign direct investments for the country.
- Hemp can play a role in transforming Ghana’s economy from one that is foreign aid-dependent to one that is self-reliant and investment-driven – the overarching goal of the Ghana Beyond Aid agenda which has had success with some automobile giants such as Volkswagen and Nissan, which have set up assembly plants in Ghana. That kind of development can be replicated in the cannabis industry, the report implies.
- Ghana has climatic and soil conditions well suited to the production of industrial hemp. Despite the technological challenges faced by the country’s farmers, agriculture makes up about 20% of Ghana’s GDP.
- Established institutions such as the Planting for Food and Jobs program launched in 2017 to modernize agriculture, create jobs and reduce poverty could serve as the framework for research into development of the cannabis sectors.
- Ghana should engage in knowhow partnerships with institutions in China, Canada and the USA that already have experience in hemp production.

## In brief

### Malawi stakeholders envision hemp as leading export crop

Proponents in Malawi have said hemp alone has the potential to surpass earnings from tobacco, the country’s main export crop. “This would certainly help to boost the economy of the country,” said William Mumba of hemp company M’mbelwa Investment Ltd.

Malawi’s Parliament approved the Cannabis Regulation Bill in March 2020, legalizing the cultivation, processing and marketing of industrial hemp, and setting the allowable THC level at a full 1.0%. The bill was widely backed by legislators who hope it will spur economic growth in the country.

But farmers have struggled with the government over the slow rollout of hemp licenses. One group of farmers, mostly from Mzimba in northern Malawi, say they have invested more than \$1.5 million in preparation for hemp farming.

Farmer Martin Kumwenda wondered why an initiative conceived by the government itself was also being hindered by the government.

“We were asked by the same government to get organized to grow cannabis. We underwent trainings, paid license fees and got down to prepare land. We are very concerned that government does not mind the time frame that was agreed upon,” Kumwenda said.

### Lesotho company says it has license to export to EU states

MG Health said it is the first African company to receive a national license to export cannabis flower, oil and extracts as active pharmaceutical ingredients to EU member states after meeting good manufacturing practice (GMP) standards. GMP guidelines set minimum quality and safety requirements in the licensing for sales of food and pharmaceutical products.

MG Health’s portfolio includes those with concentrations of THC and CBD, including dried biomass raw material, trimmed flower, CO2 extracted crude oil, and winterized crude oil.

While the export authorization opens doors to business across the EU and other international markets, MG Health said it will first concentrate on opportunities in Germany, Europe’s biggest market for CBD. The company said it has also received inquiries from France, the UK and Australia.

MG Health employs 250 people at its 5,000 sq meter, \$23 million growing and processing operation in the mountain region just outside Maseru, Lesotho’s capital. Nthabeleng Peete, MG Health’s community liaison manager, said the company hopes to eventually increase its workforce to 3,000, which is almost the entire population of the village where the company has its processing facility.

“We are sitting in a rural area where there is hardly any income. More business for the company will create a knock-on effect on the locals too, because we also acquire some products and services from the villagers,” said Andre Bothma, MG Health’s CEO.

Lesotho was the first nation in Africa to license the growing of medical cannabis in 2017. The crop is widely produced in the country, although cannabis possession and use is illegal.

### Zambia government says two bills can give hemp a kickstart

The government of Zambia has passed a bill to legalize hemp. The measure calls for establishment of licensing for farming, processing, storage, import/export and distribution of hemp, and provides for regulation of hemp research. A second cannabis bill, which also passed, will establish a similar framework for marijuana for medicinal, scientific and research purposes. The government said both sectors could be a boon to Zambia’s economy.

## Machines & Technology



# Hanf Farm’s drive for efficiency

## Multi-cropping combine adds technology that strips plant tops

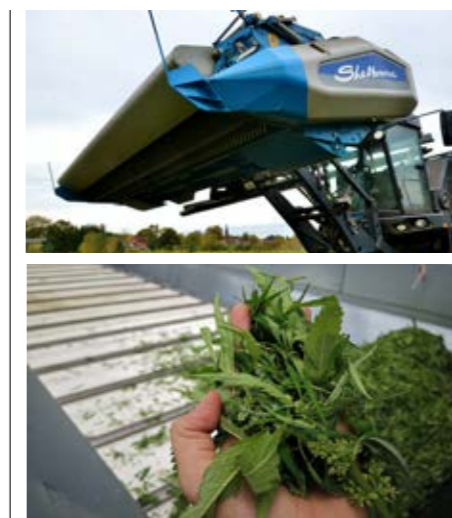
**G**ermany’s Hanf Farm GmbH has added new technology to its **Multi-Combine HC 3400**, incorporating a stripper into the highly flexible hemp harvesting ensemble which has been crawling European hemp fields since 2015.

