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University of Tennessee Extension's 2020 Hemp Industry Survey

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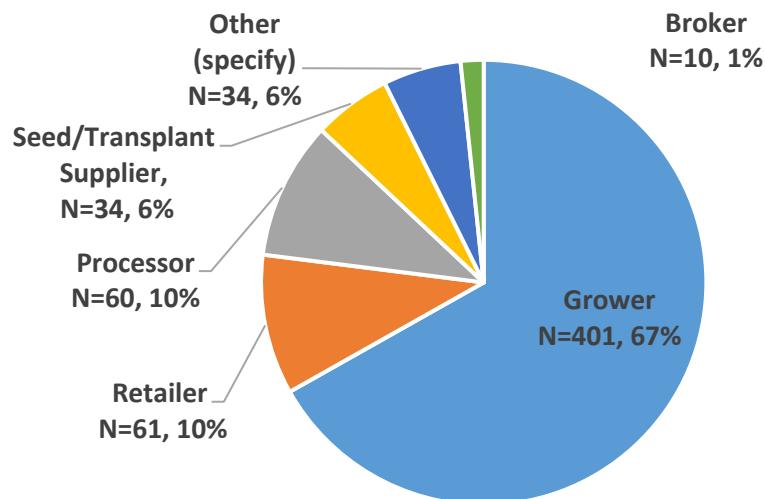
Overview

In April 2020, University of Tennessee (UT) Extension conducted a survey of hemp growers and hemp industry stakeholders. The survey consisted of 16 questions to illicit opinions regarding 2019 and 2020 hemp production in Tennessee. The survey was emailed to UT county Extension agents, area specialists and state specialists to be distributed to producers and other hemp industry stakeholders. Survey results depict the answers and opinions of the 600 respondents who completed at least one survey question.

The following information has been collected to show an overview of production, marketing and risk management practices used in the 2019 and 2020 production years. While readers can draw their own conclusions, our analysis of the results indicated that producers faced numerous challenges during the 2019 production year. Two of the largest challenges were securing a viable market or processor for their production and variation/uncertainty in pricing of the end product. On the positive side, in spite of a lack of established production methods, producers were able to successfully grow a crop, with average plant losses of only 19 percent and average yields per plant of 2.0 lb for biomass and 1.1 lb per plant for flower. Partially due to marketing challenges, the 2020 production level is anticipated to be lower than 2019. Additionally, due to bad experiences in 2019 with contracts, fewer growers are signing contracts with processors or purchasers. Despite the marketing challenges and a lack of regulatory clarity, many producers and stakeholders are willing to continue investing in the emerging hemp industry in Tennessee. The long-term structure and viability of the industrial hemp industry in Tennessee remains highly uncertain.

Survey Responses (N=600)

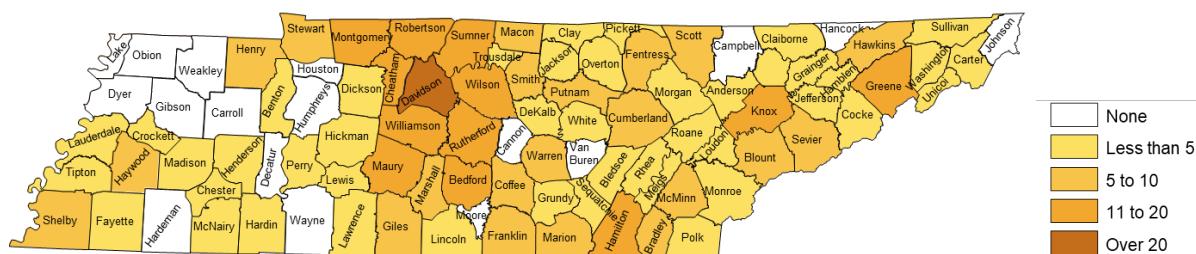
Q1. Please select the category that describes your hemp business (select all that apply): (N=600)



Number of responding growers (401) represents 10.1 percent of 3,957 Tennessee licensed growers in 2019. In Tennessee, licensed growers exceed actual growers; however, at the time of publication, the Tennessee Department of Agriculture (TDA) had not released the number of growers who planted a crop in 2019.

