

# Hemp Economics and Marketing

Sustaining Tennessee Farms with Value-Added Agriculture and Alternative Crops: In-Service  
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# Overview

- Market Overview
- 2019 Post Harvest Considerations
- Regulatory Environment
- Production Budget: What was right and wrong for 2019.

\*\*\* All Data Presented Should Be Critically Evaluated\*\*\*\*





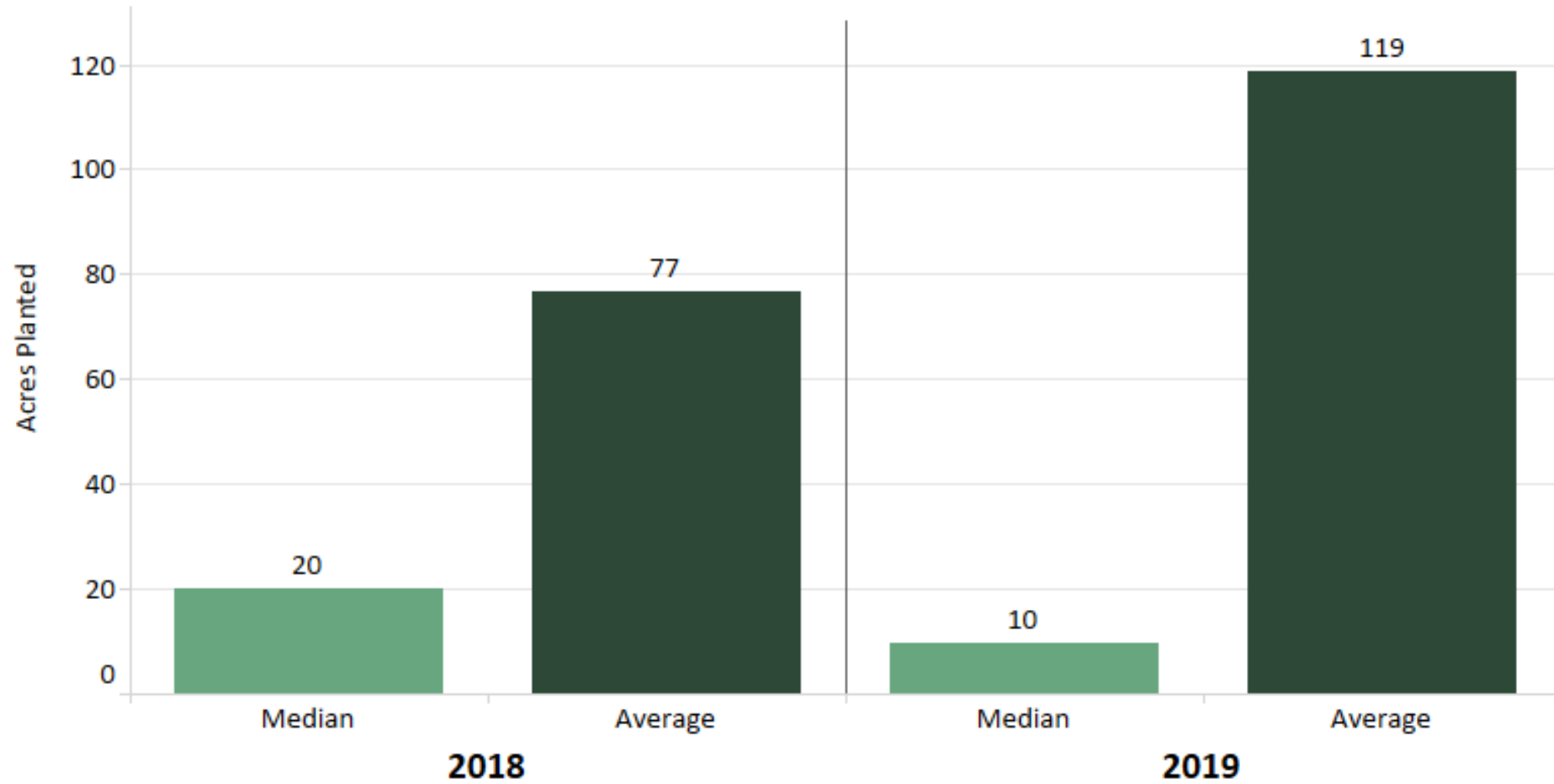
# Industrial Hemp Market Overview

- Hemp uses
  - Fiber
  - Seed / Oil products (non-CBD)
  - CBD Oil / Extract
  - Smokeable / Other
- Hemp varieties and production practices are characterized by intended use.
- Heterogeneous commodity
- Market potential and production practices are contingent on end use.

