



University of Kentucky  
College of Agriculture,  
Food and Environment  
*Cooperative Extension Service*

Presented By:

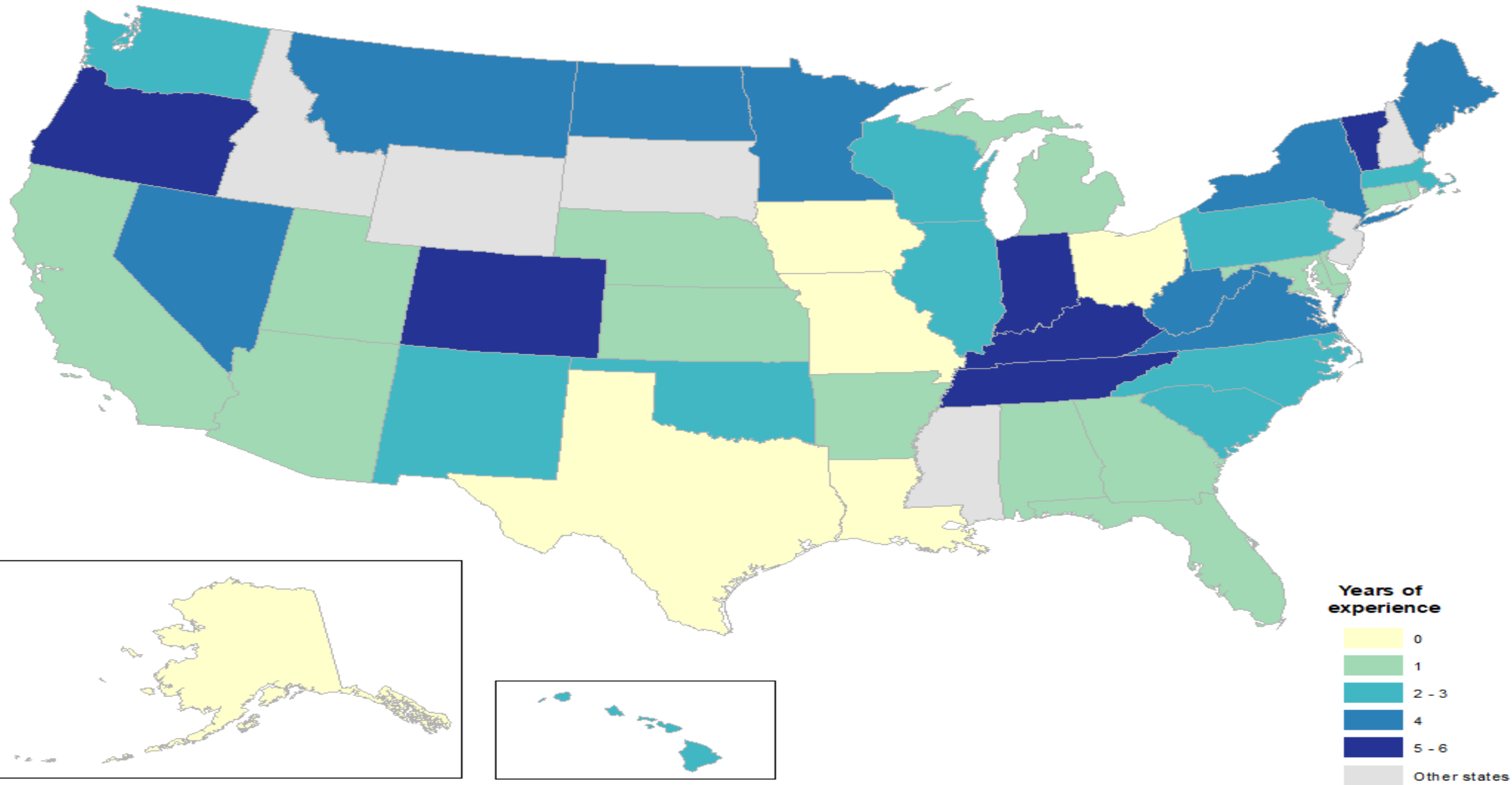
Jonathan Shepherd

Farm Management Specialist

UK Agricultural Economics

# Hemp Market and Profitability Outlook

University of Vermont  
Industrial Hemp Conference  
February 20, 2020



## U.S. Hemp Production 2017 vs 2018

State	2017 Acres	2018 Acres
Colorado	9,700	21,578
Hawaii	1	2
Illinois	0	1
Indiana	5	5
Kentucky	3,271	6,700
Maine	30	550
Massachusetts	N/A	21
Minnesota	1,205	710
Montana	542	22,000
Nebraska	1	0.5
Nevada	417	1,881
New York	2,000	2,240
North Carolina	965	3,184
North Dakota	3,020	2,778
Oklahoma	N/A	445
Oregon	3,469	7,808
Pennsylvania	36	580
South Carolina	N/A	256
Tennessee	200	3,338
Vermont	575	1,820
Virginia	87	135
Washington	175	142
West Virginia	14	155
Wisconsin	N/A	1,850
<b>Total</b>	<b>25,713</b>	<b>78,176*</b>

\*includes 10,090,188 square feet of greenhouse or indoor cultivation



## 2019 U.S. Hemp License Report



**46**  
States legalized  
hemp farming



New states which started in 2019 (13 states)



States which grew hemp in 2018 (21 states)



States with enacted hemp legislation (46 states)



**511,442**

Acres of hemp licensed nationally



**34**

States licensed hemp cultivation



**16,877**

State growers licenses issued

Vote Hemp has conducted an annual survey of state departments of agriculture since 2016 to track the growth of hemp cultivation in the United States. This year we are releasing a hemp licensing report first to document grower intent and will follow up with hemp planting and harvesting data once it has been reported.

**> 250,000  
Acres Planted  
???**

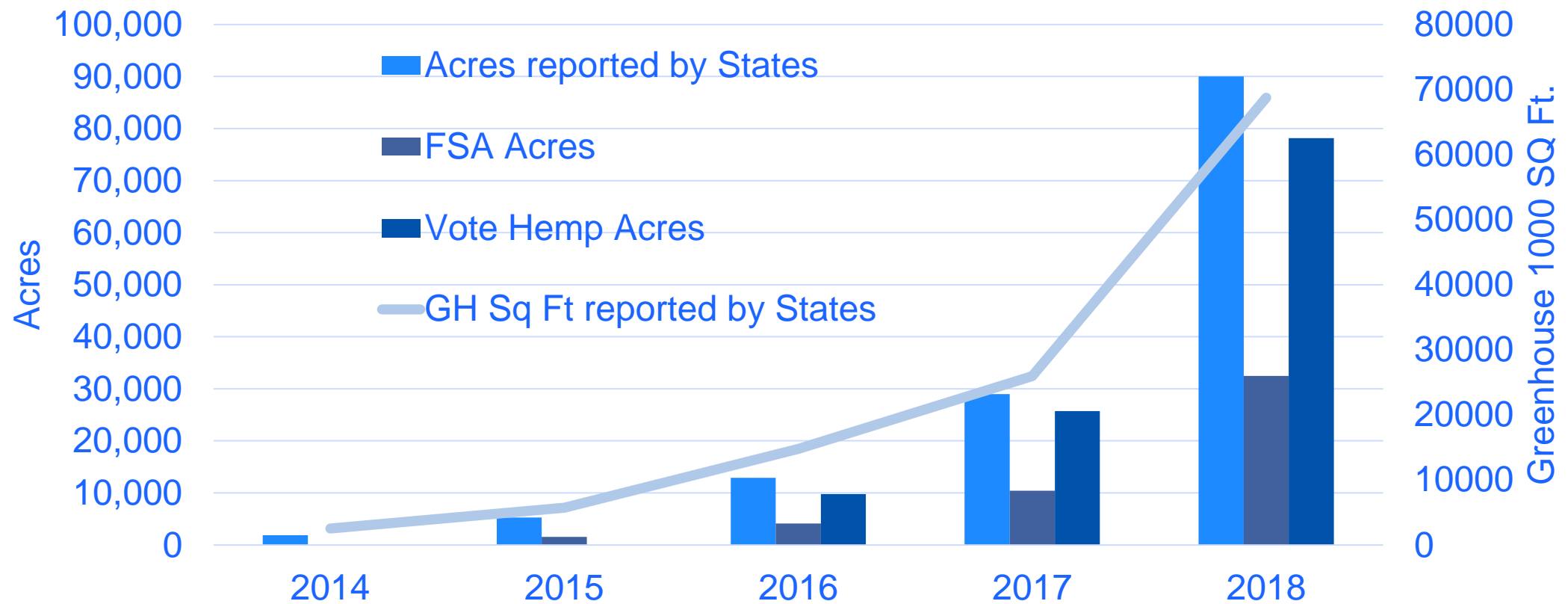
resulting in 115,000-138,000 acres of harvested hemp.

