INDUSTRIAL HEMP

Michigan Department of Agriculture and Rural Development

2020
Industrial Hemp Ag Pilot Program
Final Report

Michigan Department of AGRICULTURE & Rural Development

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INTRODUCTION

On January 15, 2019, the Michigan Legislature enacted the Michigan Industrial Hemp Research and Development Act (Act). The Act provided the Michigan Department of Agriculture and Rural Development (MDARD) with the authority to administer the Act, and to license and regulate the growing and processing of industrial hemp within the state of Michigan. As defined by the Act, industrial hemp is Cannabis (Cannabis sativa L.) with 0.3% or less 9-tetrahydrocannabinol (THC). Industrial hemp is grown to produce fiber, grain, biomass, and non-intoxicating medical compounds such as cannabidiol (CBD).

The enactment of the Michigan Industrial Hemp Research and Development Act was in response to the federal Agricultural Act of 2014, also known as the "2014 U.S. Farm Bill." The 2014 U.S. Farm Bill authorized state departments of agriculture to implement agricultural pilot programs (hereafter "Ag Pilot Program") to study industrial hemp for the purpose of agricultural or academic research, only if cultivating of industrial hemp was allowed under state law. Thus, the Michigan Industrial Hemp Research and Development Act allowed MDARD to comply with the 2014 U.S. Farm Bill and implement a hemp Ag Pilot Program.

In April of 2019, MDARD established Michigan's first Industrial Hemp Ag Pilot Program so farmers, processors, and state colleges and universities could grow, handle, process, and research industrial hemp. To comply with the 2014 U.S. Farm Bill and the Michigan Industrial Hemp Research and Development Act, registered growers and licensed processor-handlers were required to enter into a research agreement with MDARD. Under the agreement, each registered grower or licensed processor-handler was required to submit research reports to MDARD after the end of the 2019 and 2020 seasons. These reports were collected by an online survey administered by MDARD. The survey for the 2020 program was sent in January of 2021. The results of the survey submissions for 2020 and comparisons with 2019 are summarized in the report below.

2020 AG PILOT PROGRAM

At the end of the 2020 Ag Pilot Program, MDARD provided a survey to all registration and license holders[1] under the Michigan Industrial Hemp Research and Development Act. MDARD received responses from 415 registered growers and licensees. Out of the 415 responses to MDARD's research survey, 138 held hemp grower registrations, 210 held both a grower registration and a processor-handler license, and the remaining 67 held hemp processor-handler licenses only. The 2020 survey achieved a 55.2 percent response rate from registered growers and thus can only provide estimates to the full scope of the program in Michigan. The actual number of registered hemp growers in Michigan was 631 in the 2020 season, a 10.3 percent increase from the 2019 pilot program. A total of 348 registered growers submitted survey responses.

The actual number of licensed hemp processor-handlers was 517 in 2020, representing a 19.4 percent increase from 2019. Again, survey responses totaled just over half of the actual processors – 277, or 53.6 percent of the licensed businesses.

INDUSTRIAL HEMP GROWERS

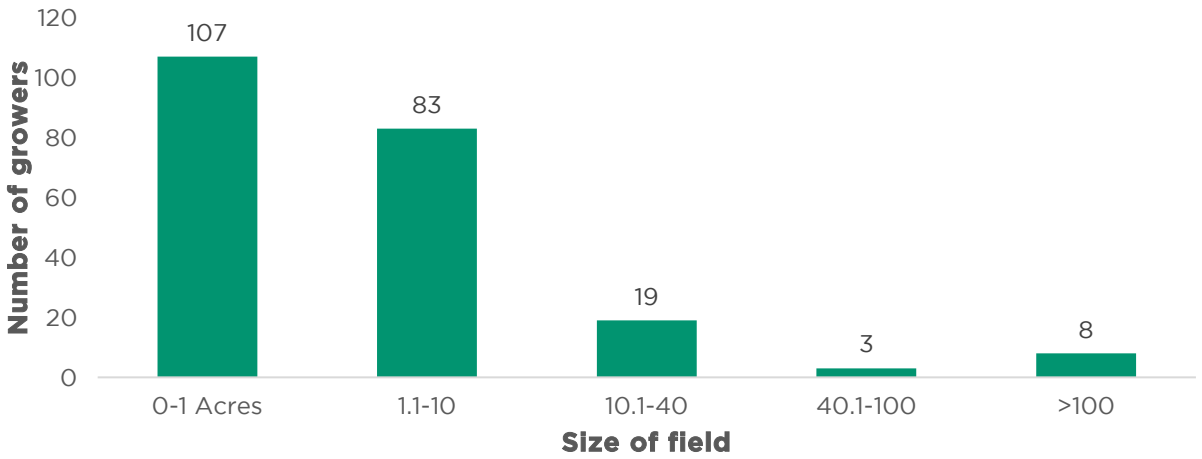
Overall, among the 348 registered growers who responded to the survey, 277 reported growing hemp in 2020. Of the 71 respondents who did not grow hemp, 32 were registered to grow only, while 39 were registered to grow and licensed to process industrial hemp. In all, registered growers planted approximately 2,329 acres of hemp outdoors during the 2020 Ag Pilot Program according to responses.[2]

