



2019

STATE OF THE
INDUSTRY
REPORT

Examining the Cannabis
Cultivation Market



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CANNABIS CULTIVATION TRENDS – TODAY & TOMORROW

Nexus Greenhouse Systems has partnered with *Cannabis Business Times* to sponsor the “State of the Cannabis Cultivation Industry” report on the cannabis cultivation market for the past four years. With solid year-over-year data, this research project provides the necessary information to assess the emerging trends in the cannabis industry as well as determine points of stability.

As the wholesale price per pound of cannabis continues to fall, managing production costs is more important than ever. In the 2018 study, the average cost per pound of dried flower for warehouses was \$472 compared to \$377 for greenhouses. This cost differential increased this year to warehouse at \$454 vs. greenhouse at \$279. For entrepreneurial companies and corporate entities alike, efficiency and significant cost control can be achieved with greenhouses.

Year-over-year data also is helpful in gaining perspective on trends regarding the size of operations’ cannabis production areas. The percentage of growers with more than 25,000 sq. ft. has increased from 22% in 2016 to 36% in 2019. On the other end of the spectrum, grow operations with less than 5,000 sq. ft. of cultivation space have fallen from 34% to 28%. This increase in larger growing areas with a simultaneous decrease in smaller ones indicates an overall expansion of industry grow operational size.

While gaining an accurate perspective of the industry over time is important for cannabis cultivators, it also allows Nexus to better serve the cultivators with exceptional greenhouse structures, integrated growing systems, and customer-focused service.

For 52 years, Nexus has been helping cultivators reach their business, energy consumption and yield goals by offering customized greenhouse designs with integrated agricultural technology, including sealed and semi-sealed structures, dehumidification, systems automation, and turnkey construction along with environmental controls and rolling benches to reduce energy costs and increase productivity.

This cannabis-industry participation has resulted in more than 2 million sq. ft. of completed cannabis projects throughout the U.S. and internationally. Nexus assists customers with the initial project design and project scope as well engineered drawings to manage weather conditions including wind, snow, humidity and temperatures. With consultation at each stage of project development, Nexus contributes to cannabis-industry growth with long-term customer relationships.

By focusing on serving customers’ growing needs today, Nexus keeps an eye on the future of cannabis production. Sponsoring this special report is important to us. Benchmarking data can help the entire industry measure current trends. Compiling year-over-year data provides a compelling look into the future. If you are asked to participate in next year’s study, I encourage you to do so; we can gather even more data with your help.

We appreciate your participation in this year’s research and are pleased to support *Cannabis Business Times* in its effort to collect essential cultivation-industry data through this annual “State of the Cannabis Cultivation Industry” report.

We look forward to continuing to work to foster this ever-changing and expanding industry.

— Greg Ellis, National Sales Director, Nexus Greenhouse Systems



EVOLVING, EXPANDING, WITH MORE ROOM TO GROW

WHEN CANNABIS BUSINESS TIMES FIRST INTRODUCED THE "STATE OF THE CANNABIS CULTIVATION INDUSTRY" REPORT IN 2016,

conducted in partnership with Readex Research and made possible each year with support from Nexus Greenhouse Systems, residents in Nevada were anticipating voting on a measure to legalize and regulate cannabis like alcohol. Ending prohibition was only a twinkle in Massachusetts advocates' eyes, as efforts to collect signatures to put the issue on the voter ballot were still under way. A bill for legalizing medical cannabis in Ohio succeeded that year, and medical programs were legalized in five other states. In 2016, four states operated adult-use programs, and voters in four other states approved adult-use in November. Now, 10 states have legalized adult-use, and only four states have not legalized medical programs of any kind.

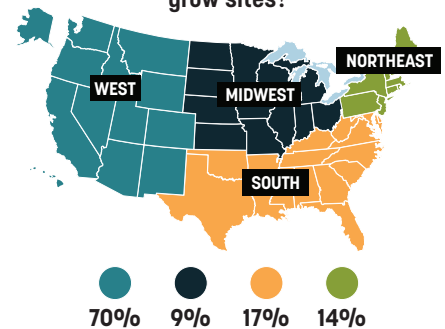
The industry and the companies that operate within it certainly have evolved quickly. In just the past year, Canada legalized cannabis and the U.S. legalized industrial hemp production and sales, with states now allowed to establish and regulate commercial hemp markets within their borders. The largest merger and acquisition deals in cannabis to date took place in just the past few months,

and agreements are increasing at a rapid pace. Investors in Canada are eyeing U.S. markets closely, and, in the case of Canopy Growth's \$3.4-billion purchase of Acreage Holdings, new terms are being built into international agreements, with acquisitions contingent on federal legalization in the U.S.

