Industrial Hemp: Economics and Marketing

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Overview

- Industrial Hemp Market Overview
 - Supply and demand
- Hemp Uses
 - Fiber, Seed/Oil, and CBD Oil
- Marketing Considerations

 Contracting shared risk / reward
- Cost of Production
 - Estimates and important considerations





Reliable, publicly available data and information is lacking.

SUPPLY AND DEMAND



Supply Snapshot

- Hemp is grown in China (~150,000 acres), Canada (~100,000 acres) and Europe (~50,000).
- In the US in 2018 total hemp acres grown were estimated at over 78,000 acres (25,713 acres in 2017). Includes hemp grown for all purposes (field and greenhouse).
- Top five states based on acres.
 - 1. Montana 22,000 acres (542 acres)
 - 2. Colorado 21,578 acres (9,700 acres)
 - 3. Oregon 7,808 acres (3,469 acres)
 - 4. Kentucky 6,700 acres (3,271 acres)
 - 5. Tennessee 3,338 acres (200 acres)
- 2019 acres = up, but ?????



Hemp Demand

- Demand for hemp is rapidly growing driven by CBD oil and, to a lesser extent, seed and fiber.
- Hemp being included in the 2018 Farm Bill has intensified interest.
- U.S. imports of hemp seeds have decreased significantly from all time highs in 2016 of 39.3 million lbs.
 - In 2017, there was a 57% decrease in seed imports from the previous year.
 - This downward trend is expected to continue as the U.S. hemp grain market continues to mature.



Reported Demand

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



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

U.S. Hemp-Based Products Sales, 2012-2022e



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



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

Where is Demand heading?

WE DON'T KNOW..... But there are positive indications from many sources.



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



Tennessee Hemp Summary

- 2017: 79 Growers.
- 58 (75%) participants reported with 130 acres planted:
 - Size of planting area from couple of pots to 44 acres
 - 64 acres grown acres
 - 25 acres harvested (20%)
 - 56 acres destroyed (43%)
- Most planted for CBD, others for fiber and seed.
- Yield: 8 growers reported their floral material yields, ranges from 10 to 1,000 pounds.
- 2018: over 160 people licensed, licensed acreage over 3,400 acres

2017 Industrial Hemp Growing Areas

79 Industrial Hemp Licensees 130 Acres Planted





Kentucky – How are they doing?

- 2017: 213 Growers (Triple TN)
- 3,200 acres Planted, 2,300 acres harvested (72%)
- 2016 Average Yield: CBD (field, floral material) 392 lbs
- Price: Emerging market, high fluctuation. '1st year of the program, KDA received reported price of \$1,000/lb. However, prices continue to decline, more products on market today will see prices between \$5-\$10/lb.'
- Marketing: 'Some companies provide all of the seed and maybe even an additional portion of the costs. The estimated per acre costs is closer to \$5,000 per acre.'

Kentucky Hemp Research . . .







CBD Gummies (Hemp)



CBD Vape Oil (Hemp)



CBD Oil (Hemp) **** \$34.99 - \$134.99

Fiber, Seed/oil, and CBD Oil

INDUSTRIAL HEMP USES



Industrial Hemp Market Overview

- Hemp Uses
 - Fiber
 - Seed / Oil products (non-CBD)
 - CBD Oil
- Hemp varieties and production practices should be characterized by intended use.
 - Different varieties and production practices for different uses.



Industrial Hemp Markets

- Variety selection is essential for final use
- We still don't know definitively how plants will preform in Tennessee.
 - THC content must be below 0.3% (by dry weight)
 - Varieties of hemp that producer higher CBD oil content are desirable.
- Question: How much of the % of CBD oil (THC?) content is variety specific versus environmental?
- What are the consequences of not meeting the required CBD oil content? (contracting)



Industrial Hemp: Fiber

- Hemp fiber can be used to make twine, paper, carpeting, clothing, building materials, animal bedding, mulch, paper, industrial products, and biofuels.
- Fiber can be injected/molded to form composite materials (packaging, bowls, etc.)
- Production practices can be key when obtaining a market
 - Organic?
 - Sustainability?