Q2. Please indicate the county/counties you grow hemp in or operate your business in. (N=396)

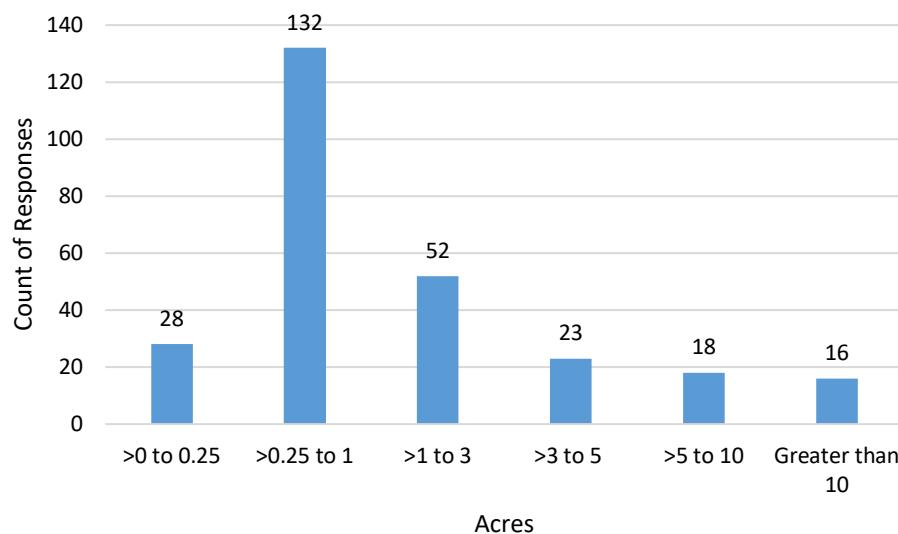
Number of survey responses by county



County and District	Number of Survey Responses	County and District	Number of Survey Responses
Lauderdale	1	Bledsoe	9
Shelby	6	Coffee	5
Tipton	2	Cumberland	5
Delta	9	Fentress	9
Benton	2	Franklin	6
Chester	2	Grundy	3
Crockett	1	Marion	5
Fayette	2	Morgan	1
Hardin	3	Overton	4
Haywood	5	Putnam	9
Henderson	1	Scott	6
Henry	8	Sequatchie	3
Madison	2	Warren	6
McNairy	3	White	4
West Tennessee	29	Cumberland Plateau	75
Cheatham	10	Anderson	4
Dickson	4	Blount	6
Hickman	2	Bradley	5
Lawrence	3	Carter	3
Lewis	2	Claiborne	2
Montgomery	15	Cocke	3
Perry	3	Grainger	1
Robertson	13	Greene	11
Stewart	9	Hamblen	3
Western Rim	61	Hamilton	12
Bedford	3	Hawkins	8
Clay	2	Jefferson	3
Davidson	24	Knox	14
DeKalb	3	Loudon	2
Giles	5	McMinn	10
Jackson	1	Meigs	2
Lincoln	3	Monroe	1
Macon	6	Polk	4
Marshall	8	Rhea	1
Maury	12	Roane	3
Rutherford	20	Sevier	7
Smith	5	Sullivan	3
Sumner	14	Unicoi	2
Trousdale	2	Union	1
Williamson	13	Washington	2
Wilson	14	East Tennessee	113
Central Basin	135	State	422

Survey responses were obtained from all three grand divisions (East, Middle and West) and all six crop reporting districts (CRD) of Tennessee. The greatest density of survey responses was in Middle Tennessee, which does coincide with TDA's licensed producer map. Numerous respondents were operating in multiple counties, resulting in 422 county production observations for 396 survey responses. Additionally, responses were recorded from producers operating in both Tennessee and southern Kentucky.

Q3. How many acres of hemp did you grow in 2019? (N=269)



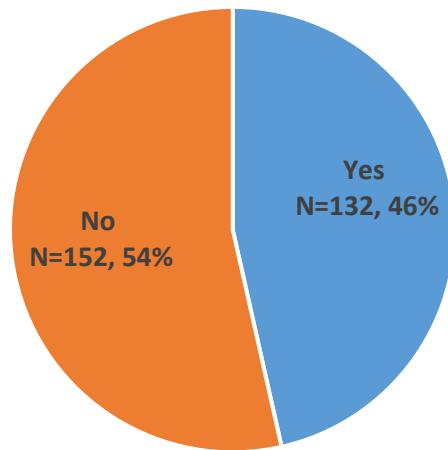
Total number of acres reported in the survey was 1,269, with a maximum of 190 acres and a minimum of less than 0.1 acre. A total of 113 producers indicated 1 acre grown.