In addition to the rapid-fire growth in states that now have medical and/or adult-use programs, the industry continues to expand in many ways. In this year's study, nearly half (48%) of participants have been in business less than two years. The average revenue that cultivators reported skyrocketed compared with 2018, and the vast majority anticipate more growth in revenue. That optimism could explain why more companies are planning to add growing space, as well as significant plans for more sizable expansion than in previous years. Speaking of growing, a quarter of study participants are growing hemp, up 16 percentage points from 2018.

This is only a snapshot of some of the major trends that have emerged as a result of the four years of research behind CBT's "State of the Cannabis Cultivation Industry" study. The following pages provide a detailed overview of how cultivators are adapting, growing and changing within this nascent market.

In what states/areas are your operation's cannabis facilities/grow sites?



Note: Totals exceed 100% because respondents could select multiple answers.



THE INDUSTRY AND
THE COMPANIES THAT
OPERATE WITHIN IT
CERTAINLY HAVE
EVOLVED QUICKLY.



REVENUE AND PROFITS:
MODERATED, BUT OPTIMISTIC GROWTH

WHILE THE NATIONAL LANDSCAPE HAS CHANGED DRASTICALLY SINCE 2012, when Washington state and Colorado first legalized adult-use cannabis sales, at least one thing hasn't changed: The industry is very much still amidst a significant boom, with no signs of slowing.

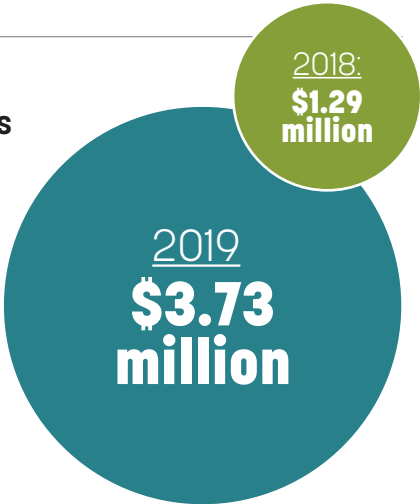
Average revenue grew between 2018 and 2019, exploding by 189% from \$1.29 million to \$3.73 million, according to this year's research. Companies appear to be climbing the revenue ladder, as evidenced by the increasing number of respondents who reported revenue greater than \$1 million (32% of respondents in 2019 versus 24% in 2016, the first year of this report). Participants who reported company revenue of more than \$5 million also are on the rise, rising from 6% in 2016 to 14% in 2019.

While average revenue exploded, the median reported revenue (the number where half of respondents reported a higher company revenue and half reported a lower revenue) only shifted by \$23,000 between 2018 and 2019 (\$250,000 and \$273,000, respectively), indicating that the bulk of the growth is going to a smaller number of companies relative to the overall research pool.

This is cemented by the drop in the number of research participants who reported company revenue growth. In 2018, 32% of participants reported increases in their top lines. In 2019, that figure slipped to 22%. Slightly more cultivators also reported a decrease in revenue this year as well, with 11% of participants indicating their operation's revenue decreased, three percentage points above 2018 (8%).

Revenue & Profits

The average revenue among participants' cultivation operations in the most recently completed fiscal year. The average revenue reported has nearly tripled between the 2018 and 2019 studies.



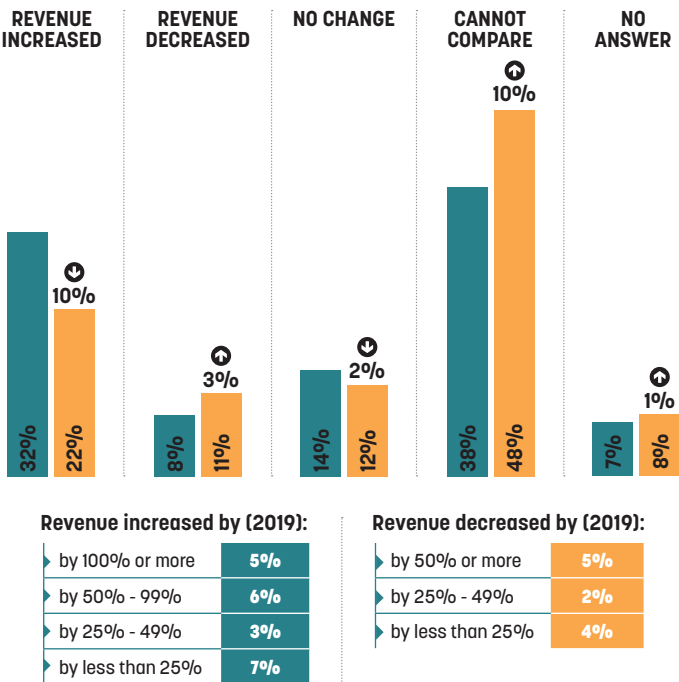
The Details: Revenue

What was your operation's **revenue** from its cannabis cultivation operations in its most recently completed fiscal year?