Industrial Hemp: Seed / Seed Oil (non-CBD)

- Hemp seed can be consumed in food and feed products similar to other oilseeds produced in Tennessee.
- Hemp seed or oil can be found in cooking oil, salad dressings, pasta, and snack products
- Oil can be used to make personal care products, pet food, cosmetics, medicines industrial products, paints, solvents, and lubricants.



Industrial Hemp: CBD oil

- Cannabidiol (CBD oil) is a natural component of industrial cannabis or hemp.
- CBD oil is cannabis oil that has a significant content of cannabidiol.
- It is made from the flowers, leaves and stalks of hemp and not from its seeds like hemp oil.
- Proponents of CBD oil claim that it can treat a wide variety of health issues, ranging from everyday ailments to chronic medical conditions. These issues include: Acne, Anxiety, Chronic pain, Depression, Epilepsy, Glaucoma, Insomnia, Loss of appetite, Muscle spasms and Parkinson's disease



Industrial Hemp: CBD oil

- Cannabis research firm Brightfield Group estimates that the U.S. market for hempderived CBD hit \$291 million in 2017 and will balloon to \$1.65 billion by 2021 – growth of more than 500% in just four years
- According to "The CBD Report," Hemp Business Journal estimates total retail sales of hemp-derived CBD products in the United States will exceed \$646 million by 2022.
 - A projected \$184.3 million of those consumer sales will take place in the natural product and specialty market channel.

U.S. HEMP-BASED CBD PRODUCT SALES, 2014-2022e







Know what you are getting into and weigh the risks and rewards

MARKETING CONSIDERATIONS



Marketing Considerations

- Before growing hemp know where and how you will sell your production.
- If possible secure a production contract or price guarantee.
- A production contract should specify:
 - Price
 - How is price determined? Beware of vague language "determined by a third party".
 - Quantity and quality to be purchased (acres or min/max production to be purchased)
 - % of CBD Oil on a dry matter basis
 - Is delivery required? "
 - What happens if quality is below the specified minimum standards?
 - Production restrictions (organic?)
 - "Act of God" or force majeure
 - Delivery and payment timeline
 - A start and end date



Marketing Considerations

- Price received per pound for every pound produced may be unlikely to be guaranteed
- Weigh the risks and rewards of any marketing /financial arrangement
- "Rolling the dice" on small quantities is very different than large

But You Can

- Cost/Revenue share with processors/transplant or seed provider supplier
 - Processor provide seeds/transplants (result in reducing costs)
 - Similar to crop share: 25:75; 50:50 (depends on how revenue and expenses are divided)
 - What production risks Weather, Production, Price / Marketing can be mitigated
 - Contract? Crop Insurance?
- Work with processors to share risk (relationships are important but they need to be reciprocal)
- Be skeptical of marketing claims / advertisements that seem too good to be true or lack sufficient information.
- Do appropriate background checks and research to protect yourself from those you enter business relationships with.
- Use qualified professionals to review documents before entering into any legally binding arrangement.





Know what you are getting into and weigh the risks and rewards

COST OF PRODUCTION



Hemp Price

- Hemp growers have reported the market is fetching:
 - \$20-\$150 per pound of dried flower for use in CBD extraction or even more if the plant CBD content is high.
 - \$10/lb per CBD % 10% CBD oil = \$100/lb
 - High CBD content is essential to obtain premium prices
 - 50-225 cents per pound for seeds intended to be pressed for seed oil or consumed as food.
 - Higher prices for consumption as a food
 - 5-19 cents a pound for fiber.
- Tremendous variability and uncertainty are present in hemp markets
- Finding a stable viable market for 2019 production may be challenging

*** the price is what someone is willing to pay in your area. Prices may swing dramatically in 2019, so try to minimize your risk on the front end***



Hemp Yield

- Fiber Yields: 3-6 tons per acre (6-12,000 lbs)
- Seed Yields: 1,000 2,000 lbs
- CBD Yields (% CBD Oil) ????
 - depends on what is measured.
 - % CBD oil on dry matter basis, different content based on the part of the plant



Cost of Production

Fixed Costs

- Land
- Machinery
 - Production
 - Processing
- Buildings
 - Greenhouse, Drying, storage

Variable Costs

- Slips / seeds
- Plastic
- Irrigation (drip tape, water, power)
- Fertilizers
- Weed, Pest and disease control
- Labor
- Machinery
 - Fuel, oil and filter, R&M, Operator Labor, Taxes Insurance and Housing
- Hanging materials and packaging
- Trucking
- License, Sampling, Inspection Fees
- Interest on operating expenses



Industrial Hemp Fiber Production Budget

Estimated costs per acre, Conventional tillage, Pennsylvania-2018

Real. Life. Solutions.