Q4. What was the average plant population per acre? (N=274)

Plants Per Acre	Count (number of survey responses)
1-599	108
600-1,199	69
1,200-1,799	61
1,800-2,399	28
2,400+	8

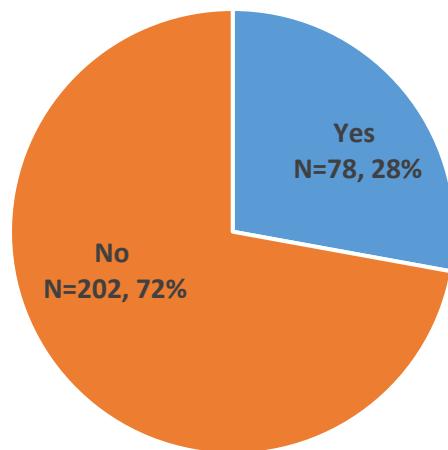
The average for all responses was 749 plants per acre, with a maximum of 15,000. After excluding plots of less than 1 acre, the most popular plant population counts were 45 for 600-1,199 plants/acre; 48 for 1,200-1,799 plants/acre; and 27 for 1,800-2,399 plants/acre.

Q5. Did you use irrigation? (N=284)



The majority of producers indicated that they did not use irrigation during the 2019 production year. We did not ask for method of irrigation in the survey.

Q6. Did you use plastic? (N=280)



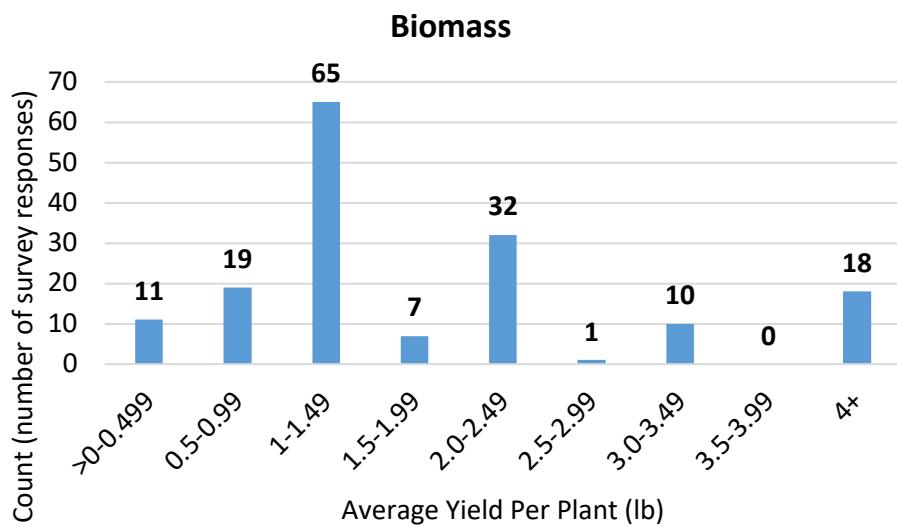
More than one quarter of survey respondents used a plastic cover as a means of weed control for hemp production in 2019. The survey did not ask about other weed control practices.

Q7. What was the percent of loss (crop failure) due to diseases or other issues? (N=399)

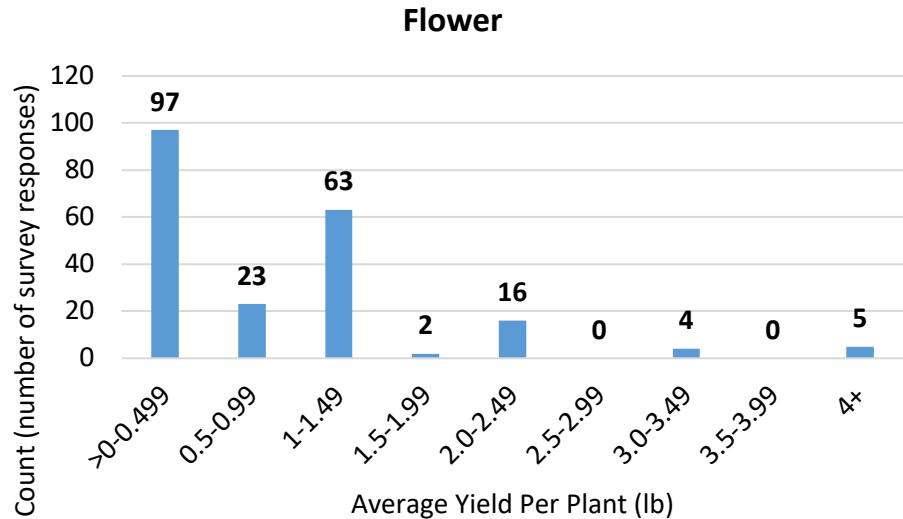
Percent Loss	Count (number of survey responses)
0	110
>0-4.99	57
5-9.99	28
10-19.99	47
20-49.99	98
50-74.99	33
75-99.99	14
100	12