	2016	2017	2018	2019
\$5 million or more	6%	8%	11%	14%
\$2 million - \$4.9 million	10%	9%	12%	7%
\$1 million - \$1.9 million	8%	11%	10%	11%
\$500,000 - \$999,999	5%	13%	8%	8%
\$250,000 - \$499,999	9%	12%	7%	9%
\$100,000 - \$249,999	17%	13%	14%	14%
\$50,000 - \$99,999	30%*	6%	8%	9%
\$25,000 - \$49,999	—	5%	3%	4%
Less than \$25,000	—	19%	21%	18%
No answer	16%	5%	5%	7%

*The 2016 report showed that a total of 30% of research participants reported revenue less than \$100,000; the research did not break down revenue ranges less than \$100,000. Total may exceed 100% due to rounding.

Compared with one year prior, how did your operation's **revenue** from its cannabis cultivation change in its most recently completed fiscal year? ● 2018 ● 2019



Note: Percentages may not add up to 100 due to rounding.

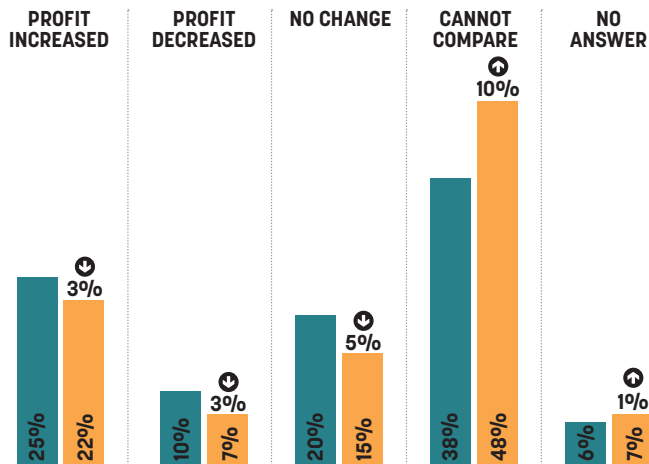


The Details: Profits

THERE ARE ADDITIONAL SILVER LININGS despite the drop in the number of companies reporting revenue growth. For example, while a smaller number of participants (22%) reported an increase in company *profit* than in 2018 (25%), fewer also reported a decrease in profitability (7% in 2019 and 10% in 2018). Fifteen percent of this year's respondents reported no change in profitability, down 5 percentage points from 2018.

Of note is that nearly half of this year's research participants (48%) could not report year-over-year growth figures as their businesses have not been in operation for two years, suggesting that the cannabis industry is still in its start-up phase. This is up 10 percentage points from 2018, when 38% of respondents said they could not compare profit growth because they were not in operation in 2017.

Compared with one year prior, how did your operation's **profit** from its cannabis cultivation change in its most recently completed fiscal year? ● 2018 ● 2019



Profit increased by (2018):

by 100% or more	7%
by 50% - 99%	4%
by 25% - 49%	6%
by less than 25%	7%

Profit decreased by (2018):

by 50% or more	4%
by 25% - 49%	2%
by less than 25%	5%

Profit increased by (2019):

by 100% or more	6%
by 50% - 99%	6%
by 25% - 49%	4%
by less than 25%	5%

Profit decreased by (2019):

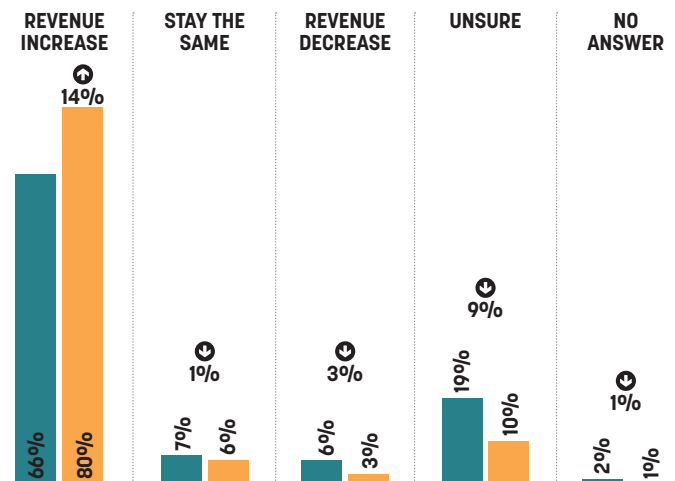
by 50% or more	4%
by 25% - 49%	3%
by less than 25%	1%

STUDY RESPONDENTS DEMONSTRATED INCREASED OPTIMISM IN 2019,

as 80% of participants said they anticipate their company's revenue to grow in their current fiscal year compared to their most recently completed fiscal year. (This is a 14-percentage point increase over 2018.) Another 6% predict revenue will remain steady, while only 3% predicted that their revenue will decline. Another 10% said they were unsure, which is down from 2018 when nearly a fifth of participants said they were uncertain.