The new attachment means even greater efficiency for farmers growing hemp plants on a massive scale, incorporating a critical step in the production of seed, leaves and flowers to field operations.

“This is the next logical step in the development of our harvester,” said Rafael Dulon, Hanf Farm’s CEO, who has been working on solutions for the complicated challenges of large-scale hemp crops for over a decade.

## Loss-free operation

The self-contained MC HC 3400, which has a ground clearance of 1.60 meters, can lop off plant tops several times during the yearly vegetation cycle, employing precision double-knife cutters and a lift system which adjusts the harvester to plant height. With the new add-on, plant tops are now stripped before being gently carried to the bunker by a conveyor, ensuring loss-free operation



The new stripper unit (above); plant tops after passing through the new attachment.

of contractors and suppliers in 2014 to develop a prototype forerunner to the MC HC 3400. By August 2015 the company completed its initial working model, which was employed during harvest that year. Dulon’s team has continually upgraded the machine, but the addition of the stripper is a critical advancement.

“There’s no question that as the industry matures and becomes more competitive, we must continually develop solutions that are more and more efficient,” Dulon said.

## ‘Dedicated to good practices’

Hanf Farm, which is mainly a hemp food ingredients producer, gets its raw, organically grown plant material primarily from fields in ecologically managed areas near its farming and processing complex in Melz, about 1.5 hours north of Berlin. The company has been certified organic since the very first days in the nineties and stands for absolute transparency in all production steps. All products can be traced back to the field where they were produced.

“We are totally dedicated to agricultural good practices that demonstrate our commitment to the environment and to humanity in general,” said Dulon.



# Mastering the stalk

Portable decorticator finds niche among researchers, builders

Industrial Hemp Latvia (IHL) is finding success with its [HurdMaster 1000 Micro Decorticator](#), recording sales in North America and Europe over the past 12 months as demand for hemp hurd and fiber picks up.

A small-scale processing unit designed by IHL founder and entrepreneur Kristaps Eglitis, the MD 1000 is designed to process stems from conventional hemp stalks. It is intended for farms of 2-5 hectares (about 6-10 acres), small-scale processors, hempcrete self-builders, hempcrete building teachers, research programs and innovative entrepreneurs.



Kristaps Eglitis

## Research tool

The machine separates the hemp stalk's woody inner core (hurd, shivs, shives) from the exterior bast fibers. The resulting hurd can be used for hempcrete construction, as animal bedding and animal litter, or as plant bedding. With additional technology, the separated bast fibers can be further processed for a wide, wide variety of applications, from insulation to textiles.

Eglitis has already sold a number of

machines in the USA, most recently shipping a unit to Cornell University, home to one of the USA's most prestigious hemp research programs. Cornell researchers will use the MD-1000 in their study of fiber processing and applications.

Eglitis designed the HurdMaster with help from a student at Latvian Technical University after intense research on decortiation technology. He eventually bought an old decorticating machine and studied its components as a part of the

design process.

IHL is collaborating with Peruza, a leading maker of technology for fish processing, developing engineering enhancements that will reduce the HurdMaster's weight while boosting efficiency.

## Separator in works

The partners are also working on a separator that will sort the hurd from the fiber, which is expected to be ready soon

The current (third) iteration of the HurdMaster MD 1000 features several upgrades that result in better quality shivs, cleaner fibers and increased capacity:

- An upgraded, rugged grinding process to make the machine capable of processing green stalks.
- Boosted engine power, thereby increasing throughput volume.
- Anti-"twining" technology that prevents fibers getting caught in the roller mechanism.

The HurdMaster MD 1000 is the smallest possible machine that can process 50 kg of hemp stalks into: 10 kg hurd/hr; 10 kg fiber/hr; 10 kg waste/hr; hurd 5-30mm long for hempcrete, animal bedding and plant bedding.



Heinrich Wieker



Front-mounted, the HHH 700 can harvest hemp continuously in the field.



Semi-stationary mode in which the machine is repeatedly repositioned.



Stationary operation indoors.