We hope you appreciate this free report and the advocacy work that Vote Hemp has been doing for almost 2 decades at the state and federal level to bring back hemp farming. If so, please consider making a donation at: [VoteHemp.com/donate](https://VoteHemp.com/donate)

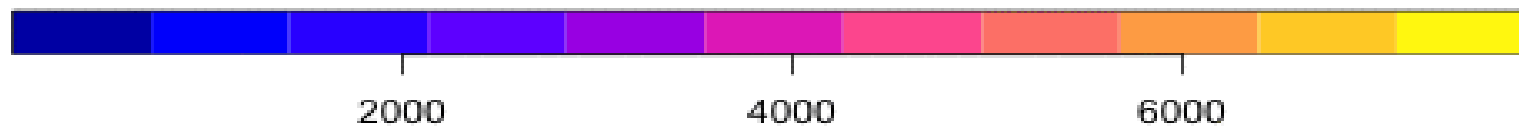
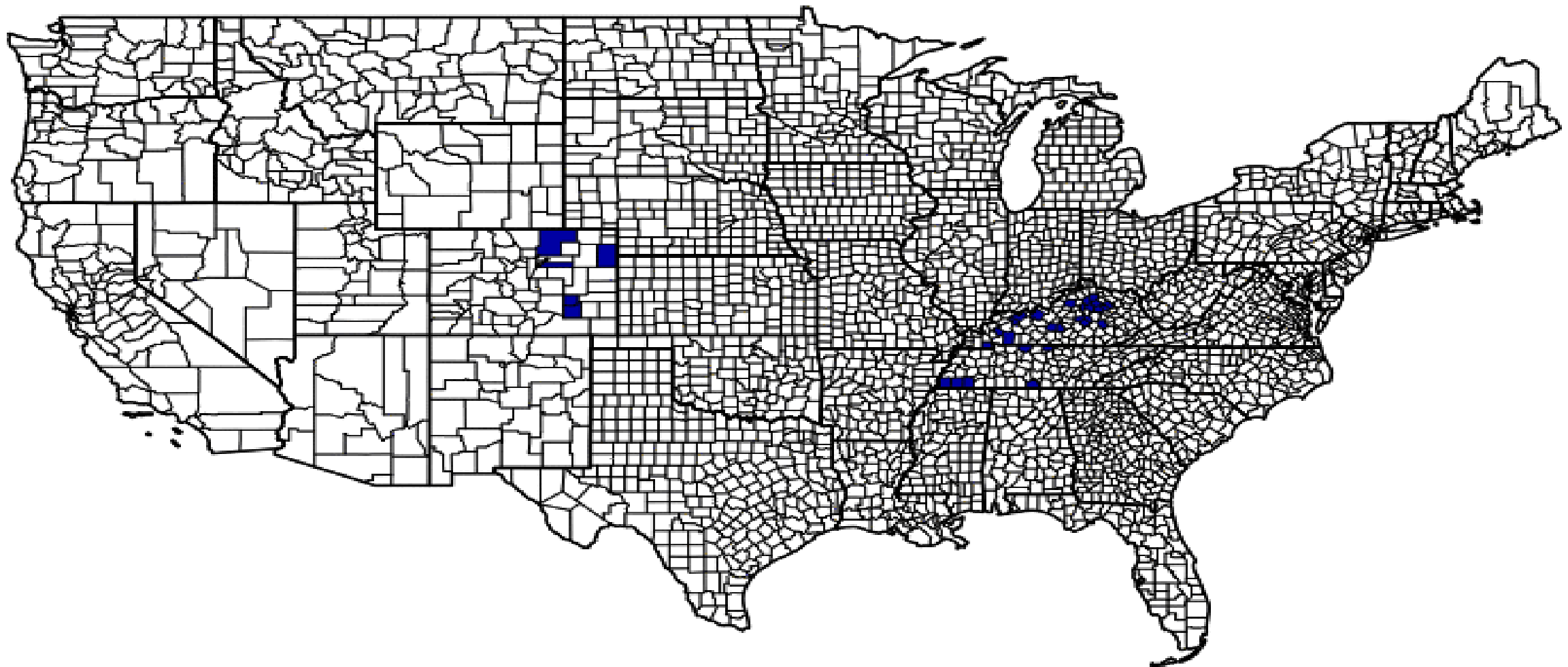
For more info: [hempinfo@votehemp.com](mailto:hempinfo@votehemp.com)

Page 1 of 1

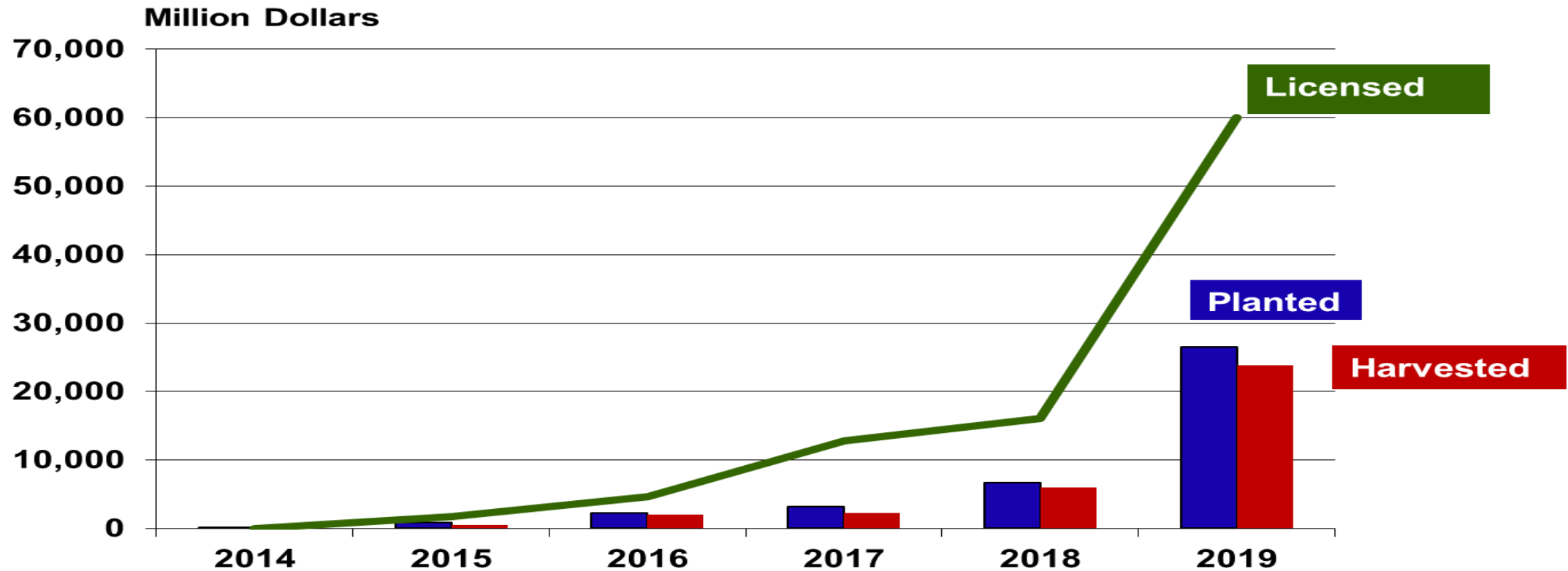
# REPORTED U.S. HEMP ACREAGE AND GREENHOUSE AREA, 2014-2018