Percent of loss ranged from a low of 0 percent (110 plots) to a high of 100 percent (12 plots). Average (non-acreage weighted) percent loss across all responses was 19 percent. The cause of loss was not asked.

Q8. What was the average yield per plant? (N=330)



Biomass¹ production ranged from a low of 0 (75 plots) to a high of +4 lb/plant. Excluding plants with zero yield, the average yield per plant was 2.0 lb/plant.

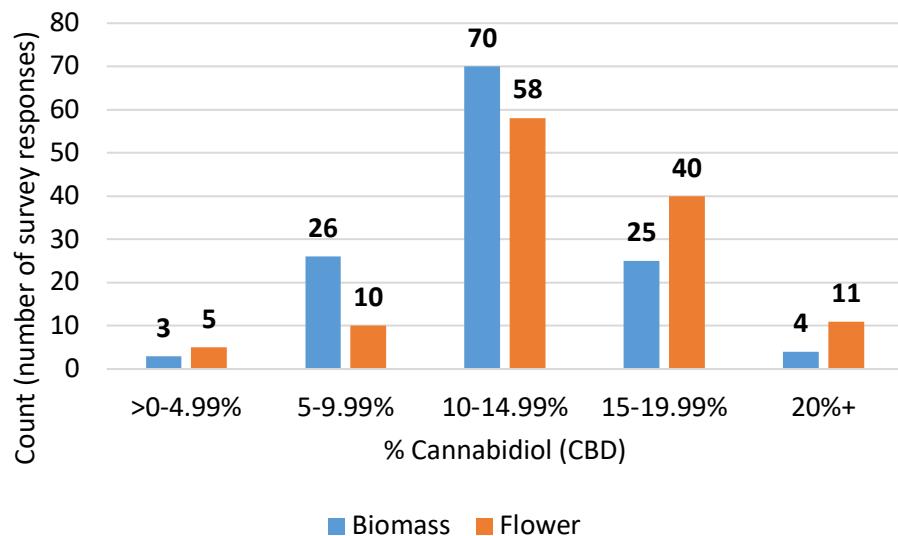


Flower² production ranged from a low of 0 (74 plots) to a high of +4 lb/plant (five plots). The most common yields were 1 lb/plant (60 plots) and 0.5 lb/plant (18 plots). Excluding zero responses, the average yield per plant was 1.1 lb/plant.

¹ The data are subject to an individual survey respondent's interpretation of "biomass." Some responses may include only flower or floral material and others the whole plant. As such, any extrapolation of the data should be cautiously undertaken. No attempt was made to interpret individual responses.

² The data are subject to an individual survey respondent's interpretation of "Flower Material." Some responses may include only flower material and others the leaves or whole plant. As such, any extrapolation of the data should be cautiously undertaken. No attempt was made to interpret individual responses.

Q9. What was the average percentage of Cannabidiol (CBD)³ content of your marketed crop? (N=215)



Biomass⁴ CBD content ranged from a low of 0 (118 plots) to a high of +20 percent (four plots). Excluding zero responses, the average CBD percent was 12 percent.

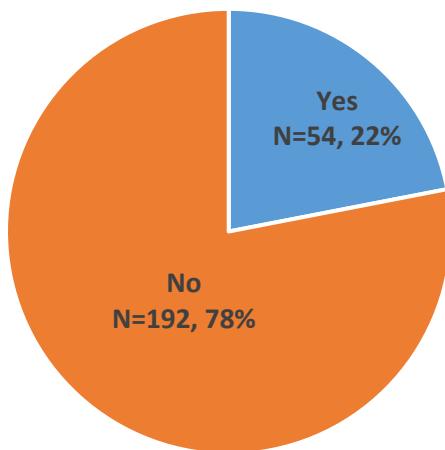
Flower⁵ CBD content ranged from a low of 0 (125 plots) to a high of +20 percent (11 plots). Excluding zero responses, the average CBD percent was 14 percent.