# Technology that goes for the bud

German flower harvester surpasses €1 million mark in sales

Germany's HHH Hemp Harvesting Technology (HHH) surpassed €1 million in sales in its first full year on the market, finding customers abroad in Canada, the United States, South Africa, Lesotho and Uruguay. As of mid-September, the company had shipped 25 units of the specialized [HHH-700 harvester](#), patented technology that renders flowers as if they were hand-picked.

In Europe, HHH has sold units in Germany, Austria, Switzerland and Slovenia. The company addressed demand last year in the U.S. and Canada, where it signed on North American distribution partner Craftfarma, Vancouver Island, British Columbia. HHH has also picked up sales representation for Uruguay and Paraguay, and is pursuing arrangements to serve other Latin American and African markets.

## Slashes costs

The HHH-700 cannabis flower stripper, which can drastically reduce costs compared to traditional hand harvesting, is being taken up both by growers in CBD hemp and marijuana, said Heinrich Wieker, CEO at HHH and the developer of the harvester.

Wieker said cost analysis of field work

proved the company's HHH 700 model reduced labor costs by 73%, and trimmed work staff from 15 to only 4 workers required to run the harvester in "semi-stationary" harvesting.

The data is based on field work in which a team of operators collect and then hand feed bushy plant stalks into the harvester's stripper mechanism as a tractor moves the unit from one spot to the next.

## Highly flexible

Highly flexible, the HHH 700 can also operate stationary in farm buildings for indoor and greenhouse growers, and can be front-mounted to a tractor to collect flowers from conventionally planted, straight-stem industrial hemp varieties while running through the field.

The machine gently detaches cannabis flowers from the stalk and stems by a patented stripping mechanism. The flowers can be collected in a bag or container. In field operation mode for harvesting traditional hemp plants, the hemp stalks are left in the field for retting. Depending on plant maturity at the time of harvesting, it's also possible to shake out the seeds.

"With industrial hemp we were like 20 times faster than hand harvesting," Wieker said of the technology's performance in

hemp fields last autumn. "With the bushy marijuana plants, it's 12 times faster."

Designed to be efficient for conventionally planted fields as small as 5 hectares (12.3 acres), the standard single-unit HHH 700 can harvest 4-5 hectares (9.8-12.3 acres) per day. But the harvesting ensemble is modular, expandable up to three units that proportionally increase the harvesting capacity.

## Award-winning technology

Four years in research, development and production, the HHH 700 has an aluminum frame and rollers for weight reduction, and stainless steel components such as chains and other flower-contacting parts for pharmacy- and food-grade yields.

Wieker, an engineer, started developing the machine after observing the laborious process of hand harvesting hemp flowers during a visit to the Czech Republic in 2015. That visit left him not only "fascinated with the possibilities of hemp" – but with the realization that hemp's expansion is inhibited by the lack of a suitable harvester for small and medium size farms.

The HHH-700 was named winner of the European Industrial Hemp Association's "Hemp Product of the Year" competition in June 2020.

# Growing through alliance

CannaSystems looks to users to fine-tune mobile decorticator

Toronto-based CannaSystems Canada Inc. is offering its [R-2 hemp decortication system](#) to 10 initial customers under a collaborative program aimed at fine-tuning the technology while building close relationships with key partners.

Dave Greer, Vice President of Sales, said the company already signed agreements with customers in New Zealand and South Africa for the R-2, groundbreaking new technology that can be installed on a farm or trailer mounted for semi-mobile operation. The deals are through CannaSystems "Alliance" program, which offers special pricing – and special attention – to those customers who qualify.

## Market sweet spot

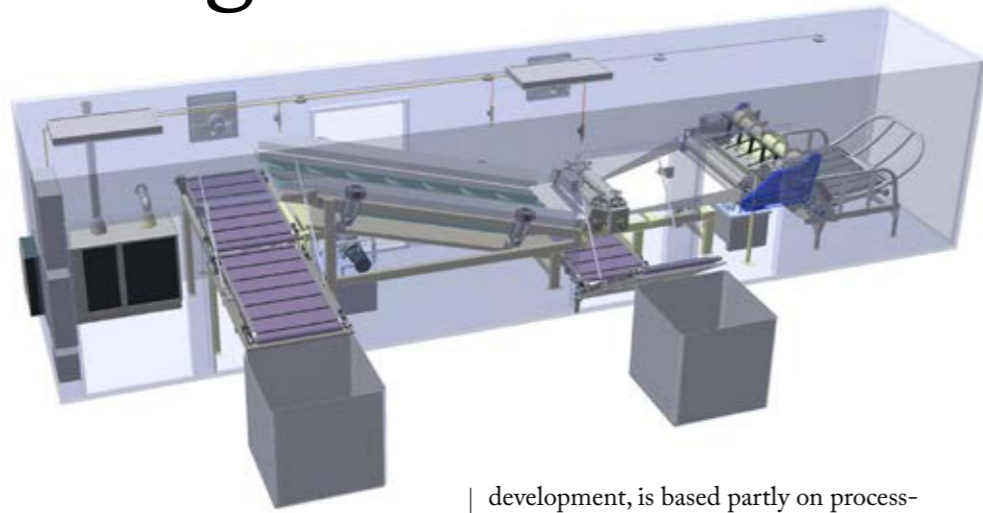
Priced at \$330,000 with processing capacity of 2 tons per hour, the R-2 hits something of a sweet spot in the market for large-scale decortication technology, which offers few reasonably priced options for handling industrial-scale loads.