Anticipated Change in Revenue

How do you **anticipate** your operation's **revenue** from cannabis cultivation to change in your **current** fiscal year compared to your most recently completed fiscal year? ● 2018 ● 2019





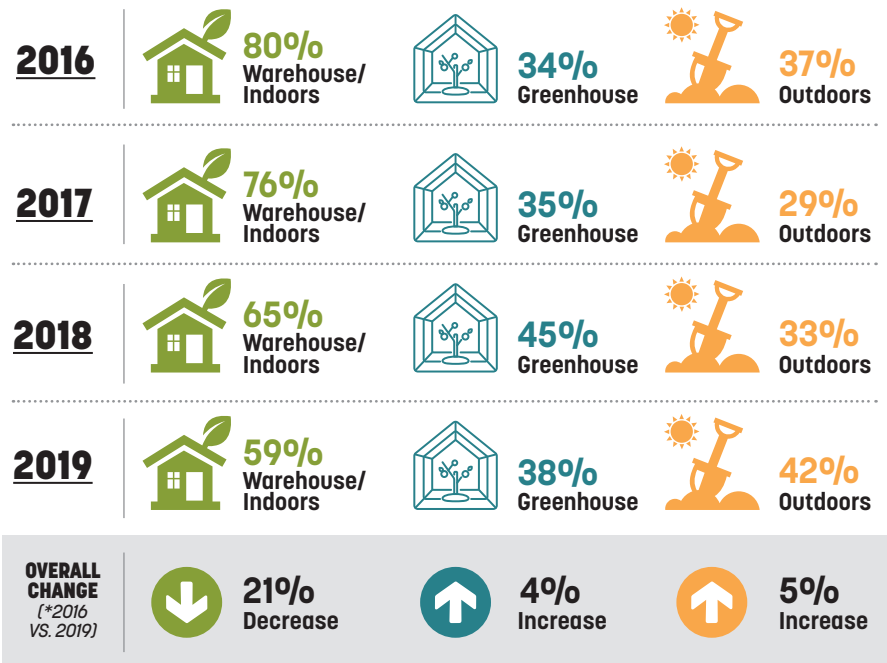
INDOOR CULTIVATION CONTINUES DOWNWARD TREND

THE MOST NOTABLE TREND ABOUT WHERE CULTIVATORS ARE GROWING CANNABIS IS REGARDING INDOOR CULTIVATION. Cannabis cultivators continued the shift away from indoor/warehouse operations in 2019. Indoor operations once were a standard for cannabis production: 80% of research participants reported growing indoors in 2016, the first year of this study. That number has dropped by 21 percentage points during the past three years—with 59% of cultivators reporting growing indoors this year.

The number of growers who cultivate in greenhouses seems to be on a slight rise compared to prior years: 38% of 2019 research participants stated they grow in a greenhouse, up four percentage points from 2016 but down seven percentage points compared to last year (a potential statistical outlier, but more data is needed to explain that).

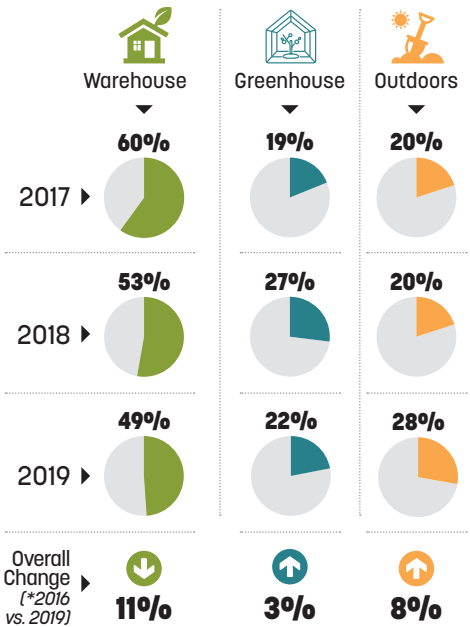
Outdoor cultivation seems to have gained some traction after a few years trailing in popularity. More than 4-in-10 cultivators (42%) said they cultivate in the open-air, an increase of nine percentage points from 2018 (33%).

Warehouse, Greenhouse or Outdoors
Where does your operation grow cannabis?



*% points. Note: Totals exceed 100% because respondents could select multiple answers.

% of Crop Space
The average percentage of your cannabis
production area is...?



Warehouse, Greenhouse or Outdoors: A Closer Look
Where does your operation grow cannabis?