To further study the distribution of the almost 2,329 acres of hemp planted outdoors, MDARD analyzed how many acres each grower planted outdoors and in which counties. Like the 2019 report, most hemp fields across the state were smaller than one acre for 2020. However, there was a wide range in the amount of acreage each hemp grower planted, with eight registered growers each reporting planting over 100 acres of hemp.

[1]Those who hold a grower registration only will hereinafter be referred to "registered growers" or "registration holders," and those holding a grower registration AND processor-handler license, or processor-handler license only, will be referred to as "licensees."

[2]Survey responses regarding outdoor acreage and indoor square footage of hemp grown did not always include the necessary units (acres or sq ft) to determine exact area of hemp grown; therefore, the data given in this report should be understood as estimates.

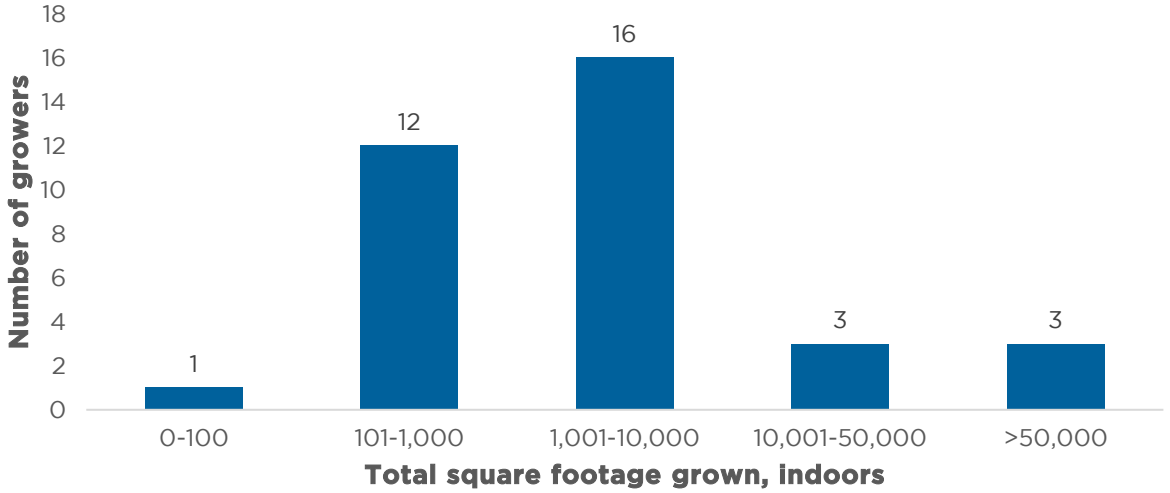
SIZE OF OUTDOOR HEMP FIELDS



Registered growers were not required to grow hemp in all the areas they planned to grow as stated on their registration applications. The total planned acreage to grow hemp in 2020 was 15,007.75 (outdoors), up 123 percent from 2019. Not all registered growers responded to the 2020 post-harvest survey, which is a significant factor contributing to the differences in total planned growing acreage and the actual total acreage of hemp grown. Other reasons contributed to this difference were not evaluated in the 2020 survey.