"Most decortication machines on the market – and there are a relative few – run in the millions of dollars. While some small-scale solutions have been developed, steadily growing interest in hemp fiber production means future scalability is critical," Greer said. The R-2 offers the necessary flexibility for future expansion of processing operations, and more.

CannaSystems designs, contract manufactures and sells equipment for production of industrial hemp biomaterials. Those materials, down the line, can be turned into a number of finished products – from textiles woven from the plant's bast fibers, to bioplastics, building materials, fuel pellets, and biochar, one of the most promising potential uses of the hemp stem's hard inner core ("hurd").

## 4 ft. fibers

Importantly, bast output from the R-2 can result in fibers up to 4 ft. in length, an advantage in any secondary processing stage. "That's a critical advantage, because when you look into the sectors that use hemp fibers, standards for length and other characteristics are still being de-



veloped," Greer said. "With those fibers in 4 ft. lengths, they can be cut to size depending on customer requirements."

The R-2 system is built into a 40-foot "high cube" shipping container, providing a fully integrated unit with all critical functions: power, input, processing, throughput, a fire system, dust control and waste handling. The self-contained, semi-portable unit can run outdoors powered by diesel. Permanent installations require only a cement slab and an industrial electricity supply.

## Alliance partnerships

To maximize the R-2's operation, Greer said CannaSystems will follow its units out the door and work closely with those customers under its Alliance program, monitoring their experiences and the machines' performance. Input from those initial partners will be used to make any needed refinements to the machine. Any upgrades made will be offered to all Alliance members at no cost.

"We have done extensive testing with our prototype and found that it works very well," Greer said. "However, there will be situations not foreseen, given that we could not possibly test for every strain of seed or every planting or harvesting process."

Alliance members also get dealer-priced discounts of 30% on their purchases, paying just \$225,000, and receive continued dealer pricing for any future purchases. "This automatically puts our Alliance members in a good position to be partners in our global expansion," Greer said.

## Bringing IP together

Design of the R-2 decorticator, which has been six years in research and

development, is based partly on processing machines built for other crops, such as banana, pineapple, sisal and palm. The design also incorporates patents on hemp processing technology from the mid-20th century which were updated with modern CAD design and material specifications.

"Advances made over the past 70 years are significant when it comes to building farm equipment to handle hemp crops," Greer said. CannaSystems has exploited those advances through existing patents while developing intellectual property in house for new manufacturing and "green" processes for key markets.

The company built prototypes and full-scale machine heads last year and assembled and tested a complete full-scale R-2 system. After a round of upgrades and the addition of an integrated bale unwinder, the R-2 reached the commercial production stage, and can be fully functional upon delivery, Greer said.

## Hitting 'critical mass'

CannaSystems was founded in 2015 by cannabis industry veteran Bruce Ryan, Founder, and Ron Larson, CFO, a corporate finance executive who worked at PriceWaterhouse and ManuLife, and held the position of CFO for X-Prize and NASA rocket businesses.

The company has been self-financed through six years of research and development. Greer said early attempts to raise small amounts of seed money proved unsuccessful. While the company is in talks with potential investors and entertains qualified potential partners, CannaSystems has now reached a "critical mass," Greer said, based on the technology's readiness and eager, well-defined markets for fiber and hurd. That means CannaSystems will continue to develop as hemp farming and production grows around the world.



# A rugged Lithuanian fiber harvester

KP-4 hits North American market just as sector begins to heat up

A Canadian company has brought specialized fiber hemp harvesting technology to North America, anticipating continued expansion of applications for the hemp plant's stalk and expanding hemp fields worldwide.