	2016	2017	2018	2019	Overall Change (% points 2016 vs. 2019)
Warehouse Only	44%	51%	43%	41%	↓3%
Greenhouse Only	4%	9%	16%	12%	↑8%
Outdoors Only	10%	8%	9%	14%	↑4%
Greenhouse + Outdoors (No Warehouse)	3%	3%	9%	5%	↑2%
Greenhouse + Warehouse (No Outdoors)	13%	6%	8%	7%	↓6%
Warehouse + Outdoors (No Greenhouse)	10%	3%	3%	3%	↓7%
All Three (Greenhouse, Outdoors and Warehouse)	14%	4%	11%	7%	↓7%

SMALLER OPERATIONS MOST PREVALENT, BUT OPERATIONS ARE GETTING BIGGER

NO MATTER THE TYPE OF STRUCTURE IN WHICH THEY GROW, a majority of cultivators (62%) continue to operate only one facility in one location, although that number dropped 4 percentage points this year compared to 2016. Overall, however, changes in the number of sites/facilities research participants report having have been relatively minimal during the four years of this study.



WHILE SINGLE-FACILITY OPERATIONS CONTINUE TO DOMINATE THE MARKET IN NUMBER, look no further than the average operation size to see that the cannabis industry is not just growing in scope, but that its operators also are investing in bigger facilities. This year's research participants' facilities averaged at 34,700 sq. ft., 9,100 sq. ft. more than last year's respondents (25,600 sq. ft.).

Indeed, operations are scaling up, as evidenced by the increase in the number of cultivation operations with 10,000 sq. ft. or more of cannabis production space. Of this year's research participants, 57% reported operating 10,000 sq. ft. or more of canopy space, a sizeable jump from 2016's report that saw only 37% of respondents operating at that scale.

To further confirm the industry's expanding footprint, according to the data, fewer businesses also have smaller cultivation areas than previous years: 28% of this year's research participants reported having less than 5,000 sq. ft. of production space compared to 33% in 2018's research, while only 14% reported having production space between 5,000 sq. ft. and 9,999 sq. ft., compared to 19% in 2018.

Grow Size

What is the square footage of your operation's cannabis production area?

SIZE	2016	2017	2018*	2019**	OVERALL CHANGE [% points 2016 vs. 2019]
80,000 sq. ft. or more	7%	7%	17%	15%	↑8%
50,000-79,999 sq. ft.	3%	5%	5%	8%	↑5%
25,000-49,999 sq. ft.	12%	13%	10%	13%	↑1%
10,000-24,999 sq. ft.	15%	21%	15%	21%	↑6%
5,000-9,999 sq. ft.	24%	20%	19%	14%	↓10%
Less than 5,000 sq. ft.	34%	32%	33%	28%	↓6%

*2% didn't answer in 2018; **1% didn't answer in 2019.

Grow Sites: Single vs. Multi-Facility

How many cannabis facilities/grow sites does your operation have?

FIVE OR MORE



2016	2017	2018	2019
6%	8%	11%	9%

FOUR



2016	2017	2018	2019
4%	4%	4%	5%

THREE



2016	2017	2018	2019
7%	8%	9%	7%

TWO



2016	2017	2018	2019
15%	16%	20%	16%

ONE



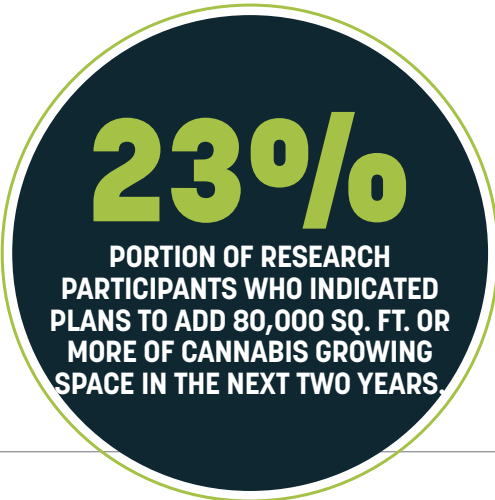
2016	2017	2018	2019
66%	64%	56%	62%

EXPANDING AND MORE OPTIMISTIC EACH YEAR

EACH YEAR THAT *CANNABIS BUSINESS TIMES* HAS PUBLISHED THE “STATE OF THE CANNABIS CULTIVATION INDUSTRY REPORT,” research respondents have increasingly reported plans to expand: 85% of cultivators studied this year indicated plans to expand their operation’s square footage for growing cannabis. In 2018 and 2017, that figure was 77% and in 2016, 71% of participants indicated any expansion plans.

