17.0692.02000

FISCAL NOTE

Requested by Legislative Council
02/06/2017

Amendment to: HB 1240

1 A. **State fiscal effect:** *Identify the state fiscal effect and the fiscal effect on agency appropriations compared to funding levels and appropriations anticipated under current law.*

	2015-2017 Biennium		2017-2019 Biennium		2019-2021 Biennium	
	General Fund	Other Funds	General Fund	Other Funds	General Fund	Other Funds
Revenues	$0	$20,100	$0	$41,100	$0	$41,100
Expenditures	$0	$13,390	$0	$41,100	$0	$41,100
Appropriations	$0	$13,390	$0	$41,100	$0	$41,100

1 B. **County, city, school district and township fiscal effect:** *Identify the fiscal effect on the appropriate political subdivision.*

	2015-2017 Biennium	2017-2019 Biennium	2019-2021 Biennium
Counties	$0	$0	$0
Cities	$0	$0	$0
School Districts	$0	$0	$0
Townships	$0	$0	$0

2 A. **Bill and fiscal impact summary:** *Provide a brief summary of the measure, including description of the provisions having fiscal impact (limited to 300 characters).*

This bill adds an industrial hemp applicant fee of $150 and increases the per acre fee from $5 to $25.

B. **Fiscal impact sections:** *Identify and provide a brief description of the sections of the measure which have fiscal impact. Include any assumptions and comments relevant to the analysis.*

Section 1 of this bill adds an industrial hemp applicant fee of $150 and increases the per acre fee from $5 to $25. Section 2 of this bill adds an emergency clause.

3. **State fiscal effect detail:** *For information shown under state fiscal effect in 1A, please:*

A. **Revenues:** *Explain the revenue amounts. Provide detail, when appropriate, for each revenue type and fund affected and any amounts included in the executive budget.*

The revenue amount is determined by the following: 13 applicants per year X $150 = $1,950; 700 acres combined for all applicants X $25 = $17,500; 22 applicant background checks per year X $50 = $1,100; $20,550 X 2 years = $41,100. All revenue will be deposited in the agriculture commissioner's operating fund. The revenue amount for the 15-17 biennium is based on the following: 13 applicants X $150 = $1,950; 700 acres X $25 = $17,500; 13 background checks X $50 = $650.

B. **Expenditures:** *Explain the expenditure amounts. Provide detail, when appropriate, for each agency, line item, and fund affected and the number of FTE positions affected.*

The agriculture commissioner will have expenditures to oversee industrial hemp growing and harvest seasons and processing. All expenditures will come out of the agriculture commissioner's budget (HB 1009/HB 1069)salaries and operating line items. Expenditures will be primarily for staff time in the field, laboratory testing, travel, supplies, printing, and postage. The expenditures for the 15-17 biennium only account for a portion of the industrial hemp growing season. Additional expenditures will be incurred in the 17-19 Biennium.

C. **Appropriations:** *Explain the appropriation amounts. Provide detail, when appropriate, for each agency and fund affected. Explain the relationship between the amounts shown for expenditures and appropriations. Indicate whether the appropriation or a part of the appropriation is included in the executive budget or relates to a continuing appropriation.*

The appropriation amount matches the expenditures amount. The appropriation was not included in either HB 1009 or HB 1069. The agriculture commissioner will request that HB 1009/HB 1069 be amended to include special fund salary and operating authority for the 17-19 Biennium if this bill passes.

Name: Junkert/Baumiller

Agency: Agriculture

Telephone: 328-4756/328-1960

Date Prepared: 01/10/2017

17.0692.01000

FISCAL NOTE

Requested by Legislative Council
01/10/2017

Bill/Resolution No.: HB 1240

1 A. **State fiscal effect:** *Identify the state fiscal effect and the fiscal effect on agency appropriations compared to funding levels and appropriations anticipated under current law.*

	2015-2017 Biennium		2017-2019 Biennium		2019-2021 Biennium	
	General Fund	Other Funds	General Fund	Other Funds	General Fund	Other Funds
Revenues	$0	$0	$0	$62,000	$0	$62,000
Expenditures	$0	$0	$0	$62,000	$0	$62,000
Appropriations	$0	$0	$0	$62,000	$0	$62,000

1 B. **County, city, school district and township fiscal effect:** *Identify the fiscal effect on the appropriate political subdivision.*

	2015-2017 Biennium	2017-2019 Biennium	2019-2021 Biennium
Counties	$0	$0	$0
Cities	$0	$0	$0
School Districts	$0	$0	$0
Townships	$0	$0	$0

2 A. **Bill and fiscal impact summary:** *Provide a brief summary of the measure, including description of the provisions having fiscal impact (limited to 300 characters).*

This bill adds an industrial hemp applicant fee and increases the per acre fee from $5 to $40.

B. **Fiscal impact sections:** *Identify and provide a brief description of the sections of the measure which have fiscal impact. Include any assumptions and comments relevant to the analysis.*

Section 1 of this adds an industrial hemp applicant fee and increases the per acre fee from $5 to $40.

3. **State fiscal effect detail:** *For information shown under state fiscal effect in 1A, please:*

A. **Revenues:** *Explain the revenue amounts. Provide detail, when appropriate, for each revenue type and fund affected and any amounts included in the executive budget.*

The revenue amount is determined by the following: 12 applicants per year X $250 = $3,000; 700 acres combined for all applicants X $40 = $28,000; $31,000 X 2 years = $62,000. All revenue will be deposited in the agriculture commissioner's operating fund.

B. **Expenditures:** *Explain the expenditure amounts. Provide detail, when appropriate, for each agency, line item, and fund affected and the number of FTE positions affected.*

The agriculture commissioner will have expenditures to oversee industrial hemp growing and harvest seasons and processing. All expenditures will come out of the agriculture commissioner's budget (HB 1009/HB 1069) operating line item. Expenditures will be primarily for laboratory testing, travel, supplies, printing, and postage.

C. **Appropriations:** *Explain the appropriation amounts. Provide detail, when appropriate, for each agency and fund affected. Explain the relationship between the amounts shown for expenditures and appropriations. Indicate whether the appropriation or a part of the appropriation is included in the executive budget or relates to a continuing appropriation.*

The appropriation amount matches the expenditures amount. The appropriation was not included in either HB 1009 or HB 1069. The agriculture commissioner will request that HB 1009 or HB 1069 be amended to include special fund operating authority if this bill passes.

Name: Junkert/Baumiller

Agency: Agriculture

Telephone: 328-4756/328-1960

Date Prepared: 01/10/2017

2017 HOUSE AGRICULTURE

HB 1240

2017 HOUSE STANDING COMMITTEE MINUTES

Agriculture Committee
Peace Garden Room, State Capitol

HB 1240
1/27/2017
Job #27537

☐ Subcommittee
☐ Conference Committee

Committee Clerk Signature Pe Mae Kuch

Explanation or reason for introduction of bill/resolution:

Relating to industrial hemp

Minutes: Attachment 1-3

Representative David Monson, Sponsor: (Attachment 1) I have been testifying on a hemp bill since 1999. I've had a license every year since licensing started. I have never raised it myself but wanted other people to have the ability to raise it.

Representative McWilliams: How many acres of hemp were planted last year?

Representative Monson: It was about 70 acres. Langdon Research Station, two years ago, planted some under a research bill that we worked through Congress. They planted several plots and had good data. Last year it was a wet spring and spray drift killed the first planting. They replanted but was too late and had to tear it up.

The Ag. Commissioner's office has a pilot program through the farm bill.

Representative Satrom: What does the future of hemp look like? What is holding us back?

Representative Monson: The future could be bright. We have to be careful we don't make the same mistake as Canada. They were making $600 to $800/acre. They overproduced and didn't have the markets. Production went down. Now it is rebounding. The Agriculture Commissioner's office is controlling the number of acres and producers.

The seed is easy to handle. We are so far from a population center to use the fiber. The most lucrative part of the plant is the fiber. It is difficult to transport efficiently. It can be used for fiberboard for construction. We need processors in the state. Depending on the variety, it produces tons per acre.

The DEA is also a stumbling block. We took this to the 8th circuit in Minneapolis. The court didn't want to get involved in the dispute between the DEA and me as a producer. They chewed out the DEA and told them to meet with us. That was seven years ago and they

have yet to contact me. They shouldn't have a role because it is now in the farm bill. USDA should be in charge of it.

Chairman Dennis Johnson: With changing the fees, if it is below $50,000 it doesn't go to appropriations.

Representative Monson: It is revenue. It is not an expenditure. I don't think it has to come to appropriations.

Representative McWilliams: With the DEA still in control, what is the potential that we can do? Does it all have to be produced and processed here?

Representative Monson: If we raised and processed it in North Dakota and it is not viable seed, that is our business. Once the seed is not viable, it can be transported. You can go to any food store and buy hemp seed. We can import into North Dakota but not export. Langdon had seed two years ago and wanted to send it to NDSU. They were told they can't travel down the highway. They ended up destroying it to avoid storing it under high security.

(16:40)
Rachel Spilde, Industrial Hemp Program Coordinator, North Dakota Agriculture Department: (Attachment 2a, b, c)

Representative Skroch: In your data you reported the costs of oversights by administrative rule?

Rachel Spilde: Enforcing the chapter through the law and administrative rule there are several trips to each location as well as with the federal guidelines and restrictions. The department is required to deliver seed and sample for THC. Administrative rule dictates that the Commissioner supervise onsite incineration of the standing stubble.

Representative Skroch: Could you reduce any oversights to lower the costs?

Rachel Spilde: That would be fantastic. The producers would appreciate that. There is a lot of oversight. Anyone that handles hemp has to have a background check. As it moves forward in the future, we can scale back on the oversight.

Representative Skroch: Will that take place by legislative action or can the administrative rules be changed within the department?

Rachel Spilde: It will be both. We have to follow federal guidelines. There may be some things in administrative rule that can be changed.

Representative Satrom: Are these all individual trips? Can you group together to help cost?

Rachel Spilde: We try to make our travel as cost effective as possible. I am also a nursery inspector so I combine hemp with nursery inspections.

Representative Satrom: Is the state making a profit? What is the breakeven point?

Rachel Spilde: It depends on what we do with this law. If the department pays for the THC testing fees, the price per acre is $60. If the department doesn't pay the THC testing fees, it would come down to about $30 per acre as a break even.

Representative Magrum: Are there any incentives for processing plants in the state?

Rachel Spilde: I don't know of any. Industrial hemp is a high risk crop. There are no pesticides allowed and no crop insurance. We can export certain products soon.

Representative Boschee: With the fee structure, is there a cap needed?

Rachel Spilde: Through the farm bill we are only able to cultivate for research purposes. I don't anticipate North Dakota planting large amounts of acres.

Tom Bodine, Deputy Ag. Commissioner: The Commissioner did ask to not put it all on the backs of the producers. We would work with the committee to make it more tolerable for the producers. This has been the most challenging program to work with the federal agency.

We are working with one producer to make sure he can export. We are confident we will get that approval.

Representative Satrom: Do we have a strategy on how to get the DEA straightened out?

Tom Bodine: We have to work with the federal agency. They are learning as well.

Chairman Dennis Johnson: Did you have a lot of applicants?

Tom Bodine: We had a committee within the department and university system to review the applicants. We didn't have funds to run the program. We had to use funds from other programs to allow us to do inspections.

Chairman Dennis Johnson: The appropriation we put into this bill will determine the applicants next year.

Representative Satrom: $1 per pound is the price. Is that a realistic long-term number to be basing this on?

Tom Bodine: Our processor was willing to pay that. The success of this program has enabled him to meet those markets for which he has a demand.

Representative McWilliams: The hemp stalks are left in the field? Has there been any research on the fibers of the stalks or just the oil itself?

Tom Bodine: It was just the seed that was harvested and part of the research. Currently there are no processors that are taking stalks.

Vice Chair Trottier: Is there any feed value in the stocks?

Chairman Dennis Johnson: Is the pelletizing just for handling or transporting?

Rachel Spilde: Roger Gussiaas with Healthy Oilseeds purchased all of the hemp seeds from our producers. One of the producers had it processed there but chose to sell it himself. Roger crushed the seed to create oil. The pellets are the remaining fiber. The protein fiber is the milled pellet.

(39:00)
David Lommen, Farmer in Bensen County: A professor at North Dakota State invented a process to take hemp and turn it into plastic. This is sustainable plastic. (Handed out pen)

Hemp is a great transition crop to turn acreage into organic.

I asked for approval for 300 acres. All I got was 15 acres. Kentucky has approved 12,800 acres. Minnesota has no cap on acreage. Their fees are $150 for a permit, $400 for the first field and then $50 for any field within a ten-mile radius. I disagree that the Canadian market has issues.

Hemp is coming big time. Other states are not asking the DEA to help with procedures. The 2015 bill has the word "nullify." That term nullifies the federal law. It says that is what we do in North Dakota. All the research has been done.

I had two varieties last year. Canadian protocol was to test your certified seed to make sure it had .003% THC. After a few years when it hits a certain percentage, you don't need to test. The Department of Agriculture incurred great expense having to test NDSU's 12 varieties with 12 separate tests.

If I want to plant 300 acres X $40 per acre = $12,000 into the Ag. Departments account to administer to program. They will have to come to my farm once to test. I got rid of all of the plant material and burned it because that is the requirement according to the DEA. None of the other states are listening to the DEA.

Roger Gussiaas paid $1 per pound for the seed. The price at that point was 80 cents Canadian which translates to 60 cents American. He can't market his product outside of North Dakota.

I am in discussion with three different Canadian companies who want to come to North Dakota to set up facilities. I have a request from a Canadian company wanting three million pounds of hemp seed.

The Koreans are buying industrial hemp. It has the highest protein of any seed oil. They think all their fish is contaminated. One tablespoon of hemp protein is 15 grams of protein. If I had been able to grow 3,000 acres, I could have sold that to a Canadian company because they sold out their supply.

I used no fertilizer with the same yields as other producers. There are approved pesticides developed in Canada. This is not the time to take a cautious approach.

Canadian companies are now setting up in Kentucky and building multimillion dollar processing facilities. They know the U.S. market will explode.

Roger paid us a premium price. He will not buy anymore if he can't sell out of North Dakota.

This would be the most expensive licensing fee of any state in the country.

We shouldn't have a limit on the number of acres that can be planted. The world wants American hemp. It has a power to it.

What is the worst case scenario?

There is tremendous opportunity. The Canadians don't test anymore. The certified registered seed will always come in with the same THC level.

Representative Headland: The 15 acres looks like you had a nice profit.

David Lommen: That is because we had a willing purchaser. What if he would not have bought it?

Representative Headland: With a nice profit it seems like you could pay the fee.

David Lommen: If we can't move our product out of state, what do we do with the seed?

Representative Headland: How are other states getting around the regulations?

David Lommen: It might be better to ask for forgiveness than permission. I would be willing to be arrested for said violation to get some precedent in a court of law. Minnesota is selling it out of state and has no limit on acreage.

Chairman Dennis Johnson: I was with Representative Monson at a legislative forum with Manitoba. Their plant is shut down and the yard is full of old bales.

David Lommen: Two years ago the Canadians were holding back seed to keep the price up. They have a company that was sold for $132 million to an American company, that is an indicator.

Read a quote from Ag Week written by a DEA representative, Russ Baer. He says the agency's 4,700 special agents are spread across 90 countries and are dealing with threats related to the opioid crisis and continuing problems with methamphetamine and cocaine.

"We've got our plate full without focusing any of our resources, quite frankly, on violations of the Industrial Hemp Act." Baer says.

I would be willing to pay for every associated cost with any testing. I will only have one variety with my application this year.

Representative McWilliams: What are we researching?

David Lommen: The research is done. The Canadians are way ahead of us. They have seed that is pesticide tolerant.

Representative Headland: (asking Tom Bodine, Deputy Ag. Commissioner)
This man would like to plant $300 acres. What is the difference if you go out to test 15 acres or 300 acres? Why not allow the expansion of acres?

Tom Bodine: This has been a learning curve for all of us. It is under consideration.
We support this area but we have to comply with state and federal law.

Representative Headland: If the Agriculture Dept. does their inspection, they have covered their risk. The farmer without the market is the one taking the risk. Why limit it to 700 acres?

Tom Bodine: What we are pushing for is to make sure that our processor is able to export the product. Without being able to export the product, we won't have a processor

Representative Headland: Is that the responsibility of the Agriculture Dept.? Let the growers grow it and take the risk.

Tom Bodine: I understand and will pass the word.

Representative Magrum: Do you test all the wild stuff down by the river?

Tom Bodine: No, we do not test. They are feral.

Under the farm bill it is a pilot program.

Representative Schreiber-Beck: I am reading the Kentucky and Minnesota regulations. They do mirror North Dakota regulations. Minnesota in 2016 grew 40 acres and is still under the pilot program. Kentucky grew 2300 acres and their fees were $350 plus some other fees.

Jamie Edwards, Farmer in 2016 Pilot Program: (Attachment 3)

Representative Satrom: Where is your comfort level?

Jamie Edwards: I understand the testing is a big expense. The state had to pay for 15 varieties that NDSU grew which isn't right. The rest of us had to pay to absorb their cost. I am willing to pay my own testing fee and transportation.

They want a ten-foot border around the field which is a loss of acres. That is four acres out of production because they can't walk. We walk our fields. Forty dollars an acre is a lot. I

might as well take my chances with corn. I can market corn wherever I want and don't have to jump through hoops

Rachel Spilde: To clarify the limit of acreage--the farm bill allows for cultivation and research of industrial hemp.

As far as exporting--we have been advised to work with the DEA and have to follow the law. Each pilot producer conducts research on behalf of the department. They sign memorandums of understanding with the department. The department holds the DEA registration as the importer. If we don't follow the rules, we could lose our DEA registration and then no one would be able to grow it.

Chairman Dennis Johnson: Closed the hearing.

2017 HOUSE STANDING COMMITTEE MINUTES

Agriculture Committee
Peace Garden Room, State Capitol

HB 1240
2/3/2017
Job #27898

☐ Subcommittee
☐ Conference Committee

Committee Clerk Signature Re Mae Kuch

Explanation or reason for introduction of bill/resolution:

Committee work

Relating to industrial hemp.

Minutes: Attachments 1 & 2

Tom Bodine, North Dakota Department of Agriculture: (Attachment 1) Amendment. One of the issues we talked about was being able to have the funds to run the program. We didn't get it in the Governor's bill. We were looking at generating dollars for this program as a producer-driven charge.

The committee felt it was too steep. We will go back to the original fee of $150. The other fee at $40 per acre is reduced to $25. All the fees would be deposited in the commissioner's fund.

Currently people have to pay for the background check. They are responsible for paying that fee. But when we collect it back, we deposit it in the general fund

Add an emergency clause to apply to this year.

This doesn't sustain us where we should be. When we take all the results, the net profit is close to $800 per acre. The new pricing would make it $20 higher per applicant.

Chairman Dennis Johnson: How many acres are we going to approve?

Tom Bodine: The application deadline was January 31. We do have a number of requests.

Chairman Dennis Johnson: (Attachment 2) The fiscal note bottom line is $41,000 of revenue. It doesn't need to go to appropriations.

Vice Chair Trottier: The processor is still holding all of the oil?

Tom Bodine: Now they are. We have found the ability for him to export. We are working with other states. We have a letter from the Commissioner going to the DEA.

Chairman Dennis Johnson: The processor fees stay the same?

Tom Bodine: There was a discussion to raise the processor fee. The success of this program rests with the processor. No processor—no program.

Representative McWilliams: When a previous applicant reapplies for the program, do they have to pay a background check every year?

Tom Bodine: Yes. It costs $47.

Representative McWilliams: How many were in the program?

Tom Bodine: Last year we had six.

Representative McWilliams: Could you do the background check every other year? Could you increase the acreage?

Tom Bodine: We are conducting research. It depends on staff time.

Representative McWilliams: Do we have a timeline for growth?

Tom Bodine: It is under authority of the farm bill that allows us to conduct research as long as we can continue to show we are meeting all the checks. Last year we were fifth in the nation for size of hemp program. Kentucky is the leader now. This is new to us and takes a lot of staff time.

Representative Magrum: It seems we price the growers out of business.

Tom Bodine: The producers feel that this is not cost effective. With the data shown, it is the best cash crop. We are not pricing them out.

Chairman Dennis Johnson: Maybe if the federal laws are relaxed.

Tom Bodine: We have to also meet state laws. Everything in agriculture is margin.

Representative McWilliams: Do we have an idea of what the crop can be sold for this year? Is that price locked in.

Tom Bodine: There is not a locked in price. That was above what the industry in other states received. It would range between 65 cents and $1 per pound. Other states have state dollars behind it. We are pulling other funds from other areas.

Representative McWilliams: Could we set it at a percentage of price?

Tom Bodine: I would be open to ideas in the future.

Chairman Dennis Johnson: This is a compromise to keep the price down for the growers.

Representative Hogan: Moved to approve the amendment (Attachment 1)

Representative Satrom: Seconded the motion.

Voice Vote taken. Motion carried.

Representative Headland: Moved Do Pass as amended.

Representative Skroch: Seconded the motion.

A Roll Call vote was taken: Yes 12, No 1, Absent 1.

Do Pass as amended carries.

Representative Satrom will carry the bill.

2/3/17 DP

17.0692.01001

Adopted by the Agriculture Committee

Title.02000

February 3, 2017

PROPOSED AMENDMENTS TO HOUSE BILL NO. 1240

Page 1, line 2, after "hemp" insert "; to provide a continuing appropriation; and to declare an emergency"

Page 2, line 25, replace "two" with "one"

Page 2, line 25, replace "forty" with "twenty-five"

Page 2, line 26, overstrike "Collections from this fee must be"

Page 2, overstrike lines 27 and 28 and insert immediately thereafter:

"5. Fees collected under this chapter must be deposited in the commissioner's operating fund and are appropriated to the department on a continuing basis for the purpose of enforcing this chapter.

SECTION 2. EMERGENCY. This Act is declared to be an emergency measure."

Renumber accordingly

Date: 2/3/2017

Roll Call Vote #: 1

2017 HOUSE STANDING COMMITTEE
ROLL CALL VOTES
BILL/RESOLUTION NO. HB 1240

House **Agriculture** Committee

☐ Subcommittee

Amendment LC# or Description: _____

Recommendation:
☒ Adopt Amendment
☐ Do Pass ☐ Do Not Pass ☐ Without Committee Recommendation
☐ As Amended ☐ Rerefer to Appropriations
☐ Place on Consent Calendar

Other Actions: ☐ Reconsider ☐ _____

Motion Made By Rep. Hogan Seconded By Rep. Satrom

Representatives	Yes	No	Representatives	Yes	No
Chairman Dennis Johnson			Rep. Joshua Boschee		
Vice Chairman Wayne Trottier			Rep. Kathy Hogan		
Rep. Jake Blum					
Rep. Craig Headland					
Rep. Michael Howe					
Rep. Dwight Kiefert					
Rep. Jeffery Magrum					
Rep. Aaron McWilliams					
Rep. Bill Oliver					
Rep. Bernie Satrom					
Rep. Cynthia Schreiber Beck					
Rep. Kathy Skroch					

Voice Vote
Motion Carried

Total Yes _____ **No** _____

Absent _____

_____

If the vote is on an amendment, briefly indicate intent:

Changes the fees and adds an emergency clause.

Date: 2/3/2017

Roll Call Vote #: 2

2017 HOUSE STANDING COMMITTEE
ROLL CALL VOTES
BILL/RESOLUTION NO. HB1240

House **Agriculture** Committee

☐ Subcommittee

Amendment LC# or Description:

Recommendation:
☐ Adopt Amendment
☒ Do Pass ☐ Do Not Pass ☐ Without Committee Recommendation
☒ As Amended ☐ Rerefer to Appropriations
☐ Place on Consent Calendar

Other Actions: ☐ Reconsider ☐

Motion Made By Rep. Headland Seconded By Rep. Skroch

Representatives	Yes	No	Representatives	Yes	No
Chairman Dennis Johnson	X		Rep. Joshua Boschee	X	
Vice Chairman Wayne Trottier	X		Rep. Kathy Hogan	X	
Rep. Jake Blum	AB				
Rep. Craig Headland	X				
Rep. Michael Howe	X				
Rep. Dwight Kiefert	X				
Rep. Jeffery Magrum		X			
Rep. Aaron McWilliams	X				
Rep. Bill Oliver	X				
Rep. Bernie Satrom	X				
Rep. Cynthia Schreiber Beck	X				
Rep. Kathy Skroch	X				

Total Yes 12 **No** 1

Absent 1

Floor Assignment Rep. Satrom

If the vote is on an amendment, briefly indicate intent:

REPORT OF STANDING COMMITTEE

HB 1240: Agriculture Committee (Rep. D. Johnson, Chairman) recommends **AMENDMENTS AS FOLLOWS** and when so amended, recommends **DO PASS** (12 YEAS, 1 NAYS, 1 ABSENT AND NOT VOTING). HB 1240 was placed on the Sixth order on the calendar.

Page 1, line 2, after "hemp" insert "; to provide a continuing appropriation; and to declare an emergency"

Page 2, line 25, replace "two" with "one"

Page 2, line 25, replace "forty" with "twenty-five"

Page 2, line 26, overstrike "Collections from this fee must be"

Page 2, overstrike lines 27 and 28 and insert immediately thereafter:

"5. Fees collected under this chapter must be deposited in the commissioner's operating fund and are appropriated to the department on a continuing basis for the purpose of enforcing this chapter.

SECTION 2. EMERGENCY. This Act is declared to be an emergency measure."

Renumber accordingly

2017 SENATE AGRICULTURE

HB 1240

2017 SENATE STANDING COMMITTEE MINUTES

Agriculture Committee
Roosevelt Park Room, State Capitol

HB 1240
3/2/2017
Job # 28587

☐ Subcommittee
☐ Conference Committee

Committee Clerk Signature Emmery Crotteng

Explanation or reason for introduction of bill/resolution:

Relating to industrial hemp

Minutes: Attachments: #1 - 2

Chairman Luick: Opened the hearing on HB 1240.

(0:45 – 4:00) **Representative Monson:** Introduced HB 1240 (See Attachment #1).

Senator Klein: I have been here as you worked through some of the issues related to industrial hemp and we have certainly learned a lot about what we can use it for. We keep trying to make it work for our producers and we now have some wiggle room with the department. Can you speak to using more of the fiber?

Representative Monson: You are right. I believe the net is anywhere from $300 - $800 an acre which more lucrative than anything we can do. We are not using the fiber; there is no market for it. We had a processor who was paying a premium for that seed. In future years, he may not be able to do that so we may see those profits go down but respectable compared to anything else we can raise. Perhaps we can use the fiber for something in the future but the profit would be eaten up by freight unless we can get it processed in ND.

Senator Klein: Once again, the reason we need these fees is because the federal government is requiring us to monitor the growing of hemp, correct?

Representative Monson: Yes. We thought when it was written into the farm bill that we would see relief and we wouldn't have to have the DEA watching over everything. But still have to follow everything the DEA said and be supervised by the national Agriculture Department. If we could get the DEA to back off the program and allow it to be supervised by the USDA, I think we would see more profit and acres.

Senator Piepkorn: When you say in testimony that your hope is that we not to cripple this industry before it gets established?

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Representative Monson: Correct. When I put the bill in, we tried to make it break even for the department and the fees were higher but the House Agriculture committee did drop the fees down to the level they are now in the bill. If we put the fees too high, we are going to make it less attractive and it will take some of the profit margin out of it.

Senator Larsen: If the hemp stalk is tilled in, does it have a nitrogen release?

Representative Monson: It grows tall so there is a lot of fiber. It is probably no worse than corn but those fibers are strong. The Agriculture Department can provide information on what the farmers on what they do with the fiber. In Canada, they leave it in the field as long as they can. If we could get to the fiber quickly, it would make it a lot easier.

Senator Klein: Is Canada still producing a lot of acres?

Representative Monson: They are. They overproduced so they are going through some growing pains. What they produce is mostly for seed. There is a higher return for the seed products versus fiber. Most of the fiber used is in Windsor, Ontario.
Representative Monson went over the uses of industrial hemp.

(15:00 – 18:20) **Rachel Spilde, ND Department of Agriculture:** Provided the committee with a summary of the hemp program (See Attachment #2b). Miss Spilde testified in Support of HB 1240 (See Attachment #2a - #2b).
She provided the committee with samples of hemp and products.

Senator Piepkorn: When you say pounds per acre, what are they harvesting?

Rachel Spilde: It is approximately the top 2-3 feet and 3-4 feet of stubble remains.

Rachel Spilde: Continued with her testimony (See attachment #2a).

(20:30) **Chairman Luick:** I have a question about the soil after the crop is grown. What is the impact on the soil?

Rachel Spilde: That is part of our research. We know industrial hemp improves the soil but now we are trying to research what the impacts of leaving the fiber in the soil.

Chairman Luick: Does that plant have a tap root? Could it maybe break up some compacted areas?

Rachel Spilde: Yes.

Senator Klein: The Canadians have done research. Have you looked at the research they have gathered?

Rachel Spilde: We have looked to Canada for several different policies we need to implement. We use their sampling protocols. The Canadians also have a list of approved cultivars, they are able to let us know how each of these varieties tend to test with regard to the THC content and we have been aware of the Canadian research and have been using

that focus our research in ND. We are focusing on Canadian varieties, we are focusing on grain and hopefully fiber in 2017. We are trying to develop a market for the fiber; in Canada, they harvest that fiber most of the time.

Senator Klein: Have the studies in Canada linked to more nitrogen or difficulty if they don't get the fiber?

Rachel Spilde: I am sure that they have. I don't have any of that data with me but I am sure we can provide it after the hearing.

Chairman Luick: Do you have any videos of the planting and harvest and processing we can review?

Rachel Spilde: I do have videos of all three of those and I can share them with you

Senator Osland: Apparently you have the 3,5000 acres spoken for?

Rachel Spilde: Yes. We are in the process of reviewing the 42 applications we have received. We may or may not approve all of them but that is the total that we received this year.

Senator Osland: Generally speaking, where are the locations of these?

Rachel Spilde: They are distributed geographically through the state. The majority are in the central or eastern central part of ND. But we do have applicants from all over the state.

Chairman Luick: Are there any types of soils this would do better in?

Rachel Spilde: We do know the hemp did well in the soil we grew it in last year. It does look promising for most of ND.

Senator Klein: Does the application fee require a background check?

Rachel Spilde: That is true. Each person that will be approved to participate in the pilot program in 2017 will be required to submit fingerprints and undergo a background check. Not only the producers, but anyone who will be assisting the producers. Generally, it is three full background checks per pilot producer. Anyone who will come in contact will need a background check.

Senator Osland: Have you looked at the different pH level of the soils?

Rachel Spilde: We did collect all of that information in 2016 and it is included in the summary. Again, it did well in all of our locations. Some were fertilized, some were not. It was a good variety for the geographic distribution.

Senator Piepkorn: I see all costs associated with the criminal history record check are the responsibility of the applicant and you mentioned there could be up to three different stages here.

Rachel Spilde: Each background check is $42.75. Some locations do charge to take the finger prints and some do not which ranges between 10 and 15 dollars.

Chairman Luick: Closed the hearing on HB 1240.

Senator Klein: Moved Do Pass on HB 1240.

Senator Osland: Seconded the motion.

A Roll Call Vote Was Taken: 6 yeas, 0 nays, 0 absent.

Motion carried.

Senator Klein will carry the bill.

Date: 3/2/17
Roll Call Vote #: 1

2017 SENATE STANDING COMMITTEE
ROLL CALL VOTES
BILL/RESOLUTION NO. 1240

Senate Agriculture Committee

☐ Subcommittee

Amendment LC# or Description: _____

Recommendation: ☐ Adopt Amendment
☑ Do Pass ☐ Do Not Pass ☐ Without Committee Recommendation
☐ As Amended ☐ Rerefer to Appropriations
☐ Place on Consent Calendar

Other Actions: ☐ Reconsider ☐ _____

Motion Made By Sen. Klein Seconded By Sen. Osland

Senators	Yes	No	Senators	Yes	No
Senator Luick	✓		Senator Piepkorn	✓	
Senator Myrdal	✓				
Senator Klein	✓				
Senator Larsen	✓				
Senator Osland	✓				

Total Yes 6 No 0

Absent 0

Floor Assignment Sen. Klein

If the vote is on an amendment, briefly indicate intent:

REPORT OF STANDING COMMITTEE

HB 1240, as engrossed: Agriculture Committee (Sen. Luick, Chairman) recommends **DO PASS** (6 YEAS, 0 NAYS, 0 ABSENT AND NOT VOTING). Engrossed HB 1240 was placed on the Fourteenth order on the calendar.

2017 TESTIMONY

HB 1240

1/27/17

Testimony on HB1240

Rep. David Monson, Dist. 10

Chairman Johnson and members of the House Agriculture Committee, I am Rep. David Monson of District 10 in far northeastern ND. HB1240 is a user fee increase bill on industrial hemp. I put this bill in at the request of the ND Ag Commissioner's office. As chairman of the House Appropriations Education and Environment section which has the Ag Commissioner's budget in our committee as we speak, I considered addressing this budget shortfall in the budget bill instead of a stand-alone bill. Because this is such a large increase to the producers in the industrial hemp program administered by the Commissioner of Agriculture's office, I felt it was most appropriate to have its own hearing and discussion. The fiscal note for this bill is $62,000 increase in other funds to their budget. The fee increases in this bill would potentially make the program break even in their budget. My recommendation is for you to amend this bill down to a more acceptable fee increase for the producers so we don't cripple this potentially lucrative industry before it get established. I don't think it is proper for the tax payers of ND to foot the whole bill, but it is a little much to expect the few producers to foot the whole bill either at this point in time. With a couple more years of experience with this new crop we could revisit this fee increase in the next biennium. I leave this in your hands to contemplate and decide what the best amount would be after hearing the testimony of the agency who will be following me.

I would be happy to try to answer any questions you may have at this time.

2a

COMMISSIONER
DOUG GOEHRING

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NORTH DAKOTA
DEPARTMENT OF AGRICULTURE

STATE CAPITOL
600 E BOULEVARD AVE DEPT 602
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Testimony of Rachel Spilde
Industrial Hemp Program Coordinator
House Bill 1240
House Agriculture Committee
Peace Garden Room
January 27, 2017

Chairman Johnson and members of the House Agriculture Committee, I am Rachel Spilde, Industrial Hemp Program Coordinator for the North Dakota Department of Agriculture (NDDA), and I am representing Agriculture Commissioner Goehring. I am here today to support and offer an amendment to House Bill 1240.

Industrial hemp's status with the DEA as a schedule 1 controlled substance has created a strict regulatory construct and decades where hemp cultivation has been restricted completely. The 2014 farm bill included language that allows state departments of agriculture and institutions of higher education, in states where hemp laws exist, to research the growth, cultivation, and marketing of industrial hemp. During the 2015 North Dakota Legislative Session, House Bill 1436 was passed that allowed NDDA the opportunity to use the authority granted by the farm bill to facilitate producer-driven research in our state. NDDA has chosen to use the authority to facilitate producer-driven research in our state.

In its facilitation and oversight of the industrial hemp program, the NDDA complies with strict federal guidelines, state law and administrative rule. The current fee structure outlined in the law does not bring in enough revenue to cover the cost of providing oversight of the industrial hemp program and enforcing this law. In fact, the actual cost to run the program in 2016 far exceeded the revenue brought in. I have included a table in my written testimony that details the basic operating expenses and testing fees of the 2016 program. Program costs were estimated at $242 per acre.

Table 1.

Sites	Mileage	Per Diem (2 Staff)	Staff Time (2 staff)	Cost Per Trip	# of Trips	Reason for Trip	Total Cost Per Location
Elgin	$66.60	$21.00	$629.12	$716.72	3	Maturity check, sampling, incineration	$2,150.16
Adrian	$96.20	$35.00	$629.12	$760.32	4	Maturity check, sampling, harvest, incineration	$3,041.28
Carrington	$92.50	$35.00	$629.12	$756.62	4	Maturity check, sampling, processing check, incineration	$3,026.48
Maddock	$111.00	$70.00	$629.12	$810.12	4	Seed delivery, maturity check, sampling, incineration	$3,240.48
Langdon	$185.00	$300.00	$1,258.24	$1,743.24	2	Seed pick up, field day	$3,486.48

$14,944.88	2016 Operating
$1,995	THC and CBD Testing
$16,939.88	2016 Total Cost

NDDA recently requested a $64,000 industrial hemp budget enhancement for the next biennium. The funds were not included in the budget. Accordingly, the NDDA supports an amendment to the law to increase the fees to $250 plus $40/acre. This fee increase would allow the NDDA to off-set the cost of meeting increased demand for the program.

I have created a cost estimate to run a larger program for 2017 (one that includes 10 producers, NDSU Langdon REC, and approximately 700 acres) in Table 2. The cost to run a program of this size is approximately $38,500. The current fee structure would provide $3,500 to administer it while the proposed fee structure would provide $30,500.

$34,655.66	2017 Operating
$3,795.00	Estimated THC Testing
$38,450.66	2017 Total Cost

Table 2.

Sites (randomly selected across the state)	**Mileage**	**Per Diem (2 Staff)**	**Staff Time (2 staff)**	**Cost Per Trip**	**# of Trips**	**Total Cost Per Location**
Elgin	$66.60	$21.00	$629.12	$716.72	3	$2,150.16
Adrian	$96.20	$35.00	$629.12	$760.32	3	$2,280.96
Carrington	$92.50	$35.00	$629.12	$756.62	4	$3,026.48
Maddock	$111.00	$70.00	$629.12	$810.12	3	$2,430.36
McClusky	$48.10	$35.00	$629.12	$712.22	3	$2,136.66
Williston	$170.20	$300.00	$1,258.24	$1,728.44	3	$5,185.32
Hettinger	$111.00	$70.00	$629.12	$810.12	3	$2,430.36
Dickinson	$74.00	$35.00	$629.12	$738.12	3	$2,214.36
Minot	$81.40	$70.00	$629.12	$780.52	3	$2,341.56
Park River	$185.00	$300.00	$1,258.24	$1,743.24	3	$5,229.72
Langdon	$185.00	$300.00	$1,258.24	$1,743.24	3	$5,229.72

The increase would cover testing fees and operating expenses associated with enforcing the chapter. These fee increases will no doubt impact the producer's bottom lines. However, in 2016, producer's reported net profits of $507 to $867 per acre (Table 3).

Table 3.

Producer	Acreage	Yield (pounds/Acre)	Input Costs/$ Acre	$ Price/Pound	Net Profit $/Acre
LaMoure	30	1266	$441.73	$1.00	$824.27
Foster	15	895	$387.27	$1.00	$507.73
Benson	15	1171	$303.85	$1.00	$867.15
Grant	10	219	$330.35	NA	

We would like to offer an amendment to this bill that would allow the NDDA to capture all of the fees of the chapter, including criminal history, applicant and acreage and to declare this act to be an emergency measure.

If anyone has questions about the bill, amendments, fiscal note, or state and federal regulatory requirements, Deputy Commissioner Tom Bodine or I would be pleased to address them.

2b
1/27/17
Rachel Spilde

PROPOSED AMENDMENTS TO HOUSE BILL NO. 1240

Page 2, line 26, overstrike "Collections from this fee must be"

Page 2, overstrike lines 27 and 28 and insert immediately thereafter "5. All fees collected under the provisions of this chapter must be deposited in the commissioner's operating fund and are appropriated to the commissioner to be used to enforce this chapter."

Page 2, after line 28, insert:

"Section 2. EMERGENCY. This Act is declared to be an emergency measure."

Renumber accordingly

HB 1240

2C
1/22/17
Rachel Spilde

PLANT INDUSTRIES DIVISION

January 2017

2016 NDDA

Industrial Hemp Pilot Program

Research Summary

North Dakota Department of Agriculture

2016 Industrial Hemp Pilot-Program

INTRODUCTION

The North Dakota Department of Agriculture (NDDA) created the Industrial Hemp Pilot Program to research the growth, cultivation, and marketing of industrial hemp in North Dakota. The goal was to increase the understanding of how industrial hemp fits into the current agricultural landscape, and investigate how it may contribute to the economy of North Dakota.

LEGAL STATUS

Industrial hemp is a variety of the plant species *Cannabis sativa* L. and is considered a Schedule I Controlled Substance under the Controlled Substances Act (CSA, 21 U.S.C. §§801 et seq.; Title 21 C.F.R. Part 1308.11). Cultivation is highly restricted and only allowable for research purposes authorized under a provision of the Agricultural Act of 2014.

The Congressional Research Service's *Hemp as an Agricultural Commodity* written by Renee Johnson (2), states that:

> The Agricultural Act of 2014 ("farm bill," P.L. 113-79) provided that certain research institutions and state departments of agriculture may grow industrial hemp, as part of an agricultural pilot program, if allowed under state laws where the institution or state department of agriculture is located. The farm bill also established a statutory definition of "industrial hemp" as the plant *Cannabis sativa L.* and any part of such plant with a delta-9 tetrahydrocannabinol (THC) concentration of not more than 0.3% on a dry weight basis. The enacted FY2015 appropriations (P.L. 113-235) further blocked federal law enforcement authorities from interfering with state agencies, hemp growers, and agricultural research.

The term hemp refers to the agricultural crop of *C. sativa L.* which produces cannabinoids, but only trace levels of the psychoactive THC. Table 1 lists the cannabinoid compounds that are produced by *C. sativa.* The major omega-6 and omega-3 fatty acids produced in hemp are linoleic and linolenic acids which are said to be produced at the ideal 3:1 blend (3).

Table 1. List of Cannabinoids available for testing by MedScan Laboratories LLC.

Cannabinoid	Designation	Notes
Tetrahydrocannabinol	THC-A	Non-psychoactive, that converts to THC
Cannabidiol	CBD-A	Non-psychoactive
Cannabinol	CBN	Mild psychoactive
Cannibidivarin	CBD-V	Non-psychoactive
Cannibigerol	CBG	Non-psychoactive, High levels in Ind. Hemp
Cannibichromene	CBC	Non-psychoactive, 2nd highest level in Ind. Hemp
Tetrahydrocannabivarin	THC-V	Highest level of all cannabinoids in Ind. hemp
Delta-9 tetrahydrocannabinol	THC	Psychoactive

THE PILOT PROGRAM

NDDA announced the Industrial Hemp Pilot Program in October of 2015. Seventeen producer applications were received and reviewed by a committee created by the Agriculture Commissioner. The Commissioner deliberated on the committee recommendations and selected five pilot producers. Geographical spread, soil type, environmental conditions, and the proximity to processing facilities were also key considerations in the selection of the candidates.

The five growers planted a total of 70 acres of industrial hemp as part of this 2016 research program. Although not covered within the NDDA Industrial Hemp Pilot Program, the NDSU Langdon Research Extension Center ran a parallel program to assess the agronomic performance of nine different seed varieties. Unfortunately, excessively wet conditions following heavy rainfall events resulted in substantial plant stand losses, and the trials were abandoned. Industrial hemp does poorly in soggy, heavy soils.

Three hemp seed companies in Manitoba, Canada supplied the four varieties planted in the 2016 program (Table 2). The varieties selected were a mixture of high yielding grain varieties and a type known to produce high oil content. Very tall hemp varieties - those suitable for fiber production - were not chosen for the program, as there are no fiber processing facilities nearby. The objective was to select hemp types that yielded well under northern prairie conditions. The Manitoba Agriculture website (1) publishes the historical data of several varieties. Since 1998 Canada has grown industrial hemp for both the seed and fiber markets, with most of the production located in the Prairie Provinces of Manitoba, Saskatchewan and Alberta. Up to 118,000 acres have been grown annually in Canada over the 1998-2011 period (1). In Manitoba, grain yields ranged between 100 to 1200 lbs./acre, with a bushel weight of 44 lbs. at 10% moisture content.

The research focus varied according to producer interest. Grower data was collected at each site, and included general agronomic practices, rainfall, observations of insect pests, weeds and diseases, crop establishment and development, and grain yield (Table 3a).

Table 2 exhibits the historical yield expectations amongst the test varieties under Manitoba conditions. All varieties were plant variety protected (PVP) and pedigreed (certified or foundation grade). Canadian seed laws specify that all hemp seed sold must be of a certified pedigree and tested by Canadian agencies to ensure a THC content below 0.3% on a dry weight basis. For instance, *cv Finola,* a variety bred for high oil content, generally produces the lowest grain yield relative to the other test varieties in nearly 20 years of Manitoba field trials. The other three varieties listed exhibited yields that were statistically equivalent over the same time period. This finding suggests that there could be large swings in seed yields year over year. It is important to note that growing industrial hemp carries considerable risk to the producer as it is not eligible for crop insurance, and markets and returns are not consistent year to year.

Table 2. Long-term agronomic characteristics of the industrial hemp cultivars selected for the 2016 NDDA Pilot Research Program

Cultivar	Seed Source	Flower Type	Use	Maturity (days)	% Seed Yield* (% of variety CRS-1)
CANDA	Parkland IHG Coop	Monoecious	Grain, fiber	110	86
CFX-1	Hemp Genetics Int.	Dioecious	Grain, fiber	105	106
CRS-1	Hemp Genetics Int.	Dioecious	Grain	110	100
FINOLA	Hemp Oil Canada Inc.	Dioecious	Grain, Oil	100	83% **

*Manitoba Agriculture data, Check variety CRS-1 @ 1548 lb/A [averaged over 21 site years]
** Note: cv Finola seed yield was significantly lower compared to the other grain varieties in long term yield trials in Manitoba. Finola is regarded as a high oil content low yielding variety.

Crop management is a key consideration in variety performance. For instance, one grower in the 2016 Minnesota Department of Agriculture Pilot Program grew *cv Finola* for cold press oil extraction. Hemp seed oil contains omega-6 and omega-3 polyunsaturated fatty acids and has been touted to provide health benefits. Harvest was delayed until the crop was completely ripe, apparently to reduce the amount of green seed content, and hence chlorophyll in the oil. Delaying harvest is a risky proposition, as excessive seed losses can result from shelling out and blackbird feeding. Experienced growers recommend that harvest begin at the onset of blackbird predation.

Photo 1. North Dakota industrial hemp crop (2016)

Hemp varieties are monoecious or dioecious. The former cultivars have both male and female flowers on the same plant, while the latter cultivars maintain separate male and female plants (see Photo 1). Plants tend to be 75-80% dioecious with the proportion of exclusively monoecious female plants being 10-15% and males about 10% (Photo 2). Under stressful Manitoba conditions (hot/dry) the proportion of pure male plants can increase to 20%, reducing yield. Pilot producers in ND observed that because hemp does not branch very well, there may be some benefit to boosting the planting density (above 10-12 plants/square foot) to improve yields. A side benefit to this practice is increased competition against weed growth. Future studies will be needed to investigate this phenomenon.

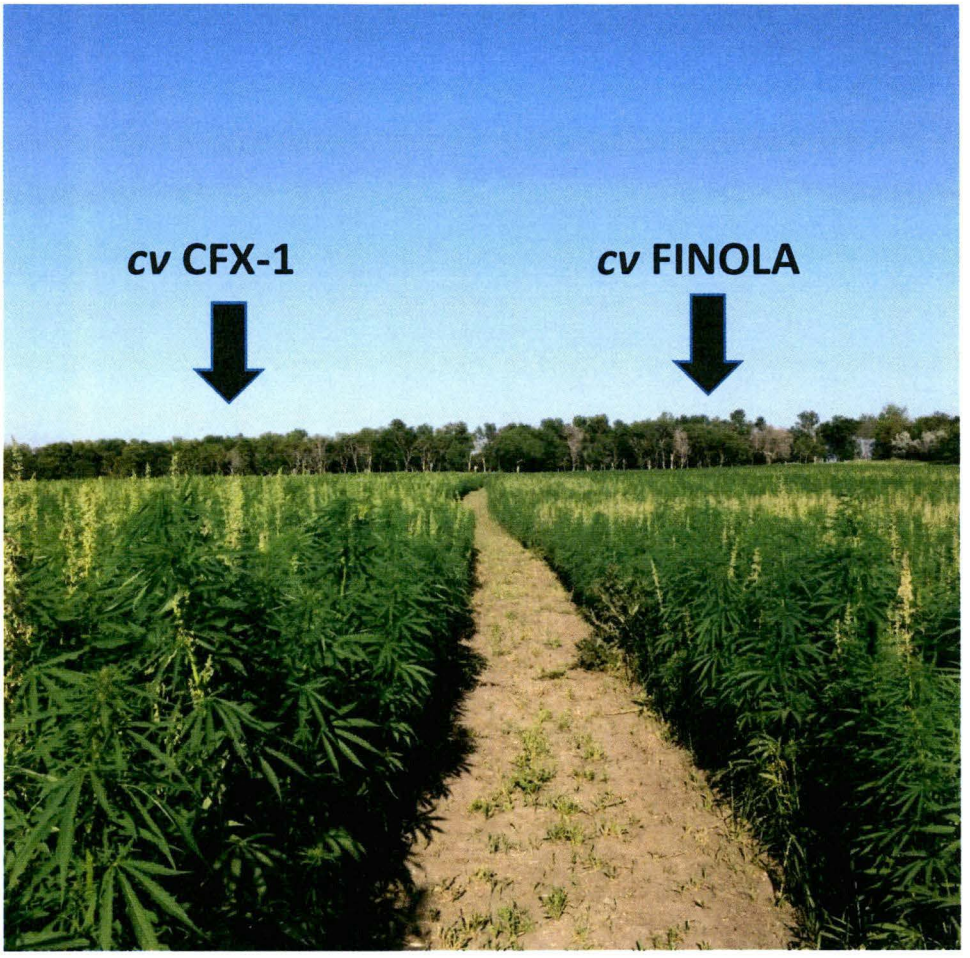


Photo 2. Industrial hemp pilot producer variety trial (Benson County July 2016).
Note: Monoecious plants - white stalks (male flowers) can constitute 10-20% or more of the plant stand.

2016 RESULTS - MATERIALS AND METHODS

In May of 2016, NDDA imported 2,175 pounds of industrial hemp seed through the three Manitoba suppliers; Hemp Oil Canada (*cv Finola*), Parkland Industrial Hemp Growers (*cv Canda*), and Hemp Genetics International (*CFX-1, CRS-1*). (Table 3a).

Table 3a. Site details for the 2016 NDDA Industrial Hemp Pilot Research Program.

Trial County	Research Focus	Cultivar	Acres
LaMOURE	Grain yield	CANDA	15
LaMOURE	Grain yield (comparison on two soil types)	CANDA	14 + 1
GRANT	Grain yield	CRS-1	5
	Grain yield	CFX-1	5
BENSON	Variety performance, grain yield	CFX-1	7.5
	Variety performance, grain yield	FINOLA	7.5
FOSTER	Variety performance, grain yield, processing, marketing	CANDA	7.5
	Variety performance, grain yield, processing, marketing	FINOLA	7.5

Previous crops were spring wheat, flax, corn, or soybeans. There are no registered pesticides (insecticides, herbicides, fungicides, nor seed treatments) for use in industrial hemp crops. With this being the case, producers were very cognizant to select their cleanest fields. In all but one instance, the growers pre-treated their fields with glyphosate to contain any early season weed growth. Hemp grows best under warmer soil conditions, and hence is planted later than other commercial crops. This late planting may allow for an additional flush of weeds that can be eliminated by the pre-plant burn-off application of glyphosate. Most fields were fertilized by the growers either the previous fall, or prior to planting.

Planting took place between May 24 and June 13, 2016. Growers used a range of newer and older planting equipment and there were no apparent seed flow problems (Table 4). The Grant County trial field was sandy with a less firm seed bed. Plant depth and dry conditions may have been the cause for the observed thin plant stand. Planting density should be set to achieve 10-12 live seeds/square foot. Planting should take place once soils warm and into a firm and moist seed bed. Hemp is highly photo sensitive, and planting later will reduce the crop height, but not result in lower yields, nor later maturity. Early May plantings favor producing very tall plant stands (suitable for fiber production) but will not provide significant gains in earlier harvesting nor seed yields. Final plant heights were between 4.0' to 7.2' tall.

Table 4. Planting equipment used by the Pilot Program producers 2016.

County	Planting Equipment (May 24-June13)
LAMOURE	Case 6200 Double disc press drill
GRANT	Concord Hoe Air Drill Dutch with openers and disc closers
BENSON	Haybuster 107 Seed Drill
FOSTER	JD 1990 Air Seeder

Table 3b. Site details for the 2016 NDDA Industrial Hemp Pilot Research Program.

County	Hemp Var	Soil Type	Planting Depth (in)	Planting Row Spacing (in)	Final Plant height (in)
LAMOURE 1	Canda	Svea Barnes Loam	.75 ± .25	6	60
LAMOURE 2	Canda	Svea Barnes Loam	.75 ± .25	6	86
LAMOURE 3	Canda	Svea Barnes Loam	.75 ± .25	6	63
GRANT 1	CRS-1	Sandy loam	.5-.75	10	84
GRANT 2	CFX-1	Sandy loam	1-1.25	10	84
BENSON 1	CFX-1	Heimdal-Emrick Loam	.5-1	7	85.2
BENSON 2	Finola	Heimdal-Emrick Loam	.5-1	7	56.4
FOSTER 1	Canda	Clay loam	.75	7.5	78
FOSTER 2	Finola	Clay loam	.75	7.5	48

SAMPLING INDUSTRIAL HEMP - THC CONTENT

NDDA staff collected random samples from each hemp field to evaluate the THC content in the foliage and involucral leaves of the hemp inflorescences. Sampling was timed when approximately half of the seeds were resistant to compression (Photo 3). The THC content in hemp is known to peak when the seeds begin to ripen. Seed forms quickly, usually about 10 days after the first flower.

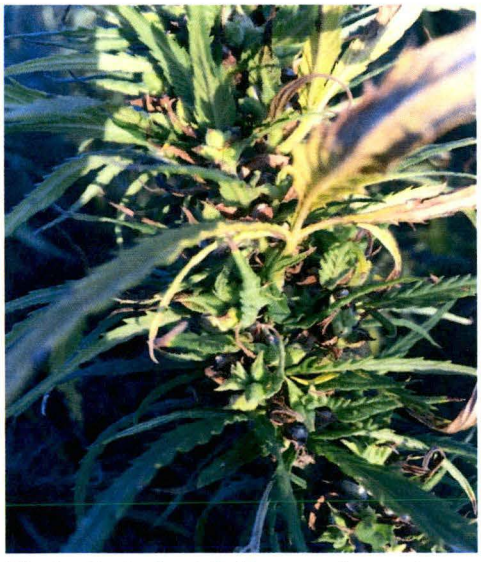


Photo 3. Industrial hemp stage at sampling time for THC analysis (2016).

Established Canadian hemp sampling protocols involved collecting the top 2-2.5 inches of 60 randomly selected industrial hemp inflorescences. The samples were evenly split into two 30-plant sets. Each set for THC analysis were bagged, and labelled and one set was couriered immediately to the federally accredited laboratory MedScan Laboratory Inc., in Williston, ND. The second duplicate sample set was sealed and retained by the pilot producer as a backup-set. Standard published analytical methods were followed by MedScan Labs to determine the delta-9-tetrahydrocannabinol (THC) content. The results of the analyses are shown for each field in Table 5. In all cases the THC content found in these plant parts were at trace levels. The THC content from the nine fields sampled, amounted to only 0.7% to 14% of the allowable THC content by dry weight.

Table 5. Delta-9 THC in industrial hemp samples, at seed ripening stage.

Producer	Cultivar	% THC** (dry weight)
LaMOURE	CANDA	.002
	CANDA (2 fields)	.012 + .037
GRANT	CRS-1	.007
	CFX-1	.007
BENSON	CFX-1	.007
	FINOLA	.008
FOSTER	CANDA	.004
	FINOLA	.044

PEST ISSUES

No significant insect pest pressures were seen at any site. Cutworm, Bertha armyworm, corn borers (photo 4a), Lygus bugs, aphids and grasshoppers on occasion can be a problem.

Bees were found to be very numerous at flowering time at several field locations, as were lady beetles.

Weed pressure was particularly light on all fields, except for some volunteer wheat at the Benson County location; and at the Grant County location where there was a mixture of annual weeds in one field under a thin crop stand and an open canopy (Photo 4b). Sandy soil, with uneven and inconsistent planting depth were attributed to the spotty emergence. Lack of significant rain through June resulted in a poor plant stand with significant weed issues and lower yields. The extra handling at harvest was necessary to remove the moist weeds, and dry down the hemp seed to a safe level for storage (10-11% moisture content).

Both wheat and wild buckwheat (*Polygonum convulvulous*) are problematic as it is most difficult to separate out of hemp seed. Wheat also may cause issues with processors who hope to maintain gluten-free facilities. Ideally, all fields need to have a low inherent weed population as there are no registered pesticides for use in hemp production. Growers are strongly urged to apply a pre-plant spray of non-residual herbicide (such as glyphosate or glufosinate-ammonium) to contain any early season weed growth. Hemp is very competitive against weeds. It emerges very rapidly (3-4 days) in warm/moist soils and can quickly shade and outcompete weeds. Growers commented on how quickly hemp develops.

Photo 4a. European corn borer infesting a hemp stalk (Grant County 2016).

Photo 4b. Thin canopy, dry conditions encourages weed development (Grant County) 2016.

No plant diseases were observed. Hemp is reported to be susceptible to some seedling diseases such as *Pythium* and *Rhizoctonia*. *Sclerotinia* (white mold) and *Botrytis* are also said to be the most serious foliar diseases for hemp. The foliar diseases generally form at the top of the plant in the inflorescences.

HARVESTING INDUSTRIAL HEMP

All harvesting was completed in September 2016. Harvest equipment is listed in Table 7. The hemp crop was straight cut, and no difficulties were reported, other than the combine speed being run intentionally slow to avoid any potential plugging or wrapping issues with the volume of green material. Some growers in Canada swath the crop; however, it is prone to sprout. Normally the seed moisture content at harvest should be 18-19%; and seed is considered dry and safe for storage 10% moisture. Hemp plants may appear quite green at normal harvest time. The seed matures rapidly at this stage and may shell out readily during the harvest operation (Photo 5).

Seed cleaning was required in all instances to reduce the amount of moist foreign material in the sample and lower the moisture content to a safe level for storage and processing.

Normal yields obtained in Manitoba are 800-1200 lbs/acre. The pilot producers were pleased with the results and harvested between 895 to 1266 lbs/acre – right in line with Canadian yield expectations for these varieties. Unfortunately, the Grant County test site yielded only 219 lbs/acre due to in part to a sparse plant stand and very dry conditions at the end of May into early July (Table 6). In fact, the May-August rainfall was only 4.8" at the Elgin NDSU Station. The variability in yields should caution potential growers willing to grow hemp on stubble with low soil moisture reserves.

Table 6. Monthly rainfall totals- Pilot sites (2016)

	Rainfall Totals (Inches)			
	Foster	**LaMoure**	**Grant**	**Benson**
May	**1.1**	**3.7**	**0.8**	**2.2**
June	**1.6**	**2.8**	**0.7**	**3.5**
July	**4.5**	**3.9**	**1.6**	**4.5**
August	**3.6**	**3.0**	**1.7**	**0.8**
September	**1.8**	**3.9**	**2.3**	**3.0**
TOTALS	12.6	17.3	7.1	14.0

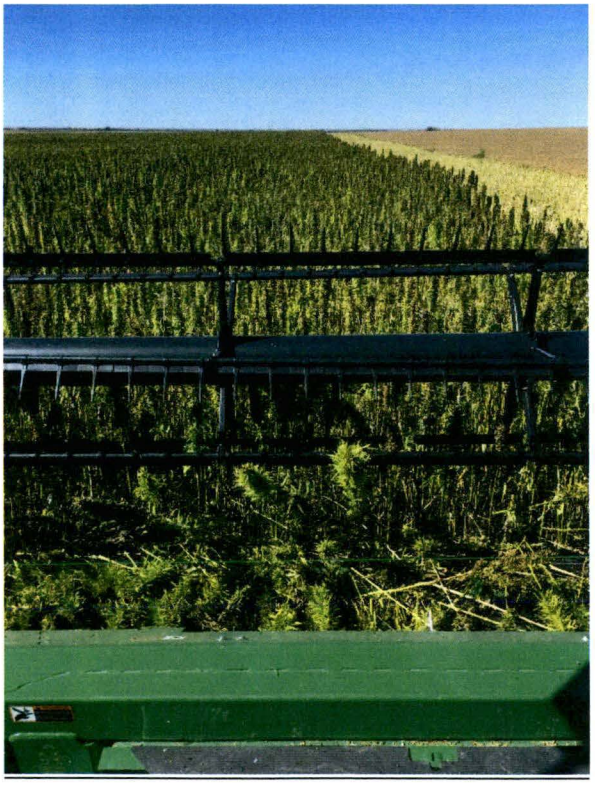


Photo 5. Harvesting industrial hemp (LaMoure County).

Table 7. Harvesting equipment used by the pilot program producers in 2016.

County	Harvesting Equipment (Sept 10-22)
LAMOURE	JD5680 combine with JD 635 Flex Draper Head
GRANT	NH CR 940 Twin Rotor Combine with NH 30 foot draper head
BENSON	JD 9650 cylinder walker with 30 foot rigid head
FOSTER	JD 8770 with JD flex head

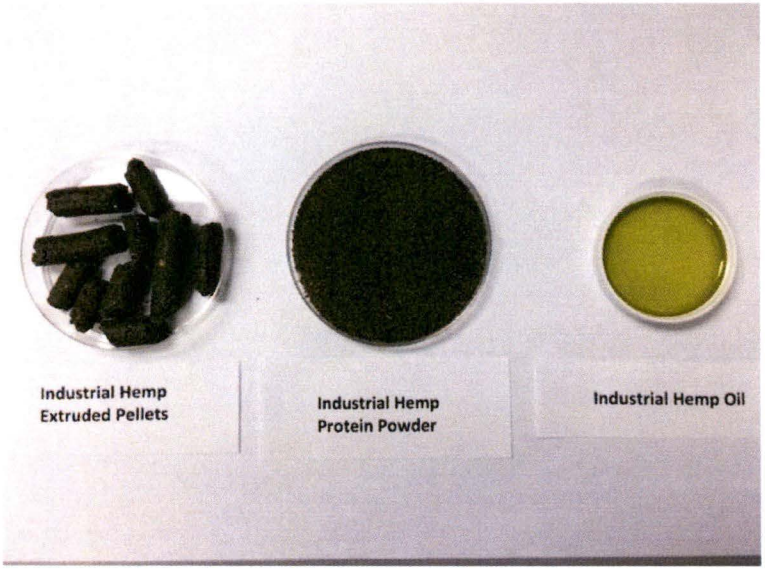
Because industrial hemp does appreciably branch/tiller, the stubble that remains is composed of long individual fibrous stocks that are tough to work down and generally moist such that burning will not be very effective (Photo 6). Normally the stubble is left standing over the winter and then rolled in spring to produce a dense soil cover to facilitate successful burning.

Photo 6. Post-harvest crop residue management (LaMoure County) 2016.

INDUSTRIAL HEMP PROCESSING

All grain was processed at Healthy Oilseeds LLC., located in Carrington, ND. The grain was crushed to extract hemp oil, the remainder milled to produce either a finely-ground high-protein flour or, extruded into pellets (Photo 8). Seed contains 30-35% oil of a desirable fatty acid profile; and flour contains around 25% protein. Reliable foreign markets for these commodities exist. A grain dehuller is also being considered in the future as the markets for industrial hemp commodities increase. Dehulled hemp or "hemp hearts" are a high demand commodity. The fiber stalks remained in the field.

Photo 7. Processed industrial hemp commodities.



Representative samples of each of the above commodities (Photo 7) have been sampled (Photos 8a, 8b) by NDDA staff following a U.S Drug Enforcement Administration (DEA) request, then couriered to MedScan laboratory to analyze for cannabidiol (CBD), and THC. Cannabidiol (CBD) is produced at higher levels than THC in hemp and is then extracted for its supposed medicinal properties (i.e. anticonvulsive, anti-epileptic and anti-microbial). As expected, the final analytical step of the processed commodities has shown low THC content (Table 8). This should result in unencumbered trade of the hemp commodities being held by the pilot producers.

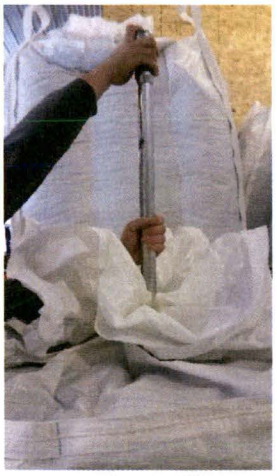


Photo 8a: (Left) Hemp meal sampling

Photo 8b: (Right) Hemp oil sampling

Table 8. THC and CBD content contained in harvested and processed samples.

COMMODITY	Mass % THC	ug/g THC	Mass % CBD	ug/g CBD
Seed	0.124	1243	0.638	6384
Flour	0.008	82	0.015	153
Pellets	0.007	74	0.101	1009
Oil	<0.001	<1	<0.001	<1

In addition, samples of roasted grain will also be germination tested by the North Dakota State Seed Department to verify seed sterility prior to any sale or movement. Other uses for industrial hemp are shown below (Table 9), and are anticipated with as acres and processing capabilities increase.

Table 9. Industrial hemp uses

Food Uses	Hemp Oil Product Uses	Hemp Fiber Product Uses
Confectionary items	Cooking	Fabric
Beer	Salad Dressing	Insulation
Flour	Dietary Supplements	Carpeting
Feed	Body Care Products	Paneling
Dietary	Fuel	Pulp and Paper
Snacks	Detergents	Recycling Additive
Non-dairy Milk and Cheese	Spreads	Automobile Parts
Baking	Paint	Animal Bedding and Mulch

Economics of Industrial Hemp

All the grain was transported to the sole processor, Healthy OilSeeds LLC in Carrington, ND. The proprieter provided an extra incentive to encourage grower delivery, and paid a premium ($1.00/lb). At the time of writing, typical industry returns range from $0.62 to $1.00 USD.

Each grower penciled out their individual costs to produce the hemp crop. Current seed cost is approximately $2.25/lb (approx $56.00/acre). Three of the four growers (Table 10) had decent returns. Only one grower had poor returns, but will market his products separately to improve the bottom line.

Table 10. Economic analysis by growers on the profitability of Industrial Hemp under the NDDA Industrial Hemp Pilot Research Program (2016).

Grower County	Acres Planted	Yield (lb/A)	Yield (bu/A)	GrowerCosts $/A	Gross Return $/lb **	Net Profit $/A
LaMoure	30	1266	28.8	$441.73	$1	$824.27
Foster	15	895	20.3	$387.27	$1	$507.53
Benson	15	1171	26.6	$303.85	$1	$867.51
Grant**	10	219	5.0	$330.35	Unknown	Unknown

Conclusions

Industrial hemp holds promise as a viable alternative crop for North Dakota producers. Based upon the industrial hemp grower experiences, the crop appears to be well adapted over most of North Dakota's agricultural conditions. Generally the field trials had low weed pressures, good plant stands, and lacked significant diseases and other pests. The pilot program growers were comfortable growing the new crop and were able to plant, maintain, and harvest hemp without significant modifications to their current farming equipment and practices. Both the seed yields and economic returns were impressive for the first time growers.

References

1. Anon. 2016. Manitoba Department of Agriculture, Industrial Hemp Production.

2. Johnson, Renee. 2015. "Hemp as an Agricultural Commodity: Congressional Research Service", CRS Report.

3. Leizer, Cary et. al. 2000. "The Composition of Hemp Seed Oil and Its Potential as an Important Source of Nutrition", Journal of Neutraceuticals, Functional and Medicinal Food.

4. Layton, Catharine and Wilhad, M. Reuter. 2015. Analysis of Cannabinoids in Hemp Seed Oils by PLC Using PDA Detection.

5. Hemp Genetics International (HGI). Hempgenetics.com/index.html

Jamie Edwards

1/27/17

HB1240, Section 4-41-02, #4

Thank you, Mr. Chairman, and committee members for giving me the opportunity to speak with you today. I would also like to thank Commissioner Goehring and Rachel for all the time and energy they have spent getting this Hemp Program going.

My name is Jamie Edwards, and I am one of the farmers who were able to participate in the Hemp Pilot Program for 2016.

Just a quick background on me, I am the 3rd generation on my family farm, South of Jamestown, in LaMoure County. My parents and I operate our farm of 3000 acres, and strive to keep the family farm prosperous in North Dakota.

We decided to apply for the hemp program, to look for a new market, to keep our farm profitable. We mainly raise corn and soybeans, and the markets haven't been the kindest to us the last few years. Hemp rejuvenated our entheusuem. A new crop, with a large potential, both on our farm, and for the great state of North Dakota.

For anyone who is new into this program, hemp has over 25,000 products it can be used in. From health foods, to cosmetics, and paper to biofuels, as well as concrete. It may be a cousin to marijuana, but contains less than 0.3% THC, so there is no high gained from it. Instead, it helps make the soil on our farm better. It is naturally organic, and no chemicals of any kind have to be used on it. It truly is a magical plant.

I could talk all day about the many uses of this plant, but I am here today to discuss the bill, HB1240.

HB1240, Section 4-41-02, #4 states:

To provide sufficient funds to pay costs associated with monitoring and testing industrial hemp in the state, ~~the~~ **The commissioner shall assess each applicant a fee of ~~five~~ two hundred fifty dollars plus forty dollars per acre. ~~The minimum fee assessed must be one hundred fifty dollars per applicant.~~** Collections from this fee must be deposited in the commissioner's operating fund and are appropriated to the commissioner to be used to enforce this chapter

Specifically the wording **The commissioner shall assess each applicant a fee of Five dollars per acre. The minimum fee assessed must be one hundred fifty dollars per applicant.** To amend it to **The commissioner shall assess each applicant a fee of two hundred fifty dollars plus forty dollars per acre.**

Changed Proposal:

The commissioner shall assess each applicant a fee of $250 plus $520 per field, per variety, for the initial field / variety, and $120 for each additional field / variety.

Break-down of fee:
THC Testing - $115
Gas for transportation (4 trips/year), calculated at 300 miles from Bismarck, at $3.00/gal - $240
Per Diem, calculated for 2 people, 4 trips each - $165

Additional field / variety fee - $120

This structure would cover the testing, transportation, and meals for 2 people, on four trips to every initial field. If a grower had more than one field and/or variety, the $120 would cover the THC testing, plus $5 extra.

This is very similar to other states that have implemented a Hemp Program. For example, Minnesota charges $150 for Registration, and $400 for the initial field. Additional fields within 10 miles are an extra $50 per field, and fields more than 10 miles from the initial field are $100 per field. Kentucky charges a flat rate of $375/field.

To put some real world numbers to all this data, using a 100 acre field, with a single variety, Minnesota would charge $550, or $5.50/ac. In North Dakota, for 2017, the fee would be $150 plus $500, for a total of $650, or $6.50/ac. If the amendment to this bill passes, the cost in North Dakota would be $250 plus $4000, or $42.50/ac. This is an 85% fee increase, and seems very excessive. This does not include any seed costs, administrations costs, or background check costs.

For 2016, the first year for ND Hemp, we experienced a fantastic yield year across the farm. Soybean and corn yields were the highest that has ever been recorded on our farm. With only 1 year of hemp data, we have to assume the hemp yields followed suit. We yielded 1255 lbs/ac. We were also given a high premium for our seed this year from Healthy Oil Seeds, in Carrington. We were paid $1.00/pound, as they wanted the seed to be able to set up their processing equipment to handle the seed, in preparation for the future. However, typical market value is around $0.63/pound.

Input Costs:
Using NDSU's Breakeven spreadsheet, I implemented our costs associated with Hemp. The total inputs, with the current 2016/2017 fee structure, comes out to $441/ac. With the yield we had, and the high prices we were paid for the seed, we Net'd an incredible $814/ac profit. However, I do not believe this will be attainable in years to come. Canadian data shows normal crops at 1000 lbs/ac. Using this figure, and realistic market value of $0.63, we would have a NET profit of $189 / ac. With the bill that is proposed by the Ag Dept., it will move this down to $153 / ac. This is assuming that other costs, such as fertilizer, stay the same as 2016. Fertilizer prices are already 12% higher today than a year ago, making profit less yet. This added cost will deter new growers from entering the program. High yields and premium prices are something we cannot count on every year.

In the handout, I have included NDSU's spreadsheet for Hemp, as well as Soybean and Corn for comparison.

Hemp Expenses Per Acre – NDSU Breakeven Cashflow Spreadsheet

CROP INCOME		**HEMP**
	Yield Per Acre	1,266.00
	Price per Bushel or per Cwt.	$ 1.00
Total Product Return per Acre		**$ 1,266.00**

DIRECT EXPENSES		
	Seed	$31.25
	Administration Fee	$8.33
	Freight	$0.83
	Background Check Fee	$4.25
	Hemp Application Fee	$10.00
	Fertilizer	$28.12
	Planting Cost	$30.00
	Harvest Cost	$33.00
	Crop Consulting	$5.50
	Crop Chemicals	$0.00
	Crop Insurance	$0.00
	Fuel and Oil	$10.96
	Repairs / Supplies	$20.87
	Custom Spread	$0.00
	Arial Application	0.00
	Labor	$24.41
	Land & Equip Rent - BDI	$139.22
	Clean & Drying	$6.87
	Operating Interest	$0.11
	Miscellaneous	$0.00
	Grain Hauling	$8.71
	Taxes	$4.30
TOTAL DIRECT EXPENSE		**$366.73**

OVERHEAD EXPENSES		
	Overhead, Mach.Paymts. & Draw	$ 75.00
TOTAL OVERHEAD EXPENSE		**$ 75.00**
	Misc. Payments Received	0.00
	Ins & Fed Crop Payment Rcv'd	0.00
TOTAL NET EXPENSES/ACRE		**$ 441.73**

	SOYBEANS	CORN
Yield Per Acre	54.00	207.00
Price per Bushel or per Cwt.	$ 9.45	$ 2.75
Total Product Return / Acre	**$ 510.30**	**$ 569.25**

Seed	$58.58	$94.67
Fertilizer	$32.74	$80.61
Crop Chemicals	$41.25	$30.29
Water	$0.34	$0.34
Crop Insurance	$7.84	$32.22
Crop Consultation - Centrol	$11.57	$11.57
Fuel and Oil	$12.63	$12.63
Repairs / Supplies	$27.14	$27.14
Custom Spread	$0.00	$0.00
Arial Application	$ -	$ -
Labor	$23.30	$23.30
Land & Equip Rent - BDI	$131.53	$131.53
Land Rent - Connie's	$28.35	$28.35
Drying	$ 0.04	$7.90
Operating Interest	$0.00	$0.00
Miscellaneous	$0.15	$0.15
Grain Hauling	$10.97	$10.97
Taxes	$4.34	$4.34
Total Direct Expenses	**$ 390.75**	**$ 496.02**

Overhead, Mach.Paymts. & Draw	$ 75.00	$ 90.00
Total Overhead Expenses	**$ 75.00**	**$ 90.00**
Misc. Payments Received	$ 11.00	$ 11.00
Ins & Fed Crop Payment Rcv'd	$ 67.59	$ 135.61
Total Net Expenses/Acre	**$ 454.75**	**$ 575.02**

The last point I would like to illustrate is the wording in Section 4-41-02 and also listed in 4-41-03. It is stated that "any person in this state may plant, grow, harvest, possess, process, sell, and buy industrial hemp (cannabis sativa l.) having no more than three-tenths of one percent tetrahydrocannabinol." When I ask the question on whether this statement gives growers the right to harvest, clean, package, and sell seed, for purpose of seed production, or bale the fiber, I have been told "I'm not sure." on various occasions. With the limited market to processing plants, within the state, I would like to see this statement to include "growing seed, for purpose of seed production, as well as transporting and marketing any part of the hemp plant, seed (sterilized as well as viable) and fiber (processed or raw) for sale to any state who has a hemp program in place, or individual with a DEA license, nationwide." This would give us farmers more opportunity to sell our seed and fiber until the North Dakota market opens up.

As a farmer, I would like to be able to grow more industrial hemp in the coming years. I thank you again for your time today.

Jamie Edwards
8438 59 St. SE
Adrian, ND 58472
701-799-5790

Resources:
Minnesota Department Of Agriculture
http://www.mda.state.mn.us/plants/~/media/Files/plants/hemp/ag03341hempx.pdf

Kentucky Department Of Agriculture
http://www.kyagr.com/marketing/documents/HEMP_App.GROWER_2017.pdf

NDSU – Carrington Research Station
https://www.ag.ndsu.edu/carringtonrec/center-points/crop-yields-rents-and-breakeven-prices-for-2014-2015

Johnson, Dennis E.

From: Eric Carlson <edcarlson11@gmail.com>
Sent: Tuesday, January 24, 2017 11:18 AM
To: Johnson, Dennis E.
Subject: Re: Eric Carlson - Hemp

Rep. Johnson -

Thank you for your response. Yes my team can support in the marketing and expansion of North Dakota's hemp program.

As you're aware - the 2014 Farm Bill Sec. 7606 delineated the Legitimacy of Industrial Hemp Research. Specific verbiage notes that the term 'research' is expanded to include 'market research' as states such as Nevada, Kentucky, New York, North Carolina, Tennessee and other states have portrayed through their legislation.

In July 2016 - a key provision was added to the Omnibus Appropriations Act spearheaded by Sen. Mitch McConnell (R-KY) that protects the transportation, processing, and sale of hemp from Farm Bill compliant pilot programs (as ND has implemented). Section 763 bars any funds from the act to interfere with Sec. 7606 of the 2014 Farm Bill.

SEC. 763. None of the funds made available by this Act or any other Act may be used-
(1) in contravention of section 7606 of the Agricultural Act of 2014 (7 U.S.C. 5940); or
(2) to prohibit the transportation, processing, sale, or use of industrial hemp that is grown or cultivated in accordance with subsection section 7606 of the Agricultural Act of 2014, within or outside the State in which the industrial hemp is grown or cultivated.

My attorney and business partner Bob Hoban of Hoban Law Group has provided the following information:

'The DEA does not have the authority to augment the Controlled Substances Act; that power resides with Congress. Congress has clearly mandated, through the 2014 Farm Bill and the 2016 Omnibus Spending Law that the Controlled Substances Act does not apply to hemp grown in state pilot programs, and that it is a violation of federal law for agencies such as DEA to interfere with these programs.'

How the DEA has ruggedly proposed language dictating North Dakota's hemp program is unlawful and being reviewed by an expert team of Preeminent AV attorney's. There should be zero interference with what is done with the hemp crop post-harvest as it follows in alignment with Federal language. Unfortunately, no other states have had to experience these hiccups as North Dakota farmers have.

An immediate recommendation of funding of the hemp pilot program is substituting the proposed increased acreage fee instead to a tax on hemp seed lawfully imported into the state, such as Nevada has modeled. The North Dakota hemp producers from last year have capacity to plant 900+ acres this season that would require ~ 22,500 pounds of seed to plant (avg. of 25 lbs per acre). If

North Dakota instead taxed $1/lb (like that of NV) of seed to the farmers this would stimulate production while self-funding the Ag Dept. In Nevada my team is importing 400k pounds of seed that the state Ag Dept. will reap a tax reward of $400,000 - we're happy to pay the tax as we build out more acreage.

My team is building out biorefinery/processing centers in CO & NV currently. We distribute seed to farmers and procure their harvested materials. We process the hemp and send downstream to our manufacturing partners (whom are F500 multinational corporations).

There is a wide and established market for hemp materials domestically and internationally. My team has no interest with CBD or other 'cannabinoid-based' products. Our focus is on industrial applications using the stalk of the plant for such goods like bio-composites and building materials.

Thank you for your service to the Peace Garden State. I look forward to working together.

Regards,
Eric D. Carlson - 303.422.2125

On Mon, Jan 23, 2017 at 12:21 PM, Johnson, Dennis E. <djohnson@nd.gov> wrote:

Eric

You have shared with us your experience with a large group of growers and acres. Can you help us find a way of marketing this product that is legal in the eyes of DEA. Transporting out of state etc.

Dennis Johnson

Chair House Ag

From: Eric Carlson [mailto:edcarlson11@gmail.com]
Sent: Monday, January 23, 2017 11:53 AM
To: Johnson, Dennis E. <djohnson@nd.gov>
Subject: Eric Carlson - Hemp

Rep. Johnson -

Thank you for connecting briefly on hemp today. It's good to make an introduction.

Once again I am COO of IHS Inc. (International Hemp Solutions) and we create infrastructure support for the hemp industry across a multitude of states. For 2017 my team has 17,000+ acres under contract split mostly between Nevada and Colorado. We are importing the seed through legal DEA channels under all Farm Bill regulations with our partners in European countries.

Over this past year I've got to know the North Dakota hemp producers well in understanding their optimism and hiccups in pioneering a new crop. Recently I've received some concerned emails and its my intention - along with yours - to support in the blossoming of a fruitful hemp sector in your state.

Currently Nevada taxes $1/lb of hemp seed to supplement their administrative costs. With my team importing 400,000+ pounds of seed this is beneficial to the department in self-funding their pilot program going forward without passing the burden of cost onto the producers themselves.

In regards to HB 1240 there's concerns it will in fact be prohibitive to farmers looking to capitalize on a new crop. This is in part due to the increased cost per acre that's been recently brought about. I'm wondering if there's other avenues to funding that can be modeled into North Dakota's hemp program.

Also - my attorney and business partner, Bob Hoban of the Hoban Law Group is the force behind the current DEA lawsuit in the 9th Circuit court about the recent reclassifications of hemp. Hoban Law Group is prepared to work with North Dakotan Roger Gussias of Healthy Oil Seeds who purchased all the raw hemp material from the North Dakotan farmers but was told is not allowed to market the crop doing a disservice to the state.

Simply put, if ND farmers are cost prohibited to grow more acres and their only market channel was told he cannot sell the goods, there will be hindered success to the state program. Ultimately resulting is a soured taste for how the program was implemented while other states, due to their regulatory framework, will forge ahead and many farmers will benefit.

I look forward to conversing further and continuing my support for the North Dakota hemp program. If there's opportunity to create a better model please let that be known.

All the best,

2/3/17 (1)
Tom Bodine

PROPOSED AMENDMENTS TO HOUSE BILL NO. 1240

Page 2, line 25, replace "two" with "one"

Page 2, line 25, replace "forty" with "twenty-five"

Page 2, line 26, overstrike "Collections from this fee must be"

Page 2, overstrike lines 27 and 28 and insert immediately thereafter "5. All fees collected under the provisions of this chapter must be deposited in the commissioner's operating fund and are appropriated to the commissioner to be used to enforce this chapter."

Page 2, after line 28, insert:

"Section 2. EMERGENCY. This Act is declared to be an emergency measure."

Renumber accordingly

2/3/17 (2)
Ag. Dept.

Industrial Hemp Fees

Fiscal Impact proposed fees:

Growers	
Registration Fee	$ 150
Fee per acre	$ 25
Background check fee	$ 50

Processors	
Registration Fee	$ 150
Background check fee	$ 50

2017-2019 Assumptions	
Number of acres in program	700
Number of growers	12
Number of processors	1
Number of grower background checks	18
Number of processor background checks	4

Growers	2017	2018	Biennium total
Registration Fees	$ 1,800	$ 1,800	$ 3,600
Per Acre Fees	$ 17,500	$ 17,500	$ 35,000
Background check fees	$ 900	$ 900	$ 1,800
Processors			
Registration Fees	$ 150	$ 150	$ 300
Background check fees	$ 200	$ 200	$ 400
Total Fees	$ 20,550	$ 20,550	$ 41,100

3/2/17 #1

Testimony on HB1240

Rep. David Monson, Dist. 10

Chairman Luick and members of the Senate Agriculture Committee, I am Rep. David Monson of District 10 in far northeastern ND. HB1240 is a user fee increase bill on industrial hemp. I put this bill in at the request of the ND Ag Commissioner's office. As chairman of the House Appropriations Education and Environment section which had the Ag Commissioner's budget in our committee the first half, I addressed this budget shortfall in the budget bill to some extent. This is quite a large increase to the producers in the industrial hemp program administered by the Commissioner of Agriculture's office, but I feel it is appropriate to have the producers foot the bill for much of the costs of their program instead of putting it on the backs of the taxpayers of ND in general. The fiscal note for this bill is $41,000 all in other funds to the Ag Commissioner's budget. The fee increases in this bill will not make the program break even, but would cover about 2/3 of the cost of running the program. This is about double what the program raised in the 15-17 biennium. My hope is that we don't cripple this potentially lucrative industry before it gets established, but the per acre profit returns for last year far out distance most other crops we raise in ND. With a couple more years of experience with this new crop we could revisit this fee increase in the next biennium. My committee did try to leave some funds in the Ag Commissioner's budget to run this program on at least a shoestring budget. I hope you can pass this bill and keep this new industry growing.

I would be happy to try to answer any questions you may have at this time.

#2a

COMMISSIONER
DOUG GOEHRING

ndda@nd.gov
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NORTH DAKOTA
DEPARTMENT OF AGRICULTURE
STATE CAPITOL
600 E BOULEVARD AVE DEPT 602
BISMARCK ND 58505-0020

Testimony of Rachel Spilde
Industrial Hemp Program Coordinator
House Bill 1240
Senate Agriculture Committee
Roosevelt Park Room
March 2, 2017

Chairman Luick and members of the Senate Agriculture Committee, I am Rachel Spilde, Industrial Hemp Program Coordinator for the North Dakota Department of Agriculture (NDDA), and I am representing Agriculture Commissioner Doug Goehring. I am here today to support House Bill 1240.

In 2016, using authority granted to us by the farm bill, the NDDA approved five producers to conduct industrial hemp research on approximately seventy acres on our behalf. Based on the industrial hemp grower experiences, the crop appears to be well adapted over most of North Dakota's agricultural conditions. After one year of the program, the state has the fifth highest acreage of industrial hemp grown. Interest in the program continues to grow with 42 applications received for the 2017 growing season totaling nearly 3500 acres. The fee structure in House Bill 1240 will allow NDDA to continue expanding this program and be a true competitor with the other twelve states growing industrial hemp.

NDDA recently requested a $64,000 industrial hemp budget enhancement for the next biennium. This enhancement request was not included in House Bill 1009. As such, HB 1240 seeks to increase the fees in an effort to offset program expenses. Each applicant would be assessed a fee of $150 and $25 per acre. As you can see from the chart I handed out, this fee structure is similar to the fee structures used by other states.

If anyone has questions about the bill, amendment fiscal note, or state and federal regulatory requirements, Deputy Commissioner Tom Bodine or I would be happy to answer them right now. Thank you for your time.

COMMISSIONER
DOUG GOEHRING

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North Dakota Industrial Hemp Research Program Comparison

State	Fee Structure	Acres Grown 2016	Number of Registrants
Colorado	$500.00 application fee + plus $5.00 per acre (outdoor – round up to next acre) and/or 0.33 per 1000 sq ft (indoor) if applicable.	8,988	312
Kentucky	$50 application fee, $400 small processor, $1,000 large processor, $350 per growing address, $500 grower modification charge, $150 per instance testing fee	4,300	209
Maine	$100 applicant fee, $500 license fee after approval of application plus $50/acre	1	1
Minnesota	$150 registration plus $400 for the first field and $50/filed within 10 miles and $100	38	6
Nevada	$500 application fee plus $5/outdoor acre and $.33/indoor square foot	260	8
New York	Only institutions of higher education - $500 fee	30	2 universities
North Dakota	Current fees: $5/acre with a minimum of $150	70	5
Oregon	Grower $1300, Handler $1300, Seed registration $120	1,200	82
Tennessee	$250 plus $2/acre, $250 processor	225	49
Vermont	$25	60	12
West Virginia	$100 plus $5/acre	69	8

House Bill 1240

- Would change the fee structure to $150 plus $25/acre.

HB 1240 3/2/17 #2b

PLANT INDUSTRIES DIVISION

January 2017

2016 NDDA

Industrial Hemp Pilot Program

Research Summary

North Dakota Department of Agriculture

2016 Industrial Hemp Pilot-Program

INTRODUCTION

The North Dakota Department of Agriculture (NDDA) created the Industrial Hemp Pilot Program to research the growth, cultivation, and marketing of industrial hemp in North Dakota. The goal was to increase the understanding of how industrial hemp fits into the current agricultural landscape, and investigate how it may contribute to the economy of North Dakota.

LEGAL STATUS

Industrial hemp is a variety of the plant species *Cannabis sativa* L. and is considered a Schedule I Controlled Substance under the Controlled Substances Act (CSA, 21 U.S.C. §§801 et seq.; Title 21 C.F.R. Part 1308.11). Cultivation is highly restricted and only allowable for research purposes authorized under a provision of the Agricultural Act of 2014.

The Congressional Research Service's *Hemp as an Agricultural Commodity* written by Renee Johnson (2), states that:

> The Agricultural Act of 2014 ("farm bill," P.L. 113-79) provided that certain research institutions and state departments of agriculture may grow industrial hemp, as part of an agricultural pilot program, if allowed under state laws where the institution or state department of agriculture is located. The farm bill also established a statutory definition of "industrial hemp" as the plant *Cannabis sativa L.* and any part of such plant with a delta-9 tetrahydrocannabinol (THC) concentration of not more than 0.3% on a dry weight basis. The enacted FY2015 appropriations (P.L. 113-235) further blocked federal law enforcement authorities from interfering with state agencies, hemp growers, and agricultural research.

The term hemp refers to the agricultural crop of *C. sativa L.* which produces cannabinoids, but only trace levels of the psychoactive THC. Table 1 lists the cannabinoid compounds that are produced by *C. sativa.* The major omega-6 and omega-3 fatty acids produced in hemp are linoleic and linolenic acids which are said to be produced at the ideal 3:1 blend (3).

Table 1. List of Cannabinoids available for testing by MedScan Laboratories LLC.

Cannabinoid	Designation	Notes
Tetrahydrocannabinol	THC-A	Non-psychoactive, that converts to THC
Cannabidiol	CBD-A	Non-psychoactive
Cannabinol	CBN	Mild psychoactive
Cannibidivarin	CBD-V	Non-psychoactive
Cannibigerol	CBG	Non-psychoactive, High levels in Ind. Hemp
Cannibichromene	CBC	Non-psychoactive, 2nd highest level in Ind. Hemp
Tetrahydrocannabivarin	THC-V	Highest level of all cannabinoids in Ind. hemp
Delta-9 tetrahydrocannabinol	THC	Psychoactive

THE PILOT PROGRAM

NDDA announced the Industrial Hemp Pilot Program in October of 2015. Seventeen producer applications were received and reviewed by a committee created by the Agriculture Commissioner. The Commissioner deliberated on the committee recommendations and selected five pilot producers. Geographical spread, soil type, environmental conditions, and the proximity to processing facilities were also key considerations in the selection of the candidates.

The five growers planted a total of 70 acres of industrial hemp as part of this 2016 research program. Although not covered within the NDDA Industrial Hemp Pilot Program, the NDSU Langdon Research Extension Center ran a parallel program to assess the agronomic performance of nine different seed varieties. Unfortunately, excessively wet conditions following heavy rainfall events resulted in substantial plant stand losses, and the trials were abandoned. Industrial hemp does poorly in soggy, heavy soils.

Three hemp seed companies in Manitoba, Canada supplied the four varieties planted in the 2016 program (Table 2). The varieties selected were a mixture of high yielding grain varieties and a type known to produce high oil content. Very tall hemp varieties - those suitable for fiber production - were not chosen for the program, as there are no fiber processing facilities nearby. The objective was to select hemp types that yielded well under northern prairie conditions. The Manitoba Agriculture website (1) publishes the historical data of several varieties. Since 1998 Canada has grown industrial hemp for both the seed and fiber markets, with most of the production located in the Prairie Provinces of Manitoba, Saskatchewan and Alberta. Up to 118,000 acres have been grown annually in Canada over the 1998-2011 period (1). In Manitoba, grain yields ranged between 100 to 1200 lbs./acre, with a bushel weight of 44 lbs. at 10% moisture content.

The research focus varied according to producer interest. Grower data was collected at each site, and included general agronomic practices, rainfall, observations of insect pests, weeds and diseases, crop establishment and development, and grain yield (Table 3a).

Table 2 exhibits the historical yield expectations amongst the test varieties under Manitoba conditions. All varieties were plant variety protected (PVP) and pedigreed (certified or foundation grade). Canadian seed laws specify that all hemp seed sold must be of a certified pedigree and tested by Canadian agencies to ensure a THC content below 0.3% on a dry weight basis. For instance, *cv Finola,* a variety bred for high oil content, generally produces the lowest grain yield relative to the other test varieties in nearly 20 years of Manitoba field trials. The other three varieties listed exhibited yields that were statistically equivalent over the same time period. This finding suggests that there could be large swings in seed yields year over year. It is important to note that growing industrial hemp carries considerable risk to the producer as it is not eligible for crop insurance, and markets and returns are not consistent year to year.

Table 2. Long-term agronomic characteristics of the industrial hemp cultivars selected for the 2016 NDDA Pilot Research Program

Cultivar	Seed Source	Flower Type	Use	Maturity (days)	% Seed Yield* (% of variety CRS-1)
CANDA	Parkland IHG Coop	Monoecious	Grain, fiber	110	86
CFX-1	Hemp Genetics Int.	Dioecious	Grain, fiber	105	106
CRS-1	Hemp Genetics Int.	Dioecious	Grain	110	100
FINOLA	Hemp Oil Canada Inc.	Dioecious	Grain, Oil	100	83% **

*Manitoba Agriculture data, Check variety CRS-1 @ 1548 lb/A [averaged over 21 site years]
** Note: cv Finola seed yield was significantly lower compared to the other grain varieties in long term yield trials in Manitoba. Finola is regarded as a high oil content low yielding variety.

Crop management is a key consideration in variety performance. For instance, one grower in the 2016 Minnesota Department of Agriculture Pilot Program grew *cv Finola* for cold press oil extraction. Hemp seed oil contains omega-6 and omega-3 polyunsaturated fatty acids and has been touted to provide health benefits. Harvest was delayed until the crop was completely ripe, apparently to reduce the amount of green seed content, and hence chlorophyll in the oil. Delaying harvest is a risky proposition, as excessive seed losses can result from shelling out and blackbird feeding. Experienced growers recommend that harvest begin at the onset of blackbird predation.

Photo 1. North Dakota industrial hemp crop (2016)

Hemp varieties are monoecious or dioecious. The former cultivars have both male and female flowers on the same plant, while the latter cultivars maintain separate male and female plants (see Photo 1). Plants tend to be 75-80% dioecious with the proportion of exclusively monoecious female plants being 10-15% and males about 10% (Photo 2). Under stressful Manitoba conditions (hot/dry) the proportion of pure male plants can increase to 20%, reducing yield. Pilot producers in ND observed that because hemp does not branch very well, there may be some benefit to boosting the planting density (above 10-12 plants/square foot) to improve yields. A side benefit to this practice is increased competition against weed growth. Future studies will be needed to investigate this phenomenon.