# Hemp Supply Snapshot

- Hemp is grown in many countries (published data can be challenging to find):
  - China 200,000 to 250,000 acres
  - Canada 70,000 to 140,000 acres
  - France 40,000 to 50,000 acres
- Top five states based on 2019 licensed acres.
  1. Colorado – 80,000+
  2. Kentucky - 58,000+
  3. Oregon – 51,000+
  4. Montana – 40,000+
  5. Tennessee – 44,000+ acres (3,400+ licenses)
- 2019 licensed acres = 511,442; 455% increase compared to 2018 (vote hemp).
- **How many acres harvested?** ~125,000??
- Interest by numerous states for the 2020 growing season.

## Average & Median Number Of Acres Planted By Hemp Cultivators: 2018 Compared With 2019



Source: 2019 Hemp Business Factbook

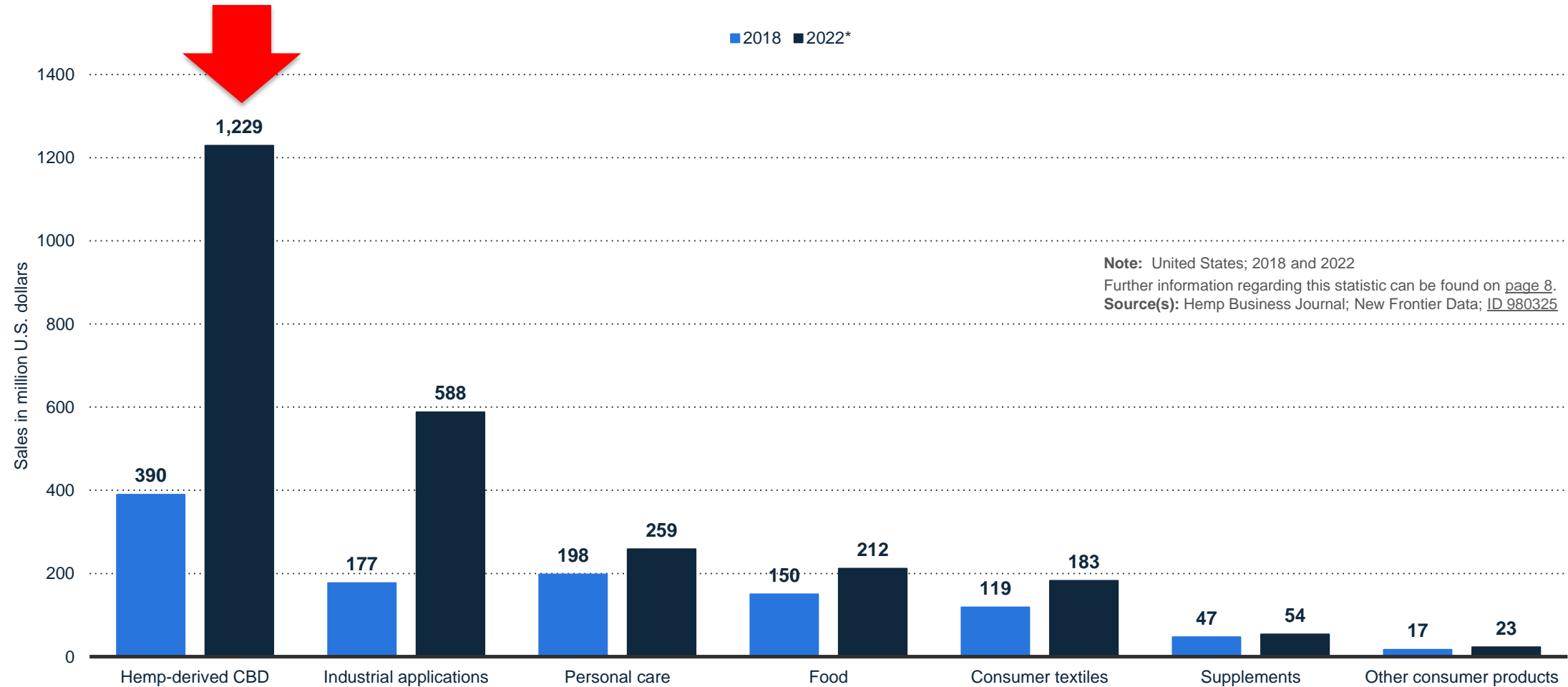
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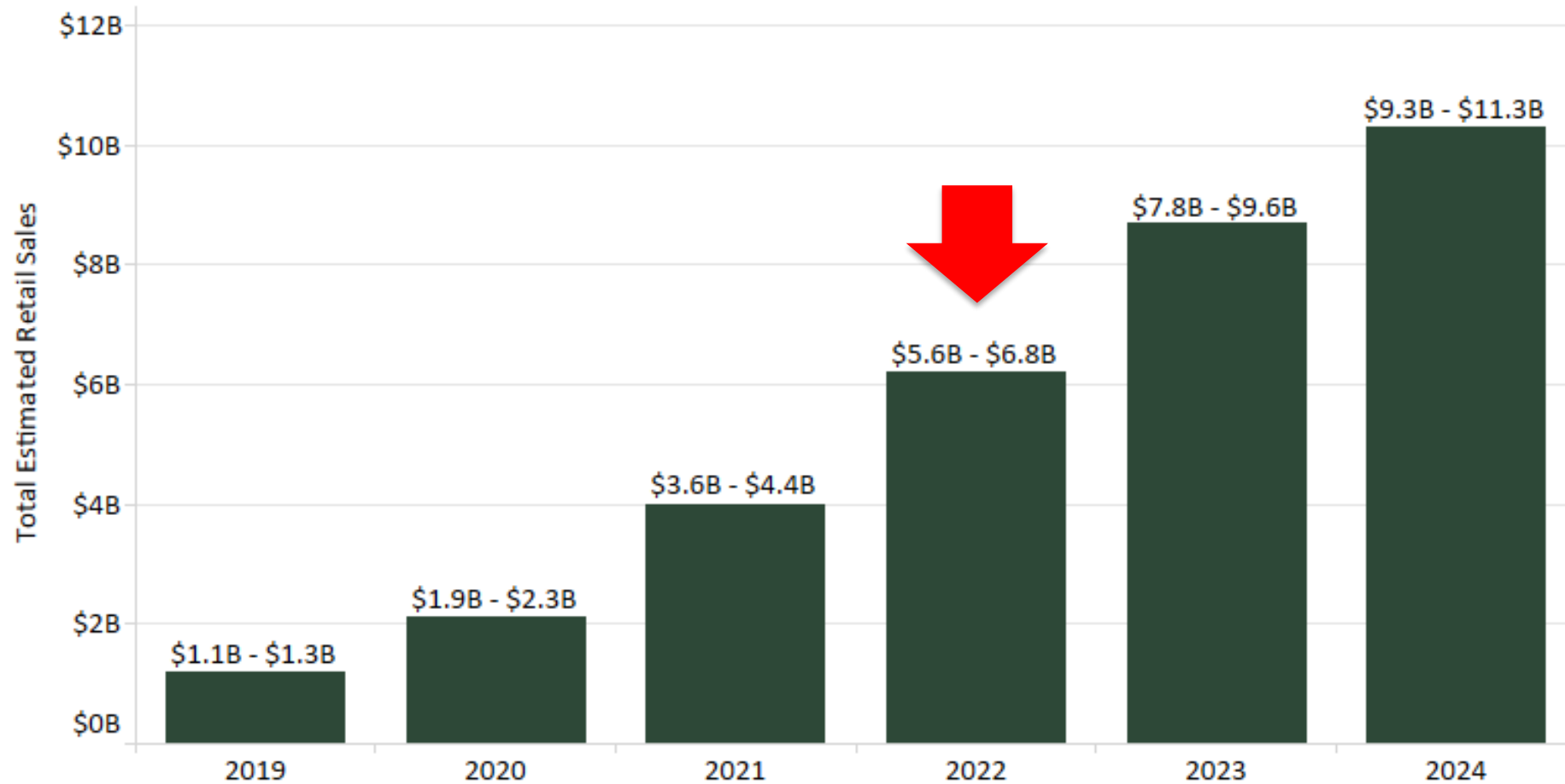
# Industrial Hemp Demand