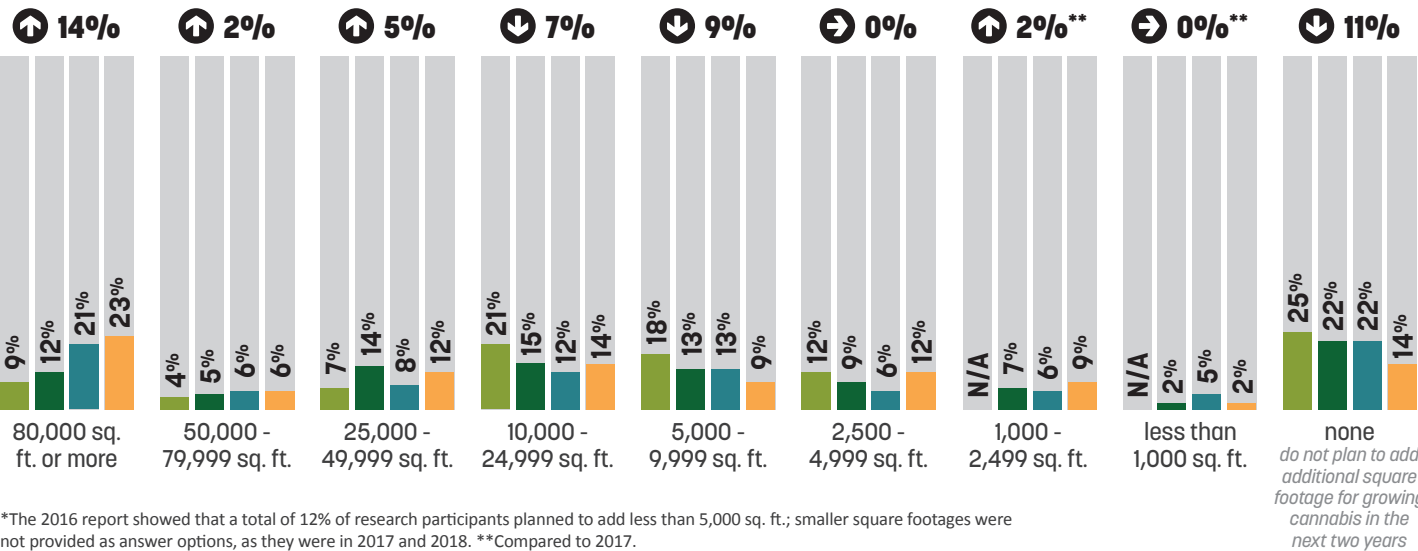
In 2017, the average square footage that cultivators said they planned to add in the next two years was 22,300 sq. ft. In 2018, that figure increased to 27,400 sq. ft. This year, the average is 39,700 sq. ft., growing by 12,300 sq. ft. compared with the previous year and by nearly 18,000 sq. ft. compared to 2017.

In addition, nearly a quarter of participants (23%) plan to add 80,000 sq. ft. or more for growing cannabis in the next two years.



Expansion Plans 2016 2017 2018 2019

How much additional square footage for growing cannabis does your operation plan to add in the next two years?



Projecting Growth Ahead

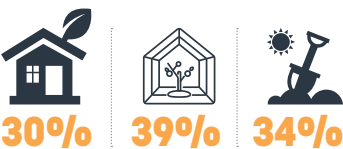
Which of the following does your operation plan to add for cannabis cultivation in the next two years?

	2016	2017	2018	2019
indoor/warehouse cultivation space	43%	47%	53%	39%
greenhouse cultivation space	44%	47%	43%	43%
outdoor cultivation space	22%	20%	25%	23%
none of these	21%	16%	18%	21%

INDUSTRY INTEREST, INVESTMENT CONTINUES

THE BURGEONING CANNABIS INDUSTRY HAS YET TO LOSE ITS LUSTER, as an additional 71 participants indicated they do not currently own or work for a cannabis cultivation operation, but plan to within the next 18 months. Of those participants, a plurality (39%) indicated they would be starting a greenhouse operation (whether passive, hoop house, semi-sealed/sealed, or evaporative pad and fan). Just over a third (34%) indicated they will operate in an outdoor setting, and less than a third of those participants (30%) plan on launching a cultivation business in an indoor/warehouse cultivation space.

If you do not currently own or work for an operation that grows cannabis, but plan to in the next 18 months*, which of the following does your operation plan to add for cannabis cultivation in the next two years?



NONE OF THESE: 18%

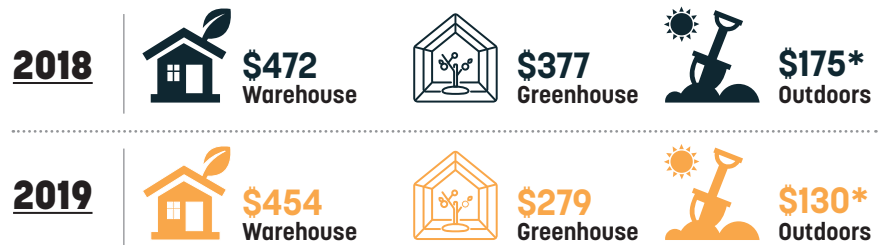
*An additional 71 research participants who do not currently own or work for an operation that grows cannabis answered several questions in the study.



WORKING SMARTER

Faced with tumbling wholesale prices and stiffer competition, cannabis cultivators have become savvier at curbing their production costs. Average production costs for all three cultivation operation types (warehouse/indoor, greenhouse and outdoor) were lower than 2018 results. Warehouse operators in this year's research indicated it cost an average of \$454 to produce one pound of dried cannabis flower (\$18 less than 2018). For greenhouse operators, that figured dropped \$98 to \$279 in 2019. Outdoor producers shaved \$45 off their median* production costs, going from \$175 per pound to \$130.