British Columbia-based Forever Green, which is providing specialized farming equipment from Laumetris, Vilainiai, Lithuania, with global sales support, is now taking orders for the [KP-4 Fiber Hemp Cutter](#).

The harvester can mow down hemp fields at up to 20 km/h (~12mp/h), taking a swath of 2.8 meters (9+ feet).

"With the success and maturity of the hemp seed and foodstuff market there is growing interest in fiber," said Peter Düşop, co-founder at Forever Green. "Newly developing research on various applications and the growing pressure of climate change and environmental sensitivity make it a great time and a ground floor entry point for those looking to pursue the hemp fiber industry."

## Cut for the processor

The KP-4 works with four combine style sickle bar cutters that sever the hemp stalks into 24-inch (60 cm) sections, the length preferred by fiber processors. The harvester is adjustable to cut from one to four 24-inch stalk sections depending on plant height.

The 4,400kg (9,700 lb.) harvester can



be pulled by any 180-HP tractor with a CAT3 3-point hookup and adequate lift capacity. Six of the KP-4 machines cut more than 1,500 hectares (3,700 acres) of fields in Lithuania last year, Düşop said.

"We have a number of years of experience with growing, harvesting and decortivating industrial hemp. Access to reliable equipment has always been a challenge," Düşop said. "To support the growth and success of the industry, we need more efficient, faster and more adaptable machinery."

## Demand will grow

The companies said the need for specialized harvesting and processing equipment is certain to grow in the coming years, noting that even in Europe, where fiber processing in the new hemp era is more advanced than in the USA or Canada, options are few. Priced at €69,900 (~\$85,000), the KP-4 fills a wide gap between a conventional single sickle mower adapted for hemp stalks — which means

further processing is required — and industrial scale double-cut harvesters that sell for more than \$1 million.

"We believe there has been some pent up interest in hemp fiber, but barriers to entry, mainly cost, have made it challenging for things to get started," Düşop said.

## Parts and service

Under Forever Green's agreement with Laumetris, the Canadian company will also provide parts and maintenance support, while the machines will continue to be made in Lithuania. Depending on location and method of transport, Düşop estimates average delivery time of three months for the harvesting units.

Forever Green comes from a second-generation family farm operation in Vanderhoof, British Columbia, in the Bulkley Valley, a forestry, mining and agricultural area.

"We appreciate Forever Green's vertically integrated approach to the hemp supply chain and their hands-on experience in field preparation of hemp to meet the needs of processing mills," Taurius Putna, Export Executive at Laumetris, said of the partnership.

Laumetris, founded in 1993, specializes in manufacturing small agriculture machinery, including strip till drills, cultivators, transportation and spraying equipment, with customers worldwide. Laumetris also makes the K-15 Hemp Harvesting System, a cannabis flower harvester.



# Affordable harvesting on a big scale

A spot-on system for high quality flowers and food seed

Family farmers at [UAB Hemp Spot](#), a Lithuanian hemp agribusiness, have developed two solutions for large-scale flower harvesting, with options starting at €16,000 (~\$18,900).

That's the price tag for the 3.5m (11'5") FEROMOTO header, which can be attached to small and medium-sized tractors outfitted with hydraulic front-mounted lifts for a conventional setup in which a second driver pulls a bunker alongside the harvesting ensemble. The harvester can cover 1.0-1.5 hectares (~2.5-3.7 acres) per hour.

Further processing through a separator the company has also developed (about €37,000/~\$44,000) results in consistent biomass, a key factor in harvesting hemp flowers for CBD and other extracts, said Audrius Karnisauskas, Hemp Spot's CEO.

### Goal: Consistent biomass

"When you look at hemp biomass, it varies greatly between producers in terms of fraction size, moisture, consistency and overall quality," Karnisauskas said. Hemp Spot's technology overcomes that challenge, he added.

Combining Hemp Spot's harvester and separator with a belt-driven dryer, completes a full processing system that yields food- and feed-grade seed along with the hemp flowers.



Hemp Spot began building the customized 3.5m header last winter, and put the technology on the market this year.

Hemp Spot also offers a bigger, self-contained hemp harvester it has engineered by stripping down sugar beet harvesting technology made by German farm equipment maker Holmer and pairing it with a front-mounted header from UK-based Shelbourne-Reynolds. With a cutting width of 5 meters (~16'5"), and a harvesting rate of 2 ha (~5 acres) per hour, that combine sells for roughly €153,000 to upwards of €708,000 (\$180,000-\$835,000), depending on whether the Holmer unit is used or new.