- Information available – most of it is inaccurate, incomplete, or advances an agenda.
- Long term demand is unknown (some estimated ranges):
  - US Market size:
    - 2018 estimates range from \$600 million to \$4.63 billion;
    - Growth to \$2.5-\$16 billion by 2025
  - Global market size:
    - 2018 ~ 6 billion; growth to 40 billion by 2030?
- Reliable estimates as to the size of the industry and long term growth potential are very uncertain.
- Research and informed regulations will play an important role as the industry evolves.
- What is the size and stability of the hemp market? By use?

Sales of hemp-based products in the United States in 2018 and 2022, by product category (in million U.S. dollars)



## Annual U.S. Hemp-Derived CBD Retail Sales Estimates: 2019-2024



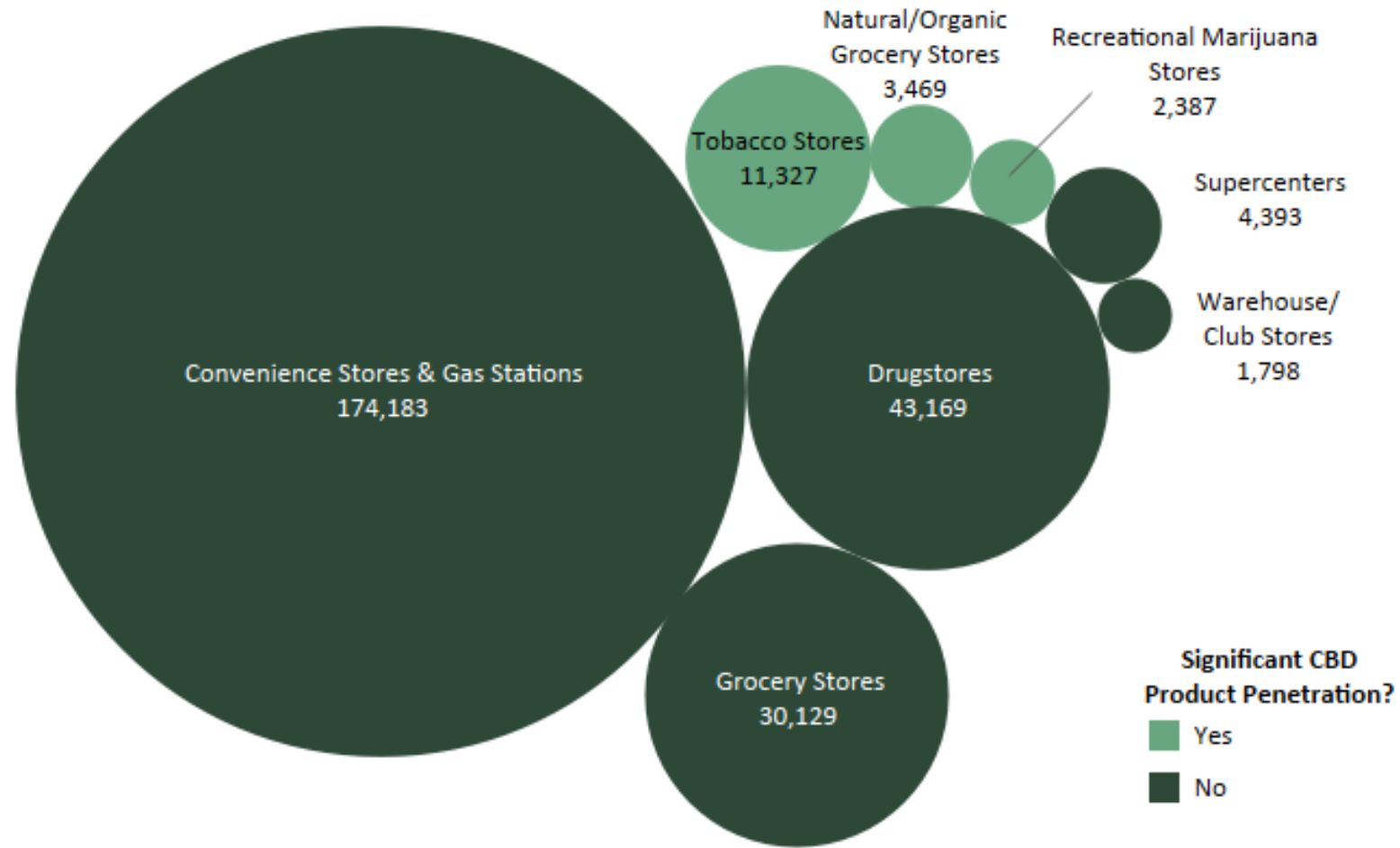
Source: 2019 Hemp Business Factbook

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## Retail Store Count By Store Type & CBD Product Penetration