		Your			Your		Calculated
Item	Quantity	Quantity	Unit	Price	Price	Total	Estimate
Income							
Hemp fiber	5		ton	\$100.00		\$500.00	\$ 0.00
Variable Costs							
Custom							
Soil test	1.0		acre	\$2.00		\$2.00	\$ 0.00
Hauling round bales	83.0		bale-miles	\$0.20		\$16.60	\$ 0.00
Fert./Soil Amendment							
Lime+spreading	0.5		ton	\$26.00		\$13.00	\$ 0.00
N	100.0		lb.	\$0.24		\$24.00	\$ 0.00
P	20.0		lb.	\$0.30		\$6.00	\$ 0.00
к	20.0		lb.	\$0.23		\$4.60	\$ 0.00
Other							
IH registration fee	1.0		acre	\$20.00		\$20.00	\$ 0.00
IH THC testing fee	1.0		acre	\$2.00		\$2.00	\$ 0.00
Seed						'	
Industrial hemp seed	35.0		lb.	\$2.50		\$87.50	\$ 0.00
Rye cover crop seed	2.0		bu.	\$7.50		\$15.00	\$ 0.00
Operator labor							
hour	2.3		hour	\$17.00		\$39.10	\$ 0.00
Diesel fuel							
Tractors	8.7		gal	\$2.80		\$24.36	\$ 0.00
Repairs & Maintenance							
Implements	1.0		acre	\$12.45		\$12.45	\$ 0.00
Tractors	1.0		acre	\$7.72		\$7.72	\$ 0.00
Additional expenses							\$ 0.00
Additional expenses				i			\$ 0.00
Interest on operating capital	1.0		acre	\$5.62		\$5.62	\$ 0.00
Total Variable Costs						\$279.95	\$ 0.00

Example Hemp Fiber Budget: Variable Costs

Source: Penn State University https://extension.psu.edu/in dustrial-hemp-production



Example Hemp Fiber Budget: Fixed Costs

Note: a round bale of industrial hemp fiber weighs approximately 1,200 lbs.				e Penn S	State		
Returns over variable costs Returns over total costs						\$220.05 \$74.17	\$ 0.00 \$ 0.00
Total Costs						\$425.83	\$ 0.00
Total Fixed Costs						\$145.88	\$ 0.00
Land charge	1.0		acre	\$100.00		\$100.00	\$ 0.00
Additional expenses							\$ 0.00
Tractors	1.0		acre	\$18.40		\$18.40	\$ 0.00
Implements	1.0		acre	\$27.48		\$27.48	\$ 0.00
Fixed Costs							

Source: Penn State University https://extension.psu.edu/in dustrial-hemp-production



Cost of Production: Important Questions

- Seed/Seedlings
 - Are the varieties I want available?
 - What risks do I face through variety selection?
 - Quality, certified or verified
 - Will the varieties selected produce as expected in Tennessee?
- Labor
 - Do I have access to sufficient labor?
- What are my weed/insect/disease control strategies?
- Planting through harvest equipment
 - Do I have access to the required equipment?
- Drying / Storage
 - Do I have access to necessary infrastructure and equipment?
- Access to markets
 - Can I sell the final product?
 - What if I don't meet the quality requirements? (ie lower CBD Oil %)



Cost of Production: Considerations

- In budgeting the two most often underestimated expenses are:
 - Labor (both management and employee)
 - Capital recovery
- Track expenses and revenue closely, this will allow you to examine changes over time and aid in expansion / financing decisions.
- Keep good records both production and financial.



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Questions, Discussion, and Good Luck

THANK YOU