Average Production Costs Per Pound of Dried Flower



*Note: due to the high proportion of respondents selecting less than \$100, the sample average cannot be meaningfully calculated for outdoor cultivation; the provided figure is the median response instead of the average.

Dried Flower: Production Costs

What is your operation's average production cost per pound (\$/lb.) of dried flower produced ...?

Cost	Warehouse	Greenhouse	Outside
\$1,000 or more	10%	2%	2%
\$700 - \$999	10%	2%	3%
\$500 - \$699	15%	2%	0%
\$400 - \$499	11%	8%	0%
\$300 - \$399	10%	26%	14%
\$200 - \$299	15%	19%	12%
\$100 - \$199	15%	21%	19%
less than \$100	7%	15%	38%
no answer	7%	6%	12%

DIFFERENCE IN AVERAGE COST PER POUND OF DRIED FLOWER, INDOOR VS. GREENHOUSE:

2018
\$95

2019
\$175



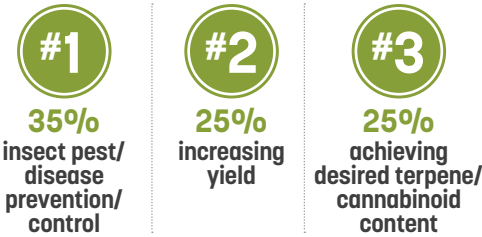
NEW YEAR, SIMILAR PROBLEMS (THOUGH TERPENES RISE IN PRIORITY)

Cultivation Challenges

The cultivation challenges facing cannabis businesses for the most part remained unchanged from 2018, with “insect pest/disease prevention/control” ranking as the No. 1 cultivation challenge once again this year. (See the chart at right.) However, “achieving desired terpene/cannabinoid content” tied with “increasing yield” as the second-highest cultivation concern this year (reported by 25% of research participants), compared with 19% in 2018. Last year, “achieving sustainable growing goals/methods” ranked No. 3, with 20% indicating it was a primary issue; this year, only 14% reported it as a chief concern.

Other cultivation challenges noted in the report included “maintaining consistent product” (21%), “achieving organic goals/methods” (18%), “finding suitable genetics for growth environment” (18%), “humidity control” (17%), “weather” (15%), “maintaining consistent yields” (14%), “watering/irrigation” (12%) and “lighting” (9%), among others.

What do you consider to be your operation's three* biggest **cultivation-related** challenges as a cultivator of cannabis?



*Note: Research participants could choose between multiple answer options. These were the top three most cited responses.



Business Challenges

The top three business challenges for cannabis operators remained unchanged from 2018 and 2019, with “competition/declining prices” still holding the No. 1 spot. (See the chart at right.) Business challenges also indicated by a quarter or more of study participants included “uncertainty regarding federal law” (27%) and “securing capital/funding” (26%). Other concerns to note were “production costs” (18%), “finding employees” (12%), “product sales” (12%) and “marketing/brand building” (11%).

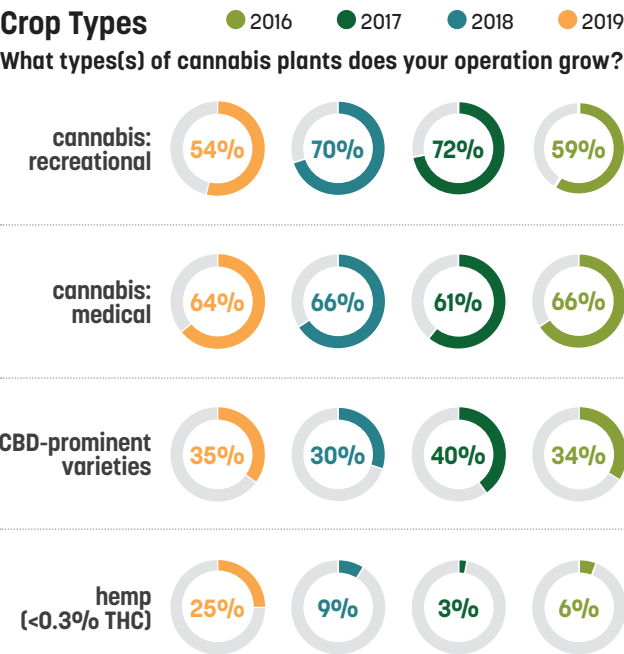
What do you consider to be your operation's three* biggest **business-related** challenges as a cultivator of cannabis?



*Note: Research participants could choose between multiple answer options. These were the top three most cited responses.

Crop Types

What type(s) of cannabis plants does your operation grow?