³ CBD stands for cannabidiol, one of the many cannabinoid compounds produced from the hemp plant.

⁴ The data are based solely on survey responses and were not subject to verification. The data are subject to an individual survey respondent's interpretation of "biomass." Some responses may include only flower material and others the whole plant. As such, any extrapolation of the data should be cautiously undertaken.

⁵ The data are subject to an individual survey respondent's interpretation of "flower material." Some responses may include only flower material, while others may include leaves or the whole plant. As such, any extrapolation of the data should be cautiously undertaken.

Q10. In 2019, did you have a contract with a processor? (N=246)



The total reported acres under contracts in 2019 was 587 acres, representing nearly half of the total reported production. Nearly 80 percent of these growers will reduce their production or do not intend to grow in 2020. The intended acres for these 54 survey respondents in 2020 was 96 acres, a nearly 84 percent reduction from 2019. Only eight of these growers obtained some form of contract for 2020, with contracted acres less than 10. In discussions with growers, two major issues arose regarding hemp contracts in 2019: 1) enforceability — many of the contracts offered by processors did not afford producers adequate protection and were easily voided through favorable clauses to the processor or purchaser in the agreement; and 2) counterparty risk⁶ — purchasers were unable to meet their obligations under the contract. The latter may have occurred as a result of financial hardship (i.e., bankrupt processors) or nefarious misrepresentation.

⁶ Counterparty risk is the risk associated with the other party to a financial arrangement not meeting its obligations.

Q11. How many pounds of 2019 harvest were you able to sell by April 30, 2020?

Biomass Sold (N=229)

Number of Pounds Sold	Count (number of survey responses)
0	186
>0-99	15
100-999	15
1,000-4,999	9
5,000+	4

The amount of biomass sold ranged from 0 to 12,000 lb, with a total of 69,691 lb sold. At the time of the survey, only 18.8 percent of the respondents (N=229) had sold any of their 2019 biomass production. The total reported sales from growers with contracts in 2019 was 39,694 lb, counting for 57 percent of total reported sales. However, it's unclear if these sales were made through the contracts. Processing capacity and willing buyers for hemp were difficult to find, with respondents indicating a lack of market as a major obstacle in 2019.

Flower Sold (N=220)

Number of Pounds Sold	Count (number of survey responses)
0	154
>0-99	50
100-999	13
1,000-4,999	2
5,000+	1

Flower sales ranged from 0 to 5,000 lb, with a total of 10,464 lb sold. At the time of the survey, only 30 percent of the question respondents (N=220) had sold any of their 2019 flower production. The total reported sales from growers with contracts in 2019 was 7,126 lb, counting for 68 percent of total reported sales. However, it's unclear if these sales were made through the contracts.

There was a total of 80,155 lb of biomass and flower sold for 2019. An estimated 5 percent of the total reported harvest assuming: 1,500 plants per acre, 1 lb/plant yield and 81 percent success rate, 1,269 acres.

CBD Oil: Eighteen survey responses indicated sales of CBD oil totaling 1,088 lb. A total of 93 percent of CBD oil sales came from three survey responses.

Q12. What was the average sales price (price received for sold hemp)?

Biomass (N=171): A total of 35 growers (20 percent) responded with values other than zero. Prices ranged from \$0.5 per percent to +\$3 per percent. The average CBD content was 14 percent, with a minimum of 8 percent. The average price received was \$1.5 per percent. The most common price received: \$1-2 per percent (nine plots) and \$0.5-0.9 per percent (six plots).