### Heavy & durable

Key advantages of the Holmer-Shelbourne combine include its weight and durability, a powerful 420 horsepower engine, ample clearance height, an oversized bunker which can quickly be unloaded,

and cockpit positioning that gives the driver a clear view of the plant tops. Most importantly, the harvester, with adjustable cutting height ranging from 30cm to 4m (1-13 feet), can be operated by one man, reducing harvesting costs.

### Mother of invention

Hemp Spot started tinkering with hemp harvesting technology six years ago, strictly out of need: "Even though hemp has been cultivated in Lithuania for thousands of years, when we started there was not much information on how to grow and harvest hemp on an industrial scale," said Karnisauskas. "There was literally no equipment dedicated to hemp, so we rented various equipment that we thought might work. It didn't."

Based in Rudiškiai, Lithuania, Hemp Spot farms 110 ha of hemp on its own fields and contracts another 100 ha from local farmers whom it supports with seed procurement, field preparation and harvesting. While the company has primarily been farming Futura 75 and Santhica 70, French hemp strains, Karnisauskas said the company is constantly test planting other cultivars.

Despite its relatively small land mass in comparison to other European countries, Lithuania is the second largest hemp growing country in the EU behind France, with hemp fields totaling about 9,000 ha (~22,000 acres).





## The perfect cut for hemp textiles

New Belgian technology is based on machines for harvesting flax

Belgian custom equipment maker Hyler BV has introduced a new hemp harvester that gives flax farmers an additional crop option while signaling the rebirth of hemp textiles. And with additional components designed for the machine, the Sativa 200, growers can also collect leftover cut straw and plant tops in a quick-change 17-cubic-meter bunker mounted on the back of the unit.

It's the first hemp-focused technology from Wielsbeke, Belgium-based Hyler, which already has two flax harvesting models and a square baler in its portfolio.

### Option for flax growers

"Farmers who grow flax are very interested in hemp as an additional crop to spread their risk in cultivation and marketing," said Niels Baert, Hyler's founder and owner. "However, until now there were no machines to harvest hemp fiber in separated swaths efficiently, to parallelize the top section of the stalk and the foot separately on the field."

The new technology, priced at roughly €300,000, can harvest up to two hectares per hour, a pace similar to flax harvesters.

Based on the engineering fundamentals of Hyler's flax harvesters, the Sativa 200 can cut down hemp plants 1.4-3.0-meters in height; swath length can be adjusted to between 0.6-1.3 meters. Onboard controls let the machine's operator lay the hemp straw in perfect parallel rows for efficient



Niels Baert, founder and owner of Hyler BV, which developed the Sativa 200 (above).

processing in the next stages. The final straw lengths match standards used in flax processing, a factor critical to making the Sativa 200 attractive to flax growers, Baert said.

### Speedy development

The new harvester was developed by Hyler from scratch in six months, working with technology partner Bosch Rexroth NV on the programming. Bosch Rexroth also supported development of the software behind Hyler's flax machines. The development team behind the Sativa 200 brings 11 patents and more than 40 years combined knowledge and experience in building fiber harvesting and processing solutions. Baert said Hyler also established partnerships with leading suppliers and research institutions in its mission to provide an added-value hemp harvesting solution for its clients.

In addition to technology development, Hyler puts a strong emphasis on after-sales

service and fine tuning of the machines it sells, working closely with customers to make sure its harvesters operate at maximum efficiency and meet individual client needs.

Hyler sold its first Sativa 200, a prototype, to French linen co-op Linière Du Nord De Caen, after demonstrating the machine's ability to process the stalks and lay them down for field retting. Linière Du Nord De Caen, based in Villons-les-Buissons, is among enterprises that make up a thriving flax industry in Normandy, where scutching factories from Bayeux to Dunkirk produce 80% of the world's linen from roughly 150,000 tons of long fibers processed each year. Linière Du Nord De Caen's factory in the commune of Villons-les-Buissons turns out 24,000 tons of flax yarn annually.

### Supply chain fit

With a new scutching factory having recently opened in nearby St-Manvieu-Norrey, the Sativa 200 slips perfectly into the already existing local fiber supply chain in Normandy. Local officials say hemp farming and processing of textiles could replace sugar beet production in the region while playing a major role in France's contribution to the wider European Green Deal. Because of the hemp plant's outsize ability to absorb CO<sub>2</sub>, hemp can be a major factor the European Union's program to develop more sustainable industries, Baert noted.

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