Source: U.S. Census Bureau, National Association of Convenience Stores, Pharmacy Times, Progressive Grocer, Marijuana Business Daily  
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# Hemp: Supply and Demand Outlook

- Interest in hemp remains high nationally
  - New states coming on line in 2020
  - Reduced interest in growing hemp in Tennessee; consolidation of acres/reduction in number of producers.
- Availability of processing in 2019 represents a challenge for growers.
- Long term demand by use/product is largely unknown.

# Know Your Market!

- What are you selling?
- Who are you selling it to?
- How much are you selling?
- What is the price (variability and risk)?
- When will the product be delivered / payment received?
- Will the product need to be stored? How? And at Who's risk?
- Do you have the capacity to carry the product for multiple months? From both a storage and financial standpoint.

# Hemp: Market Integration

**Genetics**

**Seed, Transplant,  
Clone, or Seedling  
Development**

**Production  
(greenhouse/field)**

**On –Farm Drying,  
Processing, and  
Storing**

**Off-farm or  
Processor Storage**

**Processing**

**Wholesaling /  
Retailing**

Where  
does your  
business  
fit?

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# Harvest / Post Harvest Considerations

- Contracts
- Yield
- Price
- Processing
- Storage
- Regulatory Considerations
- Winter Outlook





# Contracts

- Contracts can assist in mitigating price and marketing risk.
- Weigh the risks and rewards of any marketing / financial contractual arrangement.
- Understand the content and clauses contained in the contract.
- Objectively evaluate or use professional advice to determine the quality of the contract.
- Be cognizant of counter-party risk.

# Harvest and Drying

- Harvest methods
  - Hand picked
  - Tobacco model
  - Chopper
  - Other
- Drying
  - Hang in tobacco barn or other structure.
  - Industrial drier
  - Other
- Need to be compliant with processor specifications.



# Hemp Yield

- Fiber Yields: 1-6 tons per acre (2,000-12,000 lbs)
- Seed Yields: 500 – 2,000 lbs
- CBD Yields (% CBD Oil)
  - Depends on the parts of the plant harvested / how the plant is harvested.
  - Dried floral material ~1-3 lb/plant (plants per acre 500-2,000)
  - Depends on what is measured, % CBD oil on dry matter basis, different content based on the part of the plant.

# Hemp Price

- No official tracking, however hemp growers have reported:
  - \$10-\$200 per lb (varies by CBD %).
    - High CBD content is essential to obtain premium prices.
    - Heterogeneous product / product differentiation.
  - 40-75 cents per pound for seed (for seed oil or consumed as food).
  - 3-10 cents a pound for fiber.
- Tremendous variability and uncertainty are present in hemp markets.
- Finding a stable viable processor / market for 2019 and 2020 production may be challenging.
- Processing arrangements and risks should be clearly understood.
- Payment timing.
- Protection against failure to be paid.

**\*\*\* the price is what someone is willing to pay in your area. Prices may swing dramatically in 2019 and 2020, so try to minimize your risk \*\*\***

# Revenue Example

- CBD / Extract Example:
  - Gross Revenue = # of marketable plants x dry matter per plant (lb) x CBD % per lb of dry matter x price per %.
  - 1,000 plants/acre x 1.5 lb/plant x 10% x \$1.50/lb = \$22,500/acre.



# Processing

- In 2019/20, there will be processing delays and surplus supplies.
  - Particularly lower quality/lower CBD Hemp.
- Working with a processor or having the ability to process the product is essential.
- Product form should be agreed upon before harvest (written agreement if possible).
- Storage will be necessary due to lack of processing capacity and failure for of processors to enact commitments.