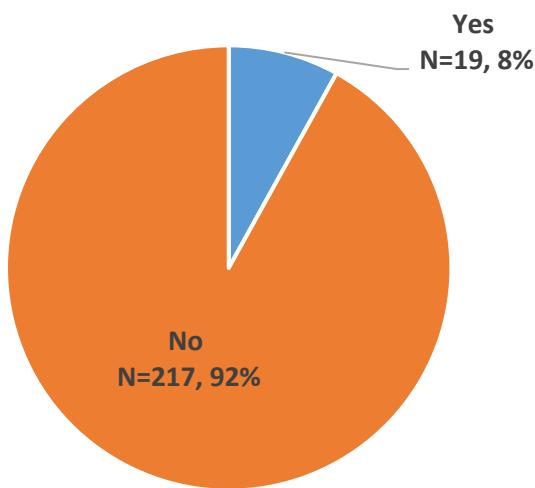
Flower and CBD Oil (N=168): A total of 52 growers (31 percent) responded with values other than zero. Prices ranged from \$0.5 to +\$400. Six responses indicated values of \$900 to \$10,000, which may have been total sales value, not sales price per unit.

Q13. For 2020, how many acres do you plan to grow, if any? (N=280)

Number of Acres	Count
0	56
>0-0.99	49
1-4.99	139
5-9.99	25
10+	11

The total intended acres for the survey respondents in 2020 was 763 acres, with a nearly 40 percent reduction compared to 2019. The average intended acres in 2020 was 3 acres, reduced from an average production of 5 acres in 2019.

Q14. If you are growing in 2020, have you reached an agreement or contract with a buyer or processor? (N=236)



Only 8 percent of respondents obtained agreements or contracts for 2020. Less contracting from processors was observed. This could be due to the lack of processors, lag of processing (many still have 2019 harvest held in inventory), or buyers weren't willing to take the risks by contracting growers. Bad growers' experiences in 2019 with production contracts likely reduced interest in entering contracts for 2020 (as also shown in the responses to Question 16). Instead, some producers have sought out share arrangements and/or processing fees with the processed product being returned to the grower. However, this survey did not inquire about these types of marketing alternatives. Additionally, there is some anecdotal evidence that operations are being vertically integrated, with one entity controlling genetics, production, processing and sales, potentially eliminating the need or reducing public disclosure of contracting.

Q15. If so, what is the contract price? If cash price is not specified in the agreement, what is the form of payment?

Six responses indicated a price range of \$1 per percent to +\$5 per percent.

Another 44 acres were under another form of agreement, with 42 acres under 50/50 revenue share agreement with the processor, 1 acre under a 60/40 share and another 1 acre under a 80/20 share.

Q16. What are your primary concerns regarding the 2020 hemp market?

Concern	Count (number of survey responses)
Sale/demand/price/slow movement	124
Regulation/THC	52
Inventory and oversupply	47
No processor/buyer/contract	34
COVID-19/economy	10
Contract not fulfilled	8
Cost of production	8
Learning	7
Fraud	6
Breeder practices/clone quality/genetics	5
Humidity/drought/weather	4
Stealing	2
Banking support	1
Limited minority resource	1
Use of chemicals/fraud testing	1

Many of the concerns for the 2020 crop reaffirmed challenges that producers faced in 2019. Regulations continue to evolve both at the state and federal level, with some policies (THC testing process) substantially different in Tennessee than other states. Producers need to be cognizant of changes in regulations that affect how they grow, transport and market their crops. Additionally, the COVID-19 pandemic has increased uncertainty at the production (labor and input supply) and retail levels (consumer spending).

Conclusions

Overall, the survey had good geographic representation of hemp producers in Tennessee. The survey indicated that Tennessee producers are using numerous production methods (plant populations, irrigation and plastic) to grow hemp. While production failures and challenges occurred in 2019, many producers were able to successfully grow a viable hemp crop. Yields and CBD content were highly variable. The largest obstacles to hemp production in Tennessee for 2019 and potentially in 2020 are a lack of processors and a stable market/pricing mechanism for growers to sell their product. For producers who were able to sell their production, prices for hemp were highly variable. Additionally, growers' experiences with production contracts in 2019 were overwhelmingly negative. While not asked directly in the survey, a lack of processing capacity in the state and supporting infrastructure will likely continue to hamper the development of the industry in the short term. Long term, industry development and market potential for hemp remains highly uncertain.

Producers and processors continue to modify and experiment with production, marketing, processing and retailing systems.

Disclaimer: The results of this survey are presented for informational and educational purposes only. For those that are interested in growing hemp, it is strongly encouraged to fully understand the risks, challenges and potential losses/payoffs from hemp production. Identifying a market, using best management practices (as are currently understood), managing risk, securing a processor or buyer, and working with qualified professionals is strongly recommended.



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