In addition to planting hemp outdoors, registered growers also reported planting approximately 480,561 square feet (11 acres) of hemp indoors during 2020. MDARD also analyzed the distribution of indoor square footage grown by each registration holder. The majority of registration holders grew between 1,000 and 10,000 square feet indoors, with 101-1,000 square feet being the second most common growing area size. Only one registered grower utilized spaces smaller than 100 square feet, while three registered growers cultivated hemp in spaces larger than 50,000 square feet.

SQUARE FOOTAGE OF INDOOR HEMP GROWING AREAS

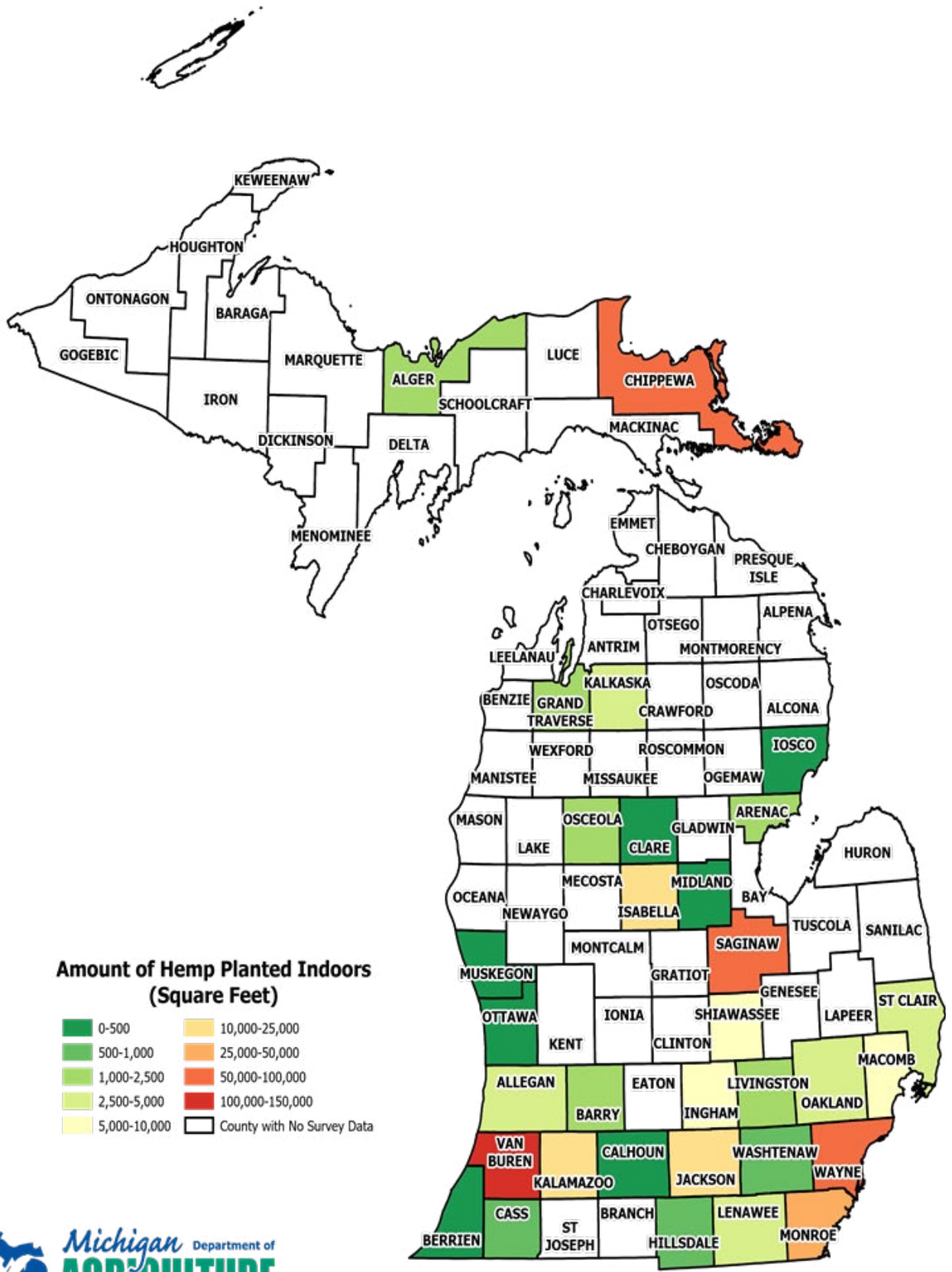


Total planned indoor square footage, according to the 2020 grower registration applications, was 11,765,220 square feet. This represents a 208 percent increase from the 2019 areas planned. Differences in planned square footage compared to actual square footage planted can again be attributed to lack of 100 percent survey response rate, among other reasons.

COUNTY PARTICIPATION

Hemp was planted throughout the state in 2020 with acreage and square footage being reported in 68 of Michigan's 83 counties based on survey responses. Some survey responses listed all counties in which hemp was grown by the registered grower and the total amount grown, without distinguishing the total amount per county. In these cases, for the purposes of this report the total amount of hemp grown was divided equally among each of the counties listed by the survey respondent. The following graphics identify counties in which hemp was grown, indoors and outdoors.

TOTAL AMOUNT OF HEMP PLANTED INDOORS BY COUNTY IN 2020



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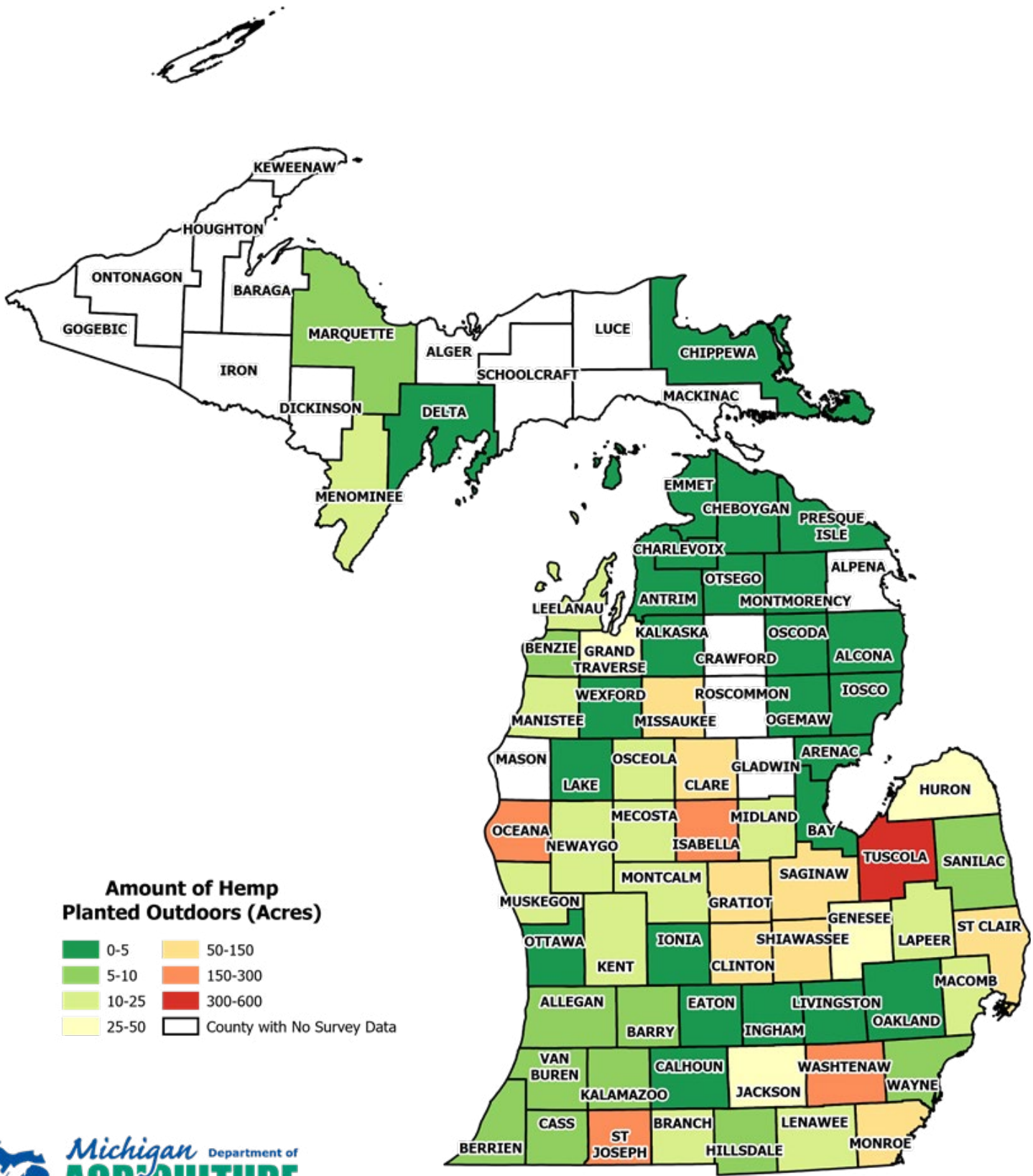
TOTAL AMOUNT OF HEMP PLANTED OUTDOORS BY COUNTY IN 2020



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DISPOSAL

Although most hemp growers were able to harvest their hemp crop during the 2020 Ag Pilot Program, 135 growers reported they had to dispose of at least some hemp. However, out of the 135 growers who reported disposing of hemp, 76 of those growers reported also harvesting some hemp during the 2020 season. Some growers reported harvesting the same acreage or square footage as planted, but then also reported disposing of some hemp post-harvest for reasons not related to THC levels.

Growers reported numerous reasons for having to dispose of hemp, with the most common reason (53.3 percent of respondents) being crop failure. 25.9 percent stated it was due to non-compliant THC levels, while an additional 8.9 percent destroyed hemp due to labor shortages. The remaining 11.8 percent of survey respondents stated "Other" as the reason for destroying hemp in 2020. Among those who stated "Other," some provided further details which included lack of buyers or lack of space for drying, moving to a different residence, and more. For those growing hemp for research purposes, hemp disposal after testing was required, rather than harvesting for sale.

There was a significant range of the reported amount of hemp destroyed by growers. Some growers reported destroying a few plants, while others reported destroying their entire crop, encompassing hundreds of plants. Approximately 57.9 percent of the 348 registered growers who responded to the survey reported having to dispose of over half their 2020 crop or more. In all, roughly 357.1 acres and 42,807 square feet of hemp had to be disposed of, for a total of 358.1 acres of combined indoor and outdoor hemp disposed.

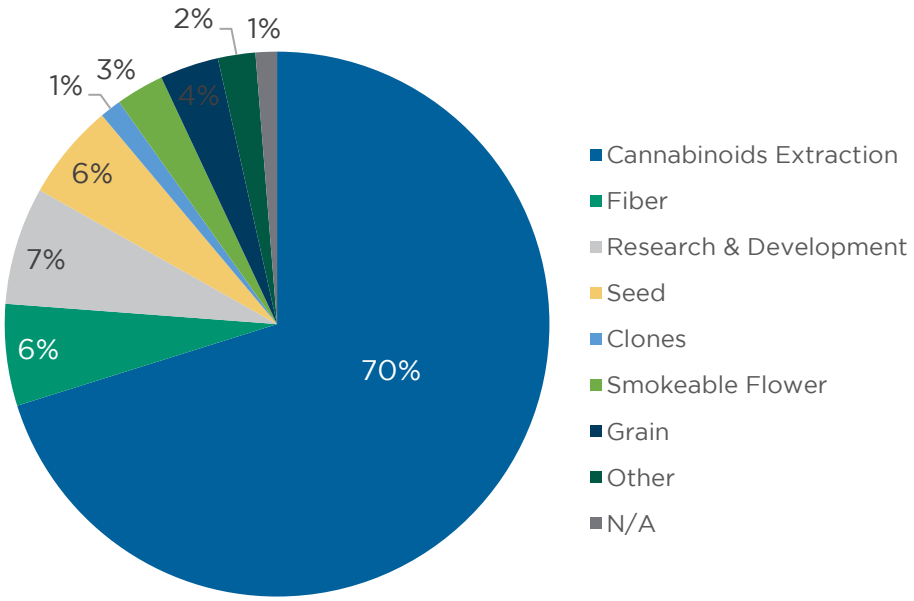
GROWERS' INTENDED USE FOR CROPS

Approximately 44.4 percent of registration holders reported they found a market for their hemp by the time they submitted their responses. However, 54.2 percent registration holders stated they had either not been able to find a market for their hemp or were still looking for a market at the time of their survey response.

To understand why participants wanted to grow industrial hemp, MDARD's research survey required each participant to select a category best describing their 2020 intended uses for their hemp crop.

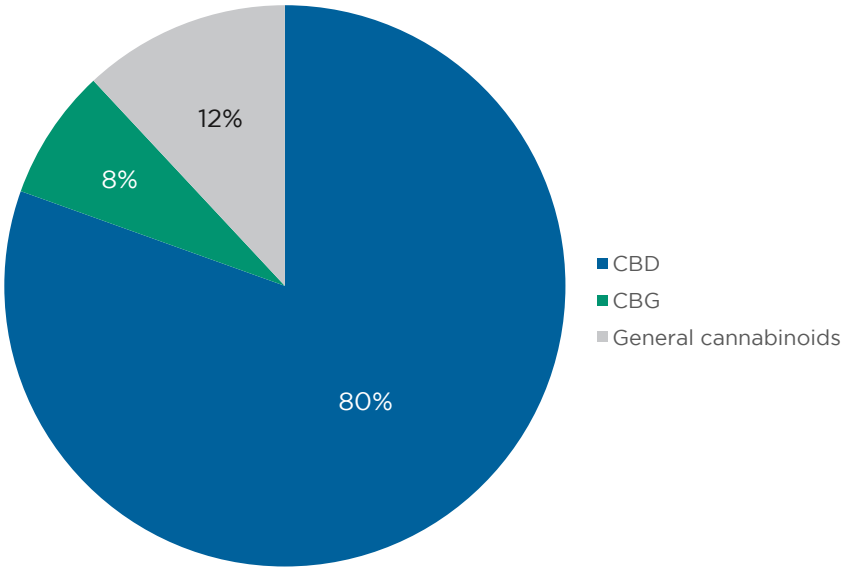
Most growers harvested hemp so they could use or sell their crop to make various value-added products. The most common uses were cannabinoid extraction including CBD and CBG oil. Of those who reported harvesting hemp for cannabinoids, 12.7 percent also reported harvesting for other types of products such as fiber, seed, and grain. The complete distribution of the different types of products hemp was harvested for during the 2020 season is shown in the chart below. Please note many survey responses listed multiple types of products within the response.

INDUSTRIAL HEMP INTENDED USES[3]



Among those growing industrial hemp for cannabinoid extraction, some gave specific purposes for extraction and others listed only general extraction. The chart below provides further analysis on growers' cannabinoid extraction.

CANNABINOID EXTRACTION



"CBD" and "CBG" categories were used when the grower specifically listed one or both of these compounds. The "general cannabinoids" category was used when growers either did not list a specific compound or listed a specific compound as well as listing "other cannabinoids extraction" or "extraction."

[3]Note: the "Research & Development" category includes all those who were growing hemp for educational, research, development, and trial purposes. Only 2 of the 22 respondents who selected this category were university or college research programs

2020 HARVEST TOTALS AND GROWER CHALLENGES

Of the 277 survey respondents who reported growing hemp, 213 reported they were able to harvest at least some of their crop during the 2020 Ag Pilot Program. Growers reported harvesting a total of 1,920.5 acres outdoors and 435,164 square feet indoors for a total of 1930.4 acres in 2020. However, some growers reported disposing of hemp post-harvest due to poor crop quality, damaged crop, lack of drying infrastructure, or lack of buyers. The total amount of viable hemp harvested excluding the post-harvest destroyed hemp thus equaled 1,923.97 acres of combined outdoor and indoor hemp harvested. Some growers chose not to harvest their entire crop for reasons not disclosed.

Approximately 54.6 percent of survey respondents who held grower registrations or both grower registration and processor-handler licenses reported they plan on growing hemp in 2021. The 152 (43.7 percent) who stated they did not plan to grow hemp in 2021 listed the following reasons as barriers to growing in the future, with most listing multiple reasons:

Market challenges including instability, saturation, and lack of buyers – 37.2 percent

Many growers expressed challenges with finding buyers for their product, especially those growing hemp for non-CBD purposes such as fiber or biomass. Others noted the drop in prices for CBD oil due to market saturation would hinder profitability.

Licensing fees and/or challenges meeting regulatory requirements – 28.2 percent

The increase in registration fees from $100 to $1,250 between the 2020 and 2021 seasons dissuaded some growers from continuing to grow hemp in 2021, particularly the small-scale operations noting the registration fees combined with the high input costs made small-scale hemp farming impractical.[4] Others found the lack of resources and support for navigating the regulatory requirements particularly challenging. A few also noted some confusion and frustration with the overlap between the harvest timeline and registration renewal.

High input costs and lack of profitability – 20.5 percent

Related to market challenges, many growers reported high input costs without adequate returns. Regarding high input costs, some noted the need for crop-specific tools which were neither widely available nor affordable for smaller operations. Those growing hemp for reasons other than CBD found it particularly challenging to find buyers willing to pay prices reflective of costs to produce.

[4]For 2019 and 2020, grower registration did not include drying raw industrial hemp. Drying hemp was part of processing previously. Therefore, growers in 2019 and 2020 that wanted to legally grow and dry hemp needed registration ($100) and a processor-handler license ($1350). When grower requirements were moved and updated in Public Act 220 of 2020 and in the state's hemp production plan starting December 1, 2020, "growing" included drying. As such, for the 2021 (non-Ag Pilot Program) season, growing and drying both fell under the $1,250 registration, which saves growers $200.

Labor challenges– 12.2 percent
Those who expressly stated labor challenges as a reason for discontinuing hemp farming noted the labor-intensiveness of hemp cultivation. Many also noted the difficulty finding help. Many noted the labor shortages as being due to complications from the COVID-19 pandemic.

Cultivation and harvest challenges – 10.3 percent
Growers also noted many challenges with the lack of industry knowledge around hemp cultivation best practices, poor seed varieties, weather and short harvesting timelines due to regulatory requirements, pests, and mildew.

Supply chain challenges – 7.1 percent
Growers also noted poor processing infrastructure for drying hemp, lack of processors to purchase raw product, and contractual failures leading to general distrust toward supply chain personnel.

In addition to the reasons given above, 10.9 percent of growers listed a variety of other unrelated reasons for choosing not to grow hemp in the future, including retirement or preferring to grow another crop; 4.5 percent of respondents choosing not to grow in 2021 did not list a reason. In general, many expressed a frustration with the high risks associated with growing hemp without adequate reward. A few stated they were still undecided or were planning to wait a few years for the market to stabilize to determine whether to grow hemp again.

2020 MDARD LABORATORY HEMP TESTING

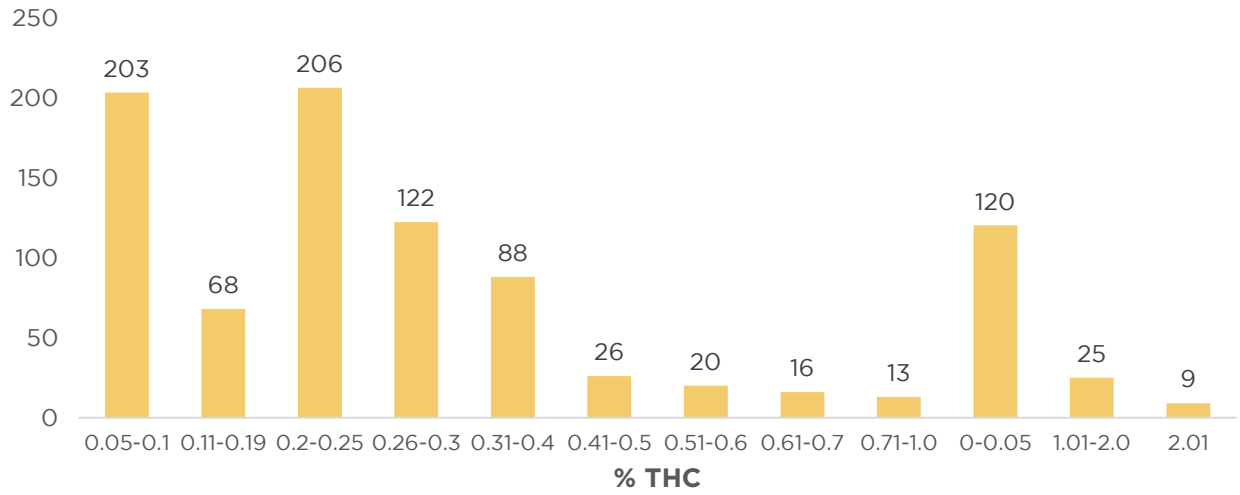
In 2019 and 2020, growers were required to submit their own samples of their hemp prior to harvest at least 20 days in advance of their intended harvest date so MDARD's laboratory could determine THC concentrations. If the sample results showed THC levels at or below 0.3%, growers could harvest their hemp crop but were required to do so within 15 days of receiving the results back from the testing facility. If the sample showed THC levels above 0.3%, growers were required to dispose of their crop. All regulatory samples were analyzed by MDARD's Geagley Laboratory.

THC levels were analyzed in 916 samples. Notable detections were as follows:

- 78.5% compliance rate
- No THC was detected in 6 cultivars
- 21.5% found above 0.3% THC
- 9.1% found above 0.5% THC

2020 HEMP TESTING RESULTS (ALL)

TOTAL SAMPLES BY % THC LEVEL



The most popular cultivars of samples submitted included:

- Cherry Wine
- Boax
- Wife
- Buffalo Soldier
- Merlot

PROCESSING

Out of the 415 registration and license holders who responded to MDARD's research survey, 210 held combined hemp grower and processor-handler licenses, while an additional 67 held hemp processor-handler licenses only. This means in total there were 277 respondents who were license holders authorized to process hemp during the 2020 pilot program.

To dry harvested hemp, growers were required to also obtain a processor-handler license, thus some processor-handlers were not in fact processing hemp beyond drying. Reasons given for obtaining a process-handler license included the following:

- To grow hemp and sell harvest to a processor – 16.97%
- To grow and process own hemp – 22.02%
- To grow hemp and sell smokable hemp – 14.44%
- To grow hemp, have it processed by another processor, and receive a split amount of processed product back with the intent to sell it – 5.42%
- To grow hemp, process harvest and also offer commercial hemp processing services for other growers – 4.33%
- Did not grow hemp, but offered commercial hemp processing services to growers – 7.58%
- Primarily a hemp broker – 2.89%

- Did not grow or process hemp but marketed it to retailers, distributors, and/or final customers – 19.49%
- No response – 6.86%

Approximately 26.71 percent of those who were licensed to grow and process hemp, or only process hemp, reported plans to process hemp in the 2021 growing season. Among the 277 licensees, 9.03 percent reported selling viable seeds to growers during the 2020 growing season, while 26.71 percent reported plans to sell viable seeds during the 2021 season.

Of the 33 licensees who processed hemp for other growers in 2020, 6.06 percent offered processing services for hemp fiber, 3.03 percent processed hemp for grain, 87.88 percent offered processing services for CBD or other cannabinoid extraction, 6.06% offered processing services for viable hemp seed, and 21.21 percent offered processing services for other reasons (drying, trimming, etc.).

Generally, the hemp to be processed was grown by the those who also held the processor-handler license. However, 67 survey responses came from those who solely processed and handled industrial hemp.

2020 AG PILOT PROGRAM CONCLUSIONS

While expected hemp planting for the 2020 season was significant compared to 2019, with planned growing locations having increased 123 percent for outdoor and 208 percent for indoor, the actual area planted from 2019 to 2020 as reported by survey respondents declined for outdoors but increased indoors. According to the 2019 survey, registered growers grew approximately 3,678 acres of hemp outdoors, compared to the 2,329 acres grown in 2020. However, the amount of hemp grown indoors increased from 400,977 square feet in 2019 to 480,561 square feet in 2020. The 2019 survey received an additional 100 responses compared to the 2020 survey, despite having 59 fewer registered growers, which may be affecting true trends in planting area size.

Complications regarding labor shortages attributed to COVID-19, like many industries, brought added challenges to the 2020 Ag Pilot Program. Many growers reported losses in the 2020 season due to declining CBD prices, labor shortages, and short harvesting timelines. Due to these challenges, the 2021 growing season is expected to have a smaller participation rate while the program, starting December 1, 2020, under Michigan's approved Hemp Production Plan, becomes more stable and the research and resources available improves.

MDARD would like to thank the 2020 Ag Pilot Program participants who responded to the survey. Each response provides critical feedback for the continued improvement of the Michigan Industrial Hemp program. Despite the challenges, the 2020 Ag Pilot Program demonstrated great success and allowed MDARD, university researchers, and the agricultural community to gain greater knowledge on cultivating industrial hemp in Michigan. MDARD is looking forward to continuing to work with both new and returning hemp growers and processors. For additional information, visit www.michigan.gov/industrialhemp.