# Storage

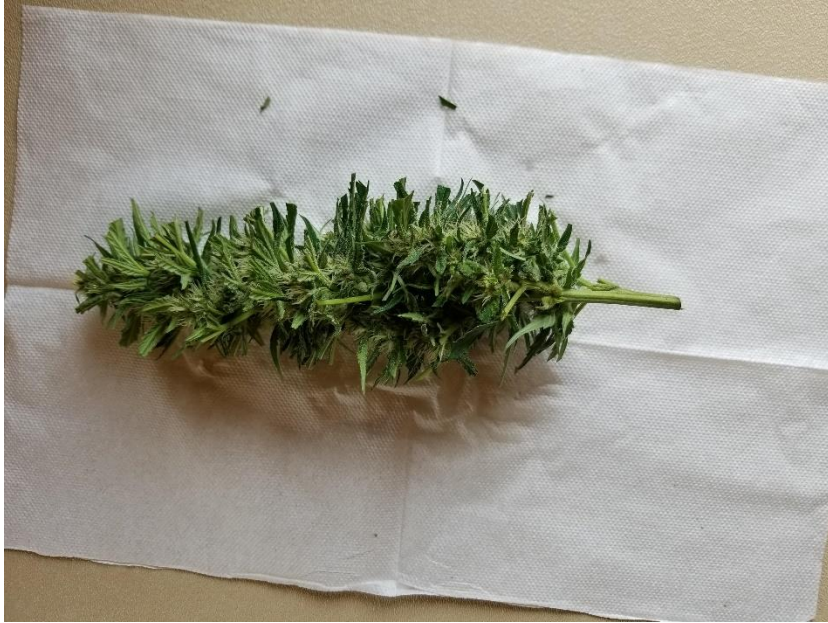
- If a producer is going to invest thousands of dollars per acre in this crop it is vital to store the product safely if it can not be immediately delivered.
  - How should the crop be stored (wrapped / dry / compacted / climate controlled environment)?
  - Where should the product be stored?
  - Who owns the crop in storage?
  - How is risk of loss allocated?
  - How long?

# Regulatory Considerations

- Tennessee regulatory requirements
  - Grower license
  - Movement permit
  - Processing – human consumption must be licensed as a food manufacturing facility in Tennessee
- National legislation
  - Agriculture Improvement Act of 2018 – WFRP crop insurance for 2020
  - Agricultural Act of 2014
  - Controlled Substances Act
  - ???? Future regulations and legislation will dictate the direction of this industry.
- Regulatory environment is likely to continue to evolve (with the potential for dramatic changes) for: production, processing, and retail

# Winter Outlook

- Reduced price environment.
- What will happen with low quality /low CBD hemp?
- May be a challenging winter for those that have not secured a processing arrangement.
- Payment issues will occur.
- Reset of the industry.
  - We have learned a lot, but we have a lot more to learn.
  - Some of the hype regarding hemp is likely to be dampened
  - There will be success stories but unfortunately there is likely to be a lot of failure / inability to meet spring 2019 expectations.
  - Probably beneficial for the hemp industry long term.



What was right and wrong for 2019?; What does 2020 look like?

# INDUSTRIAL HEMP EXTRACT PRODUCTION BUDGET

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# REVENUE

Description	Quantity	Unit
1. Projected Cannabidiol (CBD) % of Dry Matter	10%	% of dry matter
2. Price Per % CBD Oil	\$1.50	\$ per %
3. Total Plant Population	1,500	transplants/acre
4. Percent of Transplants Harvested/Marketed	95%	%
5. Average Dried Floral Material Per Plant (lb)	1.00	lb/plant
6. Total Harvested Dried Floral Material	1,425	lb/acre
<b>Estimated Gross Revenue (\$/acre)</b>		<b>\$21,375.00</b>

1. Wide variation <4% to 20%; part of plant
2. Wide variation but down dramatically from spring (contracts: \$1.00-\$5.00); market access / finding a processor
3. Production practice specific; plastic system
4. Too high based on an “average”; should be - 50-75%. top producers may get 95%; disease, non-feminized seed; insects; other plant losses.
5. Depended on the parts harvested (1/2 to 5 lb)