*Note: Totals exceed 100% because respondents could select multiple answers.



25 percent

A QUARTER OF CULTIVATORS REPORTED THEY ARE GROWING HEMP, A 16 PERCENTAGE POINT INCREASE FROM PARTICIPANTS IN THE 2018 STUDY.

HEMP HYPE

HEMP HAS BEEN A BIG CONVERSATION TOPIC this year following the passage of the 2018 Farm Bill (formally titled The Agriculture Improvement Act of 2018) late in 2018. That piece of legislation legalized, at the federal level with restrictions, the production and sale of industrial hemp. This allows states to regulate the production, commerce and research of hemp (defined as cannabis that contains less than 0.3% THC) with approval from the USDA. "At least 41 states have enacted legislation to establish industrial hemp cultivation and production programs," according to a February 2019 update from the National Conference of State Legislatures (NCSL). And the industry took notice: 63% of research participants indicated they are *more likely* to start or expand a cannabis or hemp cultivation business as a result of the federal legalization of hemp.

How likely, and quickly, those plans become reality remains to be seen. Ten percent of research participants indicated they plan on growing hemp within the next 18 months, taking advantage of friendlier laws now on the books and states continuing to work to develop regulated markets within their borders.

Hemp Plans

Does your operation plan to grow hemp (<0.3% THC) in the next 18 months?



10%
YES

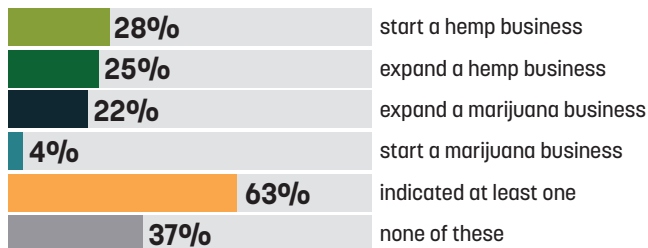


56%
NO



35%
NOT SURE

Which of the following is your operation more likely to do as a result of the federal legalization of hemp?



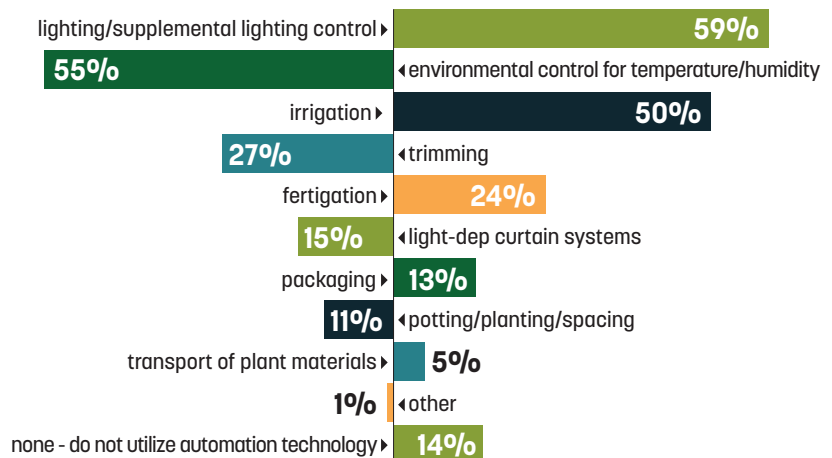
NEW FACILITIES MEANS NEW AUTOMATION

The two biggest areas where automation technology is used in indoor cultivation operations are lighting and environmental control for temperature/humidity. However, fewer research participants this year indicated using automation for lighting categories (59% in 2019 compared to 65% in 2018) and for environmental control for temperature and humidity (55% in 2019 compared to 63% (temperature) and 59% (humidity) in 2018). The reason for this decline is not clear from the data; potentially, however, the change *could* be related to the indicated shift away from indoor cultivation and/or the number of new businesses that participated in this year's research.

Instead, this year's research shows a slight increase in automation technologies used more in greenhouse and outdoor operations, namely irrigation and light-deprivation curtains. Half (50%) of this year's study participants noted using some form of automated irrigation system (up from 41% in 2018), and 15% indicated using automated light-dep curtains (up from 13% in 2018).

What Are You Automating?

For which systems does your operation utilize automation technology in its cannabis cultivation?



*Note: Total exceeds 100% because respondents could select multiple answers.

ABOUT THE RESEARCH: The data in this report was collected by Readex Research via an online study, which was sent to all available, active, qualified subscribers to *Cannabis Business Times* magazine and/or e-newsletter located in the U.S. or Canada, from April 18 to May 2, 2019. The survey was closed for tabulation with 305 responses. To best represent the audience of interest, most of the results in this report are based on the 138 respondents who indicated they currently own or work for an organization that grows cannabis. Unless otherwise noted, this is the base for the data presented in this report. Another 71 respondents indicated they do not currently own or work for an operation that grows cannabis, but plan to in the next 18 months.