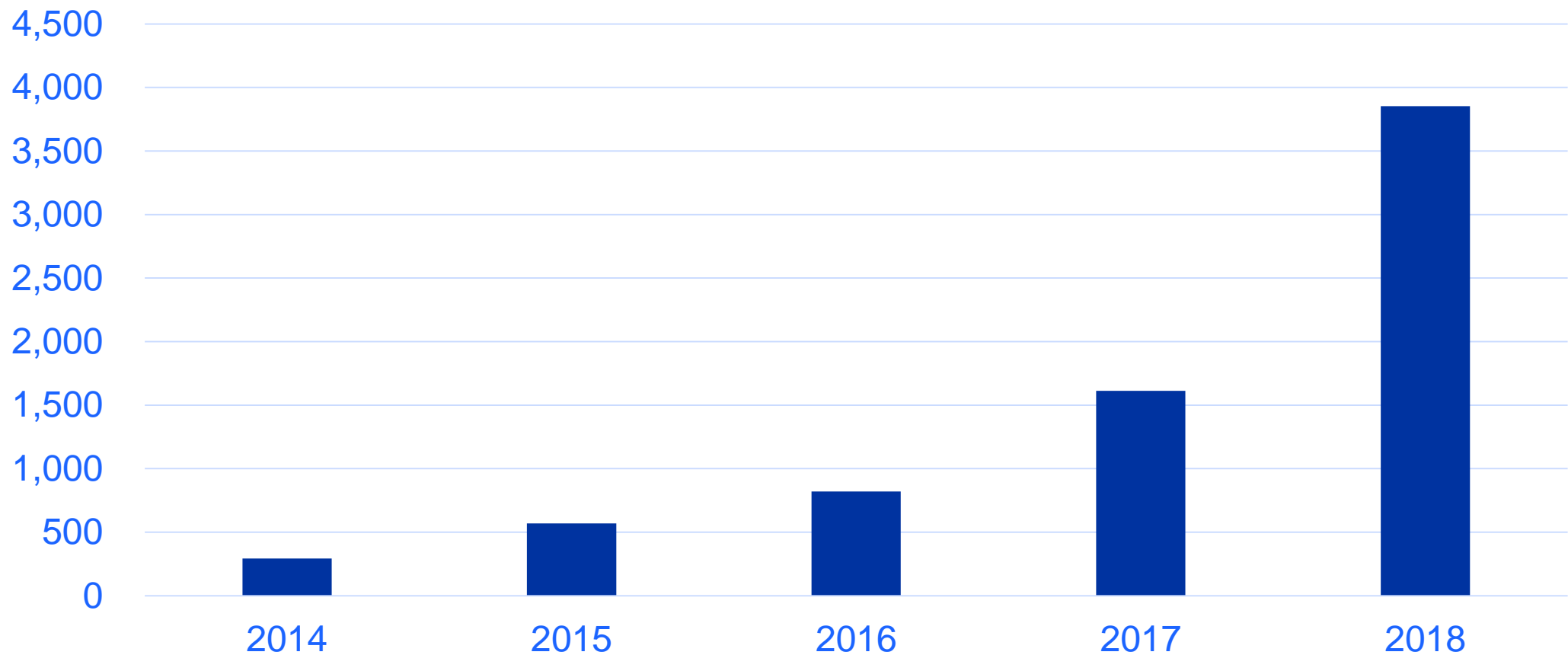
# Total Planted Hemp Acres in 2015



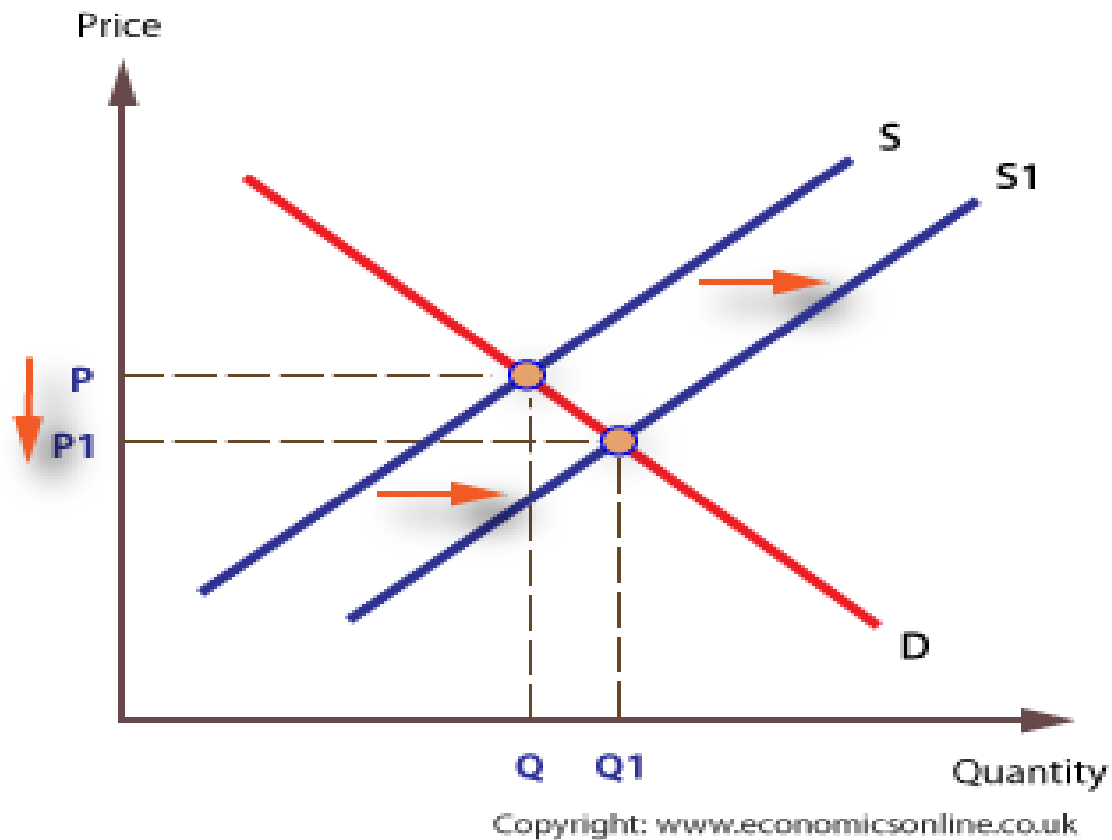
# KENTUCKY HEMP ACRES



# APPROVED U.S. PRODUCER HEMP LICENSES, 2014-2018



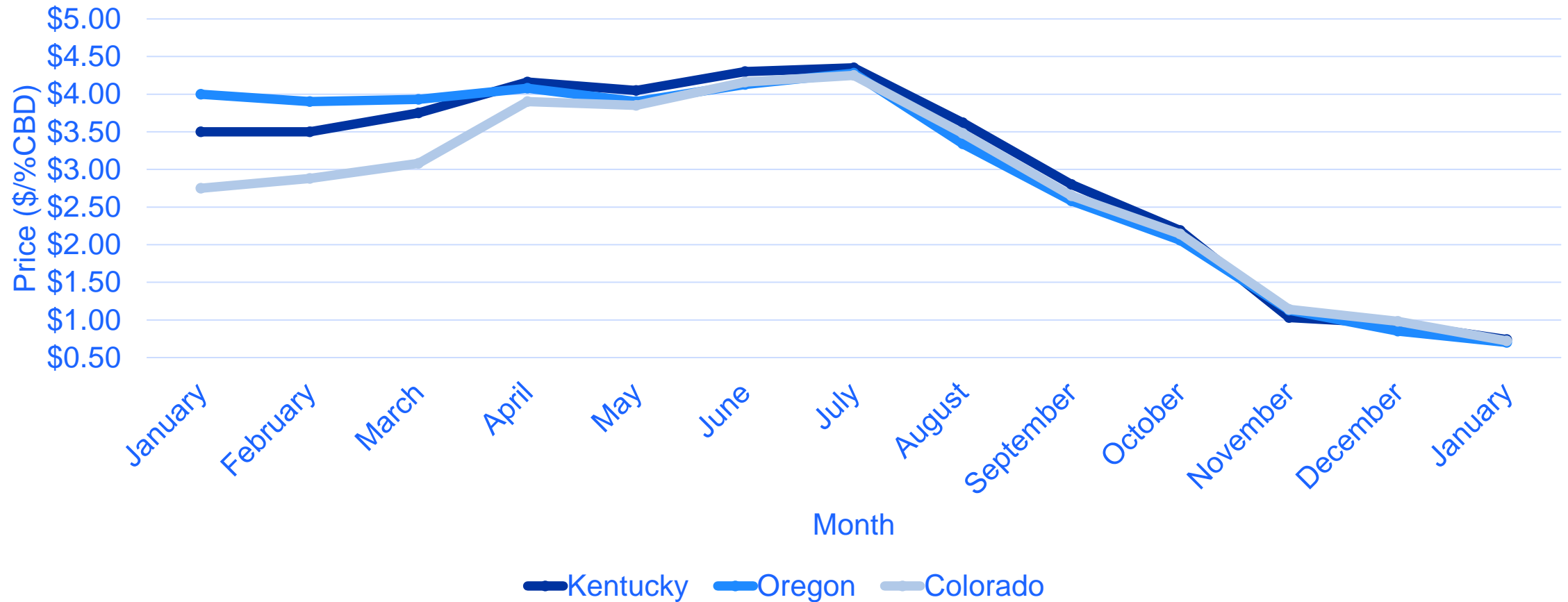
# ECONOMICS ARE IMPORTANT!!



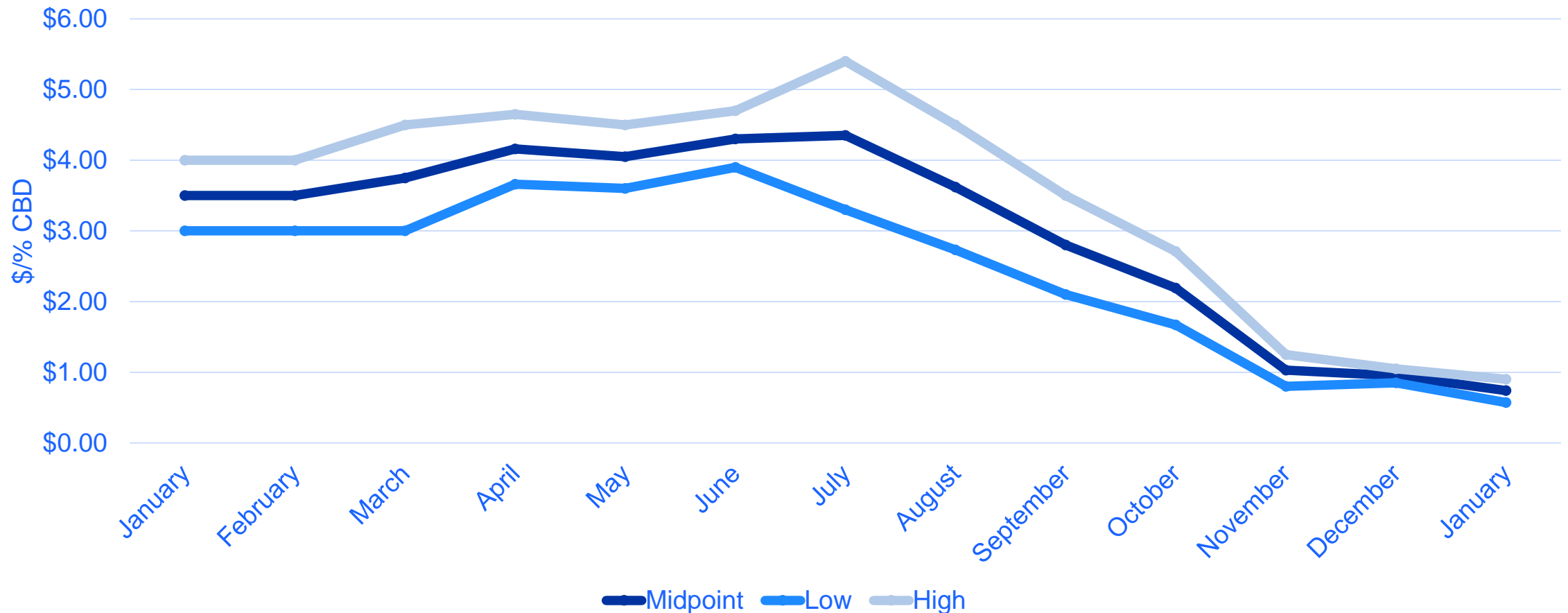


# **HEMP PRICING AND BUDGETS**

# 2019-2020 MIDPOINT BIOMASS PRICE FOR 3 KEY STATES



# KENTUCKY SPECIFIC, 2019-2020



# Grain and Fiber Woes



	Hemp Grain			Hemp Fiber		
	Quant	Price	Total	Quant	Price	Total
<b>Gross Returns Per Acre</b>						
CBD%	-	-	-	-	-	-
Price Per %	-	-	-	-	-	-
Total Yield (lbs)	-	-	-	-	-	-
Dry Matter Yield (lbs)	-	-	-	-	-	-
Hemp Grain (lbs)	1,200	\$0.70	\$840	-	-	-
Hemp Fiber (lbs)	-	-	-	10,000	\$0.07	\$700
<b>Total Revenue</b>			\$840			\$700
<b>Total Variable Costs Per Acre</b>			\$335			\$437
<b>Return Above Variable Cost Per Acre</b>			\$505			\$262*
<b>Return Above Fixed Cost Per Acre</b>			\$233			-\$9

# 2020 PRELIMINARY BUDGET FOR CBD PRODUCTION



	CBD Tobacco Model			CBD Plasticulture		
	Quant	Price	Total	Quant	Price	Total
<b>Gross Returns Per Acre</b>						
CBD%	6.00%	-	-	6.00%	-	-
Price Per %	\$1.50	-	-	\$1.50	-	-
Plants Per Acre	3,000	-	-	1,500	-	-
DFM per Plant (lbs)	0.8	-	-	1.0	-	-
Harvest Index (1=100%)	0.95	-	-	0.95	-	-
Total Marketable DFM	2,137.50	-	-	1,425.00	-	-
Crop Insurance	-	-	-	-	-	-
Hemp Grain (lbs)	-	-	-	-	-	-
Hemp Fiber (lbs)	-	-	-	-	-	-
<b>Total Revenue</b>			\$19,238			\$12,825
<b>Total Variable Costs Per Acre</b>			\$17,175			\$10,402
<b>Total Specified Fixed Costs</b>			\$367			\$371
<b>Return Above All Specified Costs</b>			\$1,695			\$2,052

# TOBACCO MODEL SENSITIVITY (\$/%/LB & %CBD)

## Sensitivity Analysis

### Returns Above All Specified Costs (%/lb DFM)

\$/%/LB		3.0%	4.0%	5.0%	6.0%	7.0%	8.0%	9.0%	10.0%
	\$1.00	(\$11,130)	(\$8,992)	(\$6,855)	(\$4,717)	(\$2,580)	(\$442)	\$1,695	\$3,833
	\$2.00	(\$4,717)	(\$442)	\$3,833	\$8,108	\$12,383	\$16,658	\$20,933	\$25,208
	\$3.00	\$1,695	\$8,108	\$14,520	\$20,933	\$27,345	\$33,758	\$40,170	\$46,583
	\$4.00	\$8,108	\$16,658	\$25,208	\$33,758	\$42,308	\$50,858	\$59,408	\$67,958
	\$5.00	\$14,520	\$25,208	\$35,895	\$46,583	\$57,270	\$67,958	\$78,645	\$89,333
	\$6.00	\$20,933	\$33,758	\$46,583	\$59,408	\$72,233	\$85,058	\$97,883	\$110,708

# PLASTICULTURE SENSITIVITY (\$/%/LB & %CBD)

## Sensitivity Analysis

### Returns Above All Specified Costs (%/lb DFM)

\$/%/LB		3.0%	4.0%	5.0%	6.0%	7.0%	8.0%	9.0%	10.0%
	\$1.00	(\$6,499)	(\$5,074)	(\$3,649)	(\$2,224)	(\$799)	\$626	\$2,051	\$3,476
	\$2.00	(\$2,224)	\$626	\$3,476	\$6,326	\$9,176	\$12,026	\$14,876	\$17,726
	\$3.00	\$2,051	\$6,326	\$10,601	\$14,876	\$19,151	\$23,426	\$27,701	\$31,976
	\$4.00	\$6,326	\$12,026	\$17,726	\$23,426	\$29,126	\$34,826	\$40,526	\$46,226
	\$5.00	\$10,601	\$17,726	\$24,851	\$31,976	\$39,101	\$46,226	\$53,351	\$60,476
	\$6.00	\$14,876	\$23,426	\$31,976	\$40,526	\$49,076	\$57,626	\$66,176	\$74,726

# Where might we go?



	CBD Row Crop W/Grain Harvested			CBD Row Crop Ensiel'd No Grain Harvested		
	Quant	Price	Total	Quant	Price	Total
<b>Gross Returns Per Acre</b>						
CBD%	3.00%	-	-	3.50%	-	-
Price Per %	\$1.00	-	-	\$1.00	-	-
Total Yield (lbs)	1,500	-	-	-	-	-
Dry Matter Yield (lbs)	1,300	\$3.00	\$3,900	1,500	\$3.50	\$5,250
Hemp Grain (lbs)	1,000	\$0.70	\$700	-	-	-
Hemp Fiber (lbs)	-	-	-	-	-	-
<b>Total Revenue</b>			\$4,600			\$5,250
<b>Total Variable Costs Per Acre</b>			\$1,522			\$1,396
<b>Return Above Variable Cost Per Acre</b>			\$3,078			\$3,854

# Grain and Fiber Woes



\*state license application cost of \$400 not accounted for

	Hemp Grain			Hemp Fiber		
	Quant	Price	Total	Quant	Price	Total
<b>Gross Returns Per Acre</b>						
CBD%	-	-	-	-	-	-
Price Per %	-	-	-	-	-	-
Total Yield (lbs)	-	-	-	-	-	-
Dry Matter Yield (lbs)	-	-	-	-	-	-
Hemp Grain (lbs)	1,200	\$0.70	\$840	-	-	-
Hemp Fiber (lbs)	-	-	-	10,000	\$0.07	\$700
<b>Total Revenue</b>			\$840			\$700
<b>Total Variable Costs Per Acre</b>			\$498*			\$665*
<b>Return Above Variable Cost Per Acre</b>			\$458*			\$35*



# **RISKS IN THE INDUSTRY**

# INPUT COSTS & AVAILABILITY

- Conventional vs. Feminized vs. Clones
  - Costs
  - Will there be enough available in 2020?
- Labelled Chemicals
  - EPA is reviewing

**Certified seed shortage means hemp crops exhibit wide range of phytochemistry, expert says**

By Hank Schultz

29-Aug-2019 - Last updated on 29-Aug-2019 at 17:27 GMT



U.S. Region Products	Units	Assessed Price	Low	High
CBD Biomass (Aggregate)	\$ / % CBD / pound	\$1.00	\$0.40	\$2.50
CBD Biomass (0 - 25K pounds)	\$ / % CBD / pound	\$1.31	\$0.70	\$2.50
CBD Biomass (25K - 100K pounds)	\$ / % CBD / pound	\$1.14	\$0.65	\$1.75
CBD Biomass (100K - 1M pounds)	\$ / % CBD / pound	\$1.01	\$0.60	\$1.30
CBD Biomass (1M+ pounds)	\$ / % CBD / pound	\$0.55	\$0.40	\$0.75
CBG Biomass	\$ / % CBG / pound	\$14.80	\$10.00	\$20.00
CBD Flower (Bulk)	\$ / pound	\$226	\$63	\$675
CBD Clones	\$ / each	\$4.25	\$3.00	\$6.00
Industrial Seeds	\$ / pound	\$4.57	\$3.72	\$8.00
CBD Seeds (Non-Feminized)	\$ / pound	\$1,435	\$475	\$4,000
CBD Seeds (Feminized)	\$ / seed	\$0.93	\$0.40	\$1.25
Crude Hemp Oil	\$ / kilogram	\$668	\$325	\$1,200
Refined Hemp Oil (Aggregate)	\$ / kilogram	\$2,528	\$750	\$5,273
Distillate - THC Free	\$ / kilogram	\$3,120	\$2,000	\$5,273
Distillate - Broad Spectrum	\$ / kilogram	\$2,858	\$1,400	\$3,954
Distillate - Full Spectrum	\$ / kilogram	\$1,791	\$750	\$2,640
CBD Isolate	\$ / kilogram	\$1,624	\$1,100	\$4,000

Source: Hemp Benchmarks

# CONTRACTS AND STORAGE

- Contract Structure
  - What are the terms of the contract?
  - Payment terms
  - Contract structures vary widely
  - Can dictate ability to grow?
  - Involve a lawyer
  - Speculation
- Storage is a distant thought to producers
  - 6-12 months of storage
  - Impact on storage of other commodities
  - Different than traditional grain storage
  - Improper storage creates off flavors or mold



# WHAT IS AN AGRICULTURAL PRODUCTION CONTRACT

- Agricultural production contracts are agreements between producers and contractors, typically agricultural commodity processors, that detail an arrangement for raising agricultural commodities. These contracts usually identify the production practices to be used, identify the party responsible for supplying the required resources, and specify quantity, quality, and method of payment for the product.
- Source: <https://nationalaglawcenter.org/research-by-topic/production-contracts/>

# CONTRACT CONSIDERATIONS

- State law restrictions or regulations on agricultural production contracts
- What happens if pre-harvest THC testing is above allowable amount?
- What happens if post-harvest THC testing is above allowable amount?
- When will CBD or Essential Oil testing take place?
- How is the my hemp tracked through the system?
- Who is responsible if hemp is seized?
- Who is providing the plant material or genetics?
- Who is responsible for testing costs? (heavy metal, residues, etc.)
  - What lab will be used for testing?
- How will payment be made? If payment is late what % interest will accrue?
- Money upfront?

# ACCESS TO CREDIT & RISK MANAGEMENT

- Can you get operating capital
  - Will lenders even lend to hemp producers?
  - Setting up bank accounts to put hemp money in be problematic
  - Utilization of operating loan to produce hemp
- Lack of risk management tools
  - crop insurance
    - Private
    - Noninsured Crop Disaster Assistance Program (NAP)
    - Whole Farm Revenue Policy
      - (<https://www.rma.usda.gov/en/News-Room/Frequently-Asked-Questions/Whole-Farm-Revenue-Protection-Plan-2020>)
    - Actual Production History pilot program in 2020
    - Nursery Value Select pilot program in 2021???
  - farm programs
  - futures markets...
  - Security



# ACTUAL PRODUCTION HISTORY (APH) CROP INSURANCE

- Pilot Insurance Coverage for Hemp Growers (Grain, Fiber, Flower)
  - 21 States in 2020 (Select Counties)
    - Alabama, California, Colorado, Illinois, Indiana, Kansas Kentucky, Maine, Michigan, Minnesota, Montana, New Mexico, New York, North Carolina, North Dakota, Oklahoma, Oregon, Pennsylvania, Tennessee, Virginia, and Wisconsin
  - Compliant with applicable state, tribal or federal regulations for hemp production
  - At least 1 year of history producing the crop
  - Contract for the sale of insured hemp
  - Licensed under a state, tribal or federal program approved by the USDA under the IFR for federal hemp production
  - Will not cover crop exceeding federal acceptable limits (0.3% THC on a dry-weight basis)
  - No Replant

# KY HEADLINES

WDRB

## Kentucky's hemp supporters remain optimistic despite ...

LOUISVILLE, Ky. (WDRB) — The bankruptcy of a major hemp processor is raising new questions about the future of the crop in Kentucky.

9 hours ago

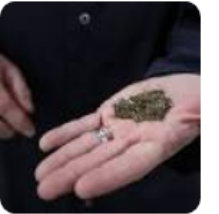


Courier Journal

## Kentucky hemp's painful correction: Some big players sink, smaller ones hang on

Amid news of two high-profile bankruptcies in Kentucky hemp, Clinton County grower Bobby Huff issued a public service announcement to ...

2 days ago



Courier Journal

## Kentucky hemp, CBD giant's bankruptcy is a 'black eye' for industry, congressman says

Kentucky hemp, CBD giant's bankruptcy is a 'black eye' for industry, ... money they owe farmers and contractors in Kentucky," Comer said.

1 week ago



Lexington Herald Leader

## Ky. hemp companies face bankruptcy as 'bureaucratic paralysis' plagues industry

Two Kentucky hemp companies — one in Winchester and another in Louisville — are facing bankruptcy proceedings following months of cash ...

2 weeks ago



WKYT

## 2 Kentucky hemp companies face bankruptcy proceedings

LEXINGTON, Ky. (AP) Two Kentucky hemp companies, including one of the state's largest, are facing bankruptcy proceedings. The Lexington ...

2 weeks ago



# Over Hyped Hemp? Amid Price Drop And A Big Bankruptcy, Some Farmers Feel Burned

By LIAM NIEMEYER • FEB 10, 2020

Wkms.org

| [www.agecon.ca.uky.edu](http://www.agecon.ca.uky.edu)

# LEGAL AND LABOR

- Transportation
- Banking
- Mixing of industrial hemp, medical marijuana & recreational marijuana
- Access to labor
- Standards for final products and testing
  - THC
- FDA
  - <https://www.fda.gov/news-events/public-health-focus/fda-regulation-cannabis-and-cannabis-derived-products-including-cannabidiol-cbd>
- State Plans
  - <https://www.ams.usda.gov/rules-regulations/hemp/state-and-tribal-plan-review>
- State Fee Schedules
- Lawsuits



Creating a legal exception for CBD supplements, short of full safety data, could set a bad precedent, says FDA at CRN Conference



Photo © AdobeStock.com/KCULP



**GOING FORWARD IN 2020**

# 2020 CRYSTAL BALL

- 47+ states looking to get into the market
- New Regulations at State and Federal Level
  - Standardization of Regulations....PLEASE
- Hype Machine Continues
- # of producers with little to no ag background
- International Markets
- Concentration
- Contracts
- Crop Insurance Clarification
- Oversupply Issues
- Financing
- Prices are going, going,  
\_\_\_\_\_

# CONSIDERATIONS FOR PRODUCERS AND PROCESSORS

## Producers

- How many acres can I effectively manage?
- Do I have access to the market I am producing?
- How much do I have to invest?
- Financing method
- Do I have a contract and understand?
- Have I done my homework on the company I am contracting?
- How can I mitigate risk?
- What is my Plan B?
- What happens if crop has to be destroyed?

## Processors

- How much can I effectively process?
- Do I have a market for your product and how big is it?
- Who has the liability on the crop?
- Will my contract and terms attract the number of acres needed?
- What is my Plan B if venture capital is pulled?
- How long can I store?
- How am I going to finance the operation?
- Understanding of Rules and Regs



## 5 KEY TAKEAWAYS

1. 2020 Increased Production...Overproduction??
2. Risk Tolerance (Crop Insurance, Financing, Markets, etc.)
3. Regulations are slightly clear but still in flux
4. Misinformation
5. Tightening Margins



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# Outcomes from the 2014 Pilot Programs

- 
- 
- Economic Viability of Industrial Hemp in the United State: A Review of the State Pilot Programs
    - A collaborative effort between ERS, USDA, and University of Kentucky
    - Many thanks to all of those involved!!!!



# LESSONS LEARNED

# STATE PILOT PROGRAM SUPPORT AND MANAGEMENT CHARACTERISTICS

	Similarities	Differences
Support	Fees to Cover Program Costs	Fee Schedule
	Small Staff	University Extension
Management	THC* Testing Required	THC* Sampling, Testing Procedures and Costs
	Background Checks	Stakeholder Engagement
	GPS Field Locations	Seed Source Requirements
	Annual Reports	Detail of Data Collected

\* THC is delta-9 tetrahydrocannabinol.

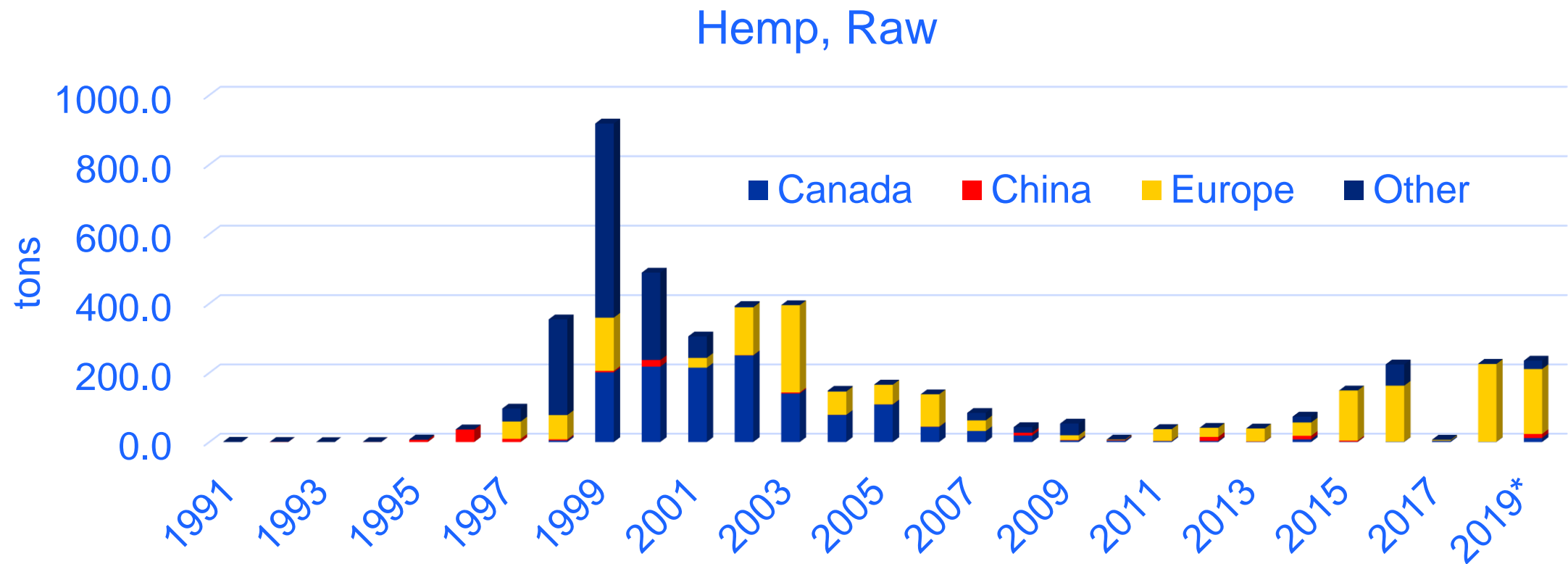
# AVERAGE STAFF RESPONSIBILITY FOR HEMP PILOT PROGRAM IN STATES WITH REPORTED DATA

	Coverage per Staff Person		
Production	Average	Minimum	Maximum
Field Acres (n=17)	2,479	4.2	22,000
Greenhouse Square Ft (n=8)	203,514	1,000	1,368,149
Processor Number (n=13)	12.6	0.5	30.3

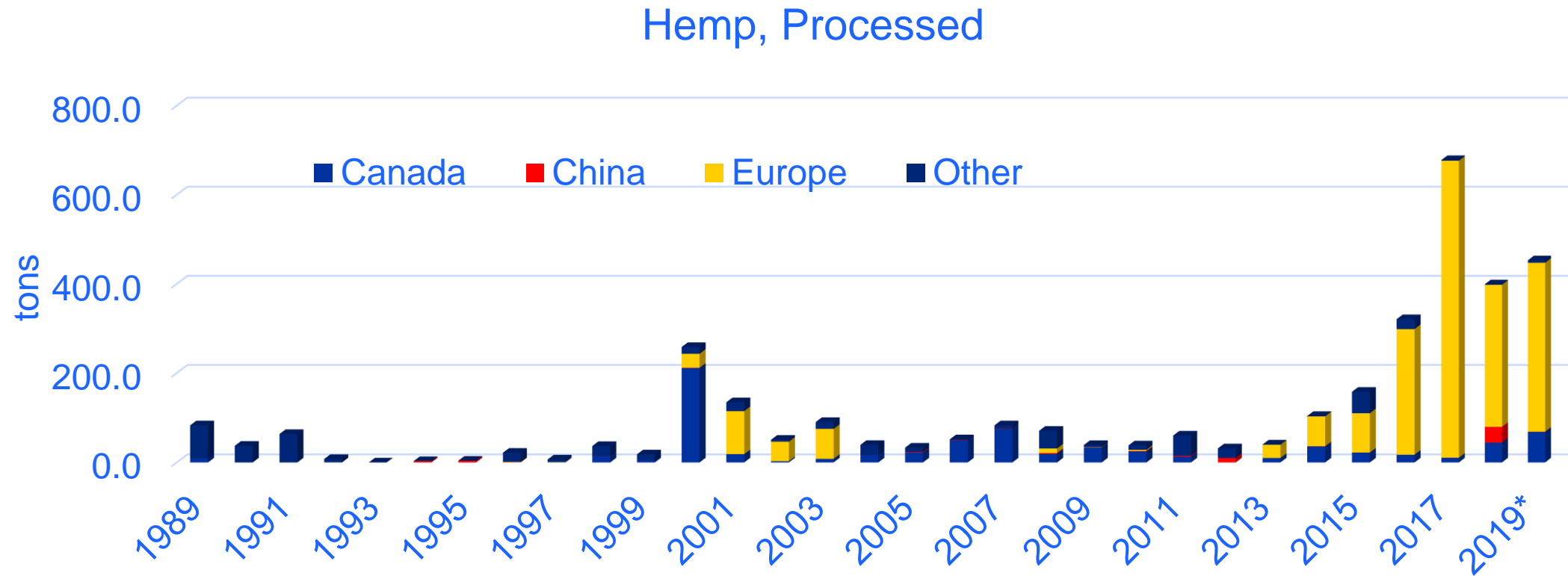


# **ECONOMIC VIABILITY**

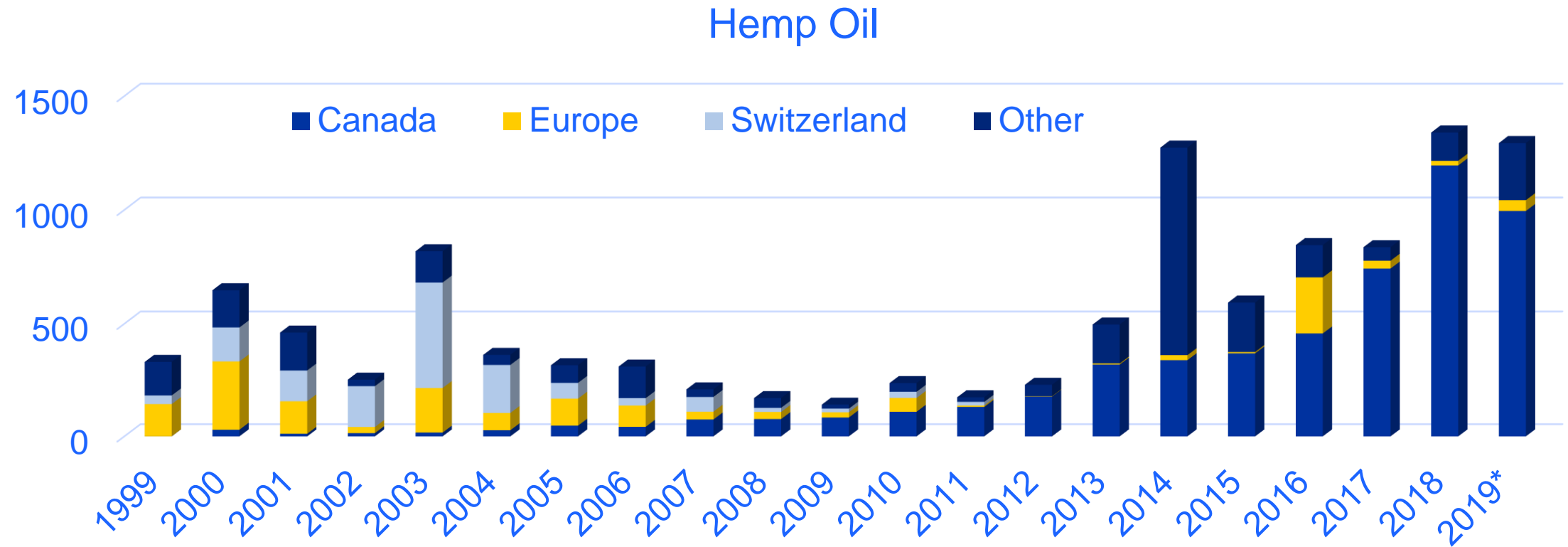
# U.S. IMPORTS OF RAW HEMP, 1991-2019.



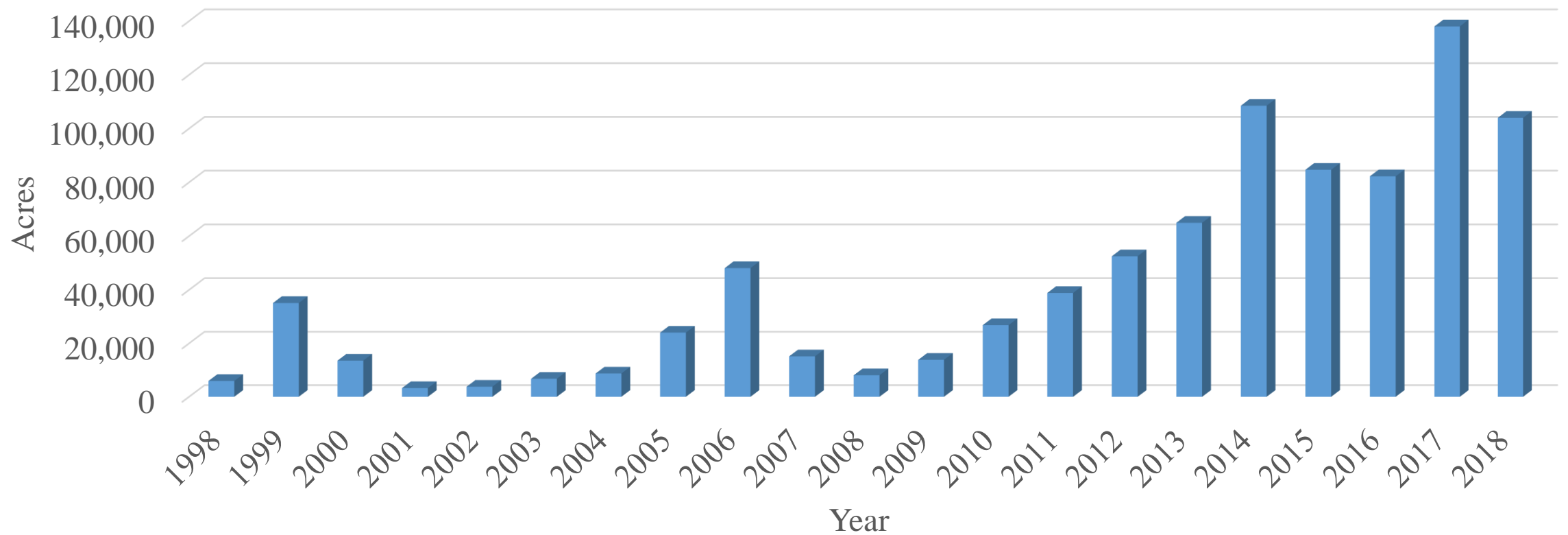
# U.S. IMPORTS OF PROCESSED HEMP, 1989-2019



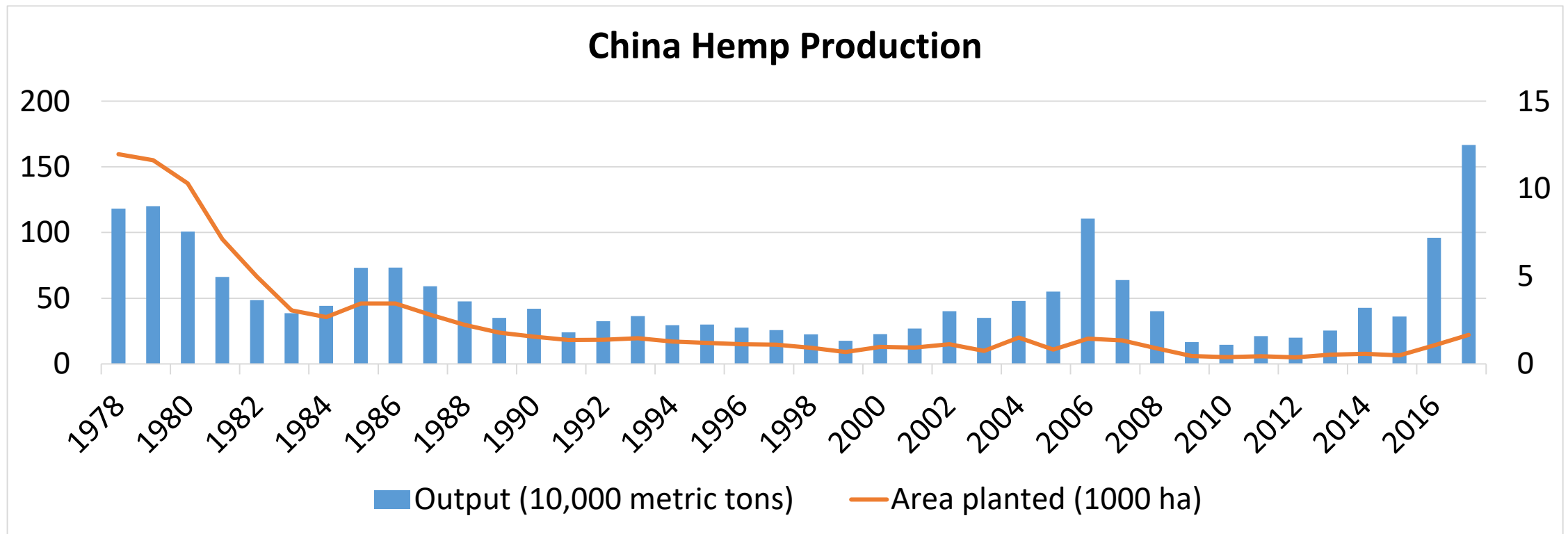
# U.S. IMPORTS OF HEMP OIL, 1999-2019



# CANADIAN HEMP ACREAGE 1998-2018



# CHINA HEMP PRODUCTION, 1978-2017



# Contact Information



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# REFERENCES

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  - <https://www.hempbenchmarks.com/hemp-spot-price-index.html>
- University of Tennessee
  - <https://ag.tennessee.edu/arec/Pages/budgets.aspx>
- Industrial Hemp as a Modern Commodity Crop
  - <https://dl.sciencesocieties.org/publications/industrialhemp>