# Variable (Excluding labor and marketing)

EXPENSES		Unit	Quantity (#/acre)	Price (\$/unit)	Total (\$/acre)
<b>Variable Expenses</b>					
Transplants <sup>2</sup>	Purchased	Transplants	1,500	\$4.00	\$6,000.00
Soil Test <sup>3</sup>	Soil Fertility Test	plot	1	\$20.00	\$20.00
	Heavy Metal	plot	1	\$50.00	\$50.00
	Pesticide Residue	plot	1	\$350.00	\$350.00
Fertilization <sup>4</sup>	Dolomite Lime - Spread	ton	1	\$30.00	\$30.00
	Nitrogen - N	lb	100	\$0.46	\$46.00
	Phosphorus - P	lb	150	\$0.60	\$90.00
	Potassium - K	lb	180	\$0.34	\$61.20
	Other	lb	0	\$0.00	\$0.00
Fertigation	Nitrogen - N	lb	100	\$0.48	\$48.00
	Other	lb	0	\$0.00	\$0.00
Plastic Mulch <sup>5</sup>	Plastic Mulch	acre	1	\$285.00	\$285.00
Irrigation <sup>6</sup>	Drip Tape	acre	1	\$156.00	\$156.00
	Pumping Cost	hr	96	\$2.14	\$205.44
	Water Cost	1,000 gal	0	\$3.00	\$0.00
Machinery Costs <sup>7</sup>	Fuel, Operator Labor, Repair and Maintenance	ac	1	\$305.18	\$305.18
Other Processing Costs	Drying/Grinding/On-Farm Processing	ac	1	\$0.00	\$0.00
Other Expenses <sup>8</sup>		acre	1	\$0.00	\$0.00

# Labor

EXPENSES		Unit	Quantity (#/acre)	Price (\$/unit)	Total (\$/acre)
<b>Variable Expenses</b>					
<b>Non-operator Labor Expense<sup>9</sup></b>					
	Pre-plant and Planting Labor	hrs	50	\$11.63	\$581.50
	In-season Labor	hrs	50	\$11.63	\$581.50
	Harvest Labor	hrs	100	\$11.63	\$1,163.00
	Post-harvest Labor	hrs	175	\$11.63	\$2,035.25
	Management Labor	hrs	25	\$15.00	\$375.00
	Other Labor	hrs	0	\$11.63	\$0.00
<b>Total Labor Expense</b>		hrs	400		<b>\$4,736.25</b>

# Marketing

EXPENSES		Unit	Quantity (#/acre)	Price (\$/unit)	Total (\$/acre)
<b>Variable Expenses</b>					
Pallet Boxes	Boxes and Plastic Cover	box	10	\$22.50	\$225.00
Transportation to Processor <sup>10</sup>	50 miles One-Way to Market	ac	1	\$63.58	\$63.58
License Fee <sup>11</sup>	Up to 5 acres	plot	1	\$250.00	\$250.00
Sampling Fee <sup>12</sup>	1 Variety	variety	1	\$150.00	\$150.00
Inspection Fee <sup>13</sup>		hr	2	\$35.00	\$70.00
Cannabinoid Test <sup>14</sup>		variety	1	\$40.00	\$40.00
<b>Total Marketing and TDA Charges</b>					<b>\$798.58</b>

# Fixed Expenses

## Fixed Expenses

	Depreciation, Interest, Taxes, Insurance and Housing	ac	1	\$78.03	\$78.03
Machinery <sup>16</sup>					
Irrigation System <sup>17</sup>	Capital Recovery	ac	1	\$424.46	\$424.46
Drying Barn <sup>18</sup>	Annual Lease	ac	1	\$555.00	\$555.00
Drying Materials <sup>19</sup>	Depreciation	ac	1	\$50.00	\$50.00
Land Rent <sup>20</sup>		ac	1	\$95.00	\$95.00

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<b>Total Fixed Expenses</b>					<b>\$1,202.49</b>
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<b>Total Expenses</b>					<b>\$14,812.54</b>
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# 2020 Hemp Budget

- Modify existing hemp budget based on 2019 results.
- Variability in production practices, harvest methods, and use requirements are challenging to standardize.
- Market access and price uncertainty are likely to continue to remain.
- Risk and uncertainty will continue.
- What are realistic returns for this crop in 2020?

*“You are what you do, not what you say you’ll do.”* Carl Jung

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# THANK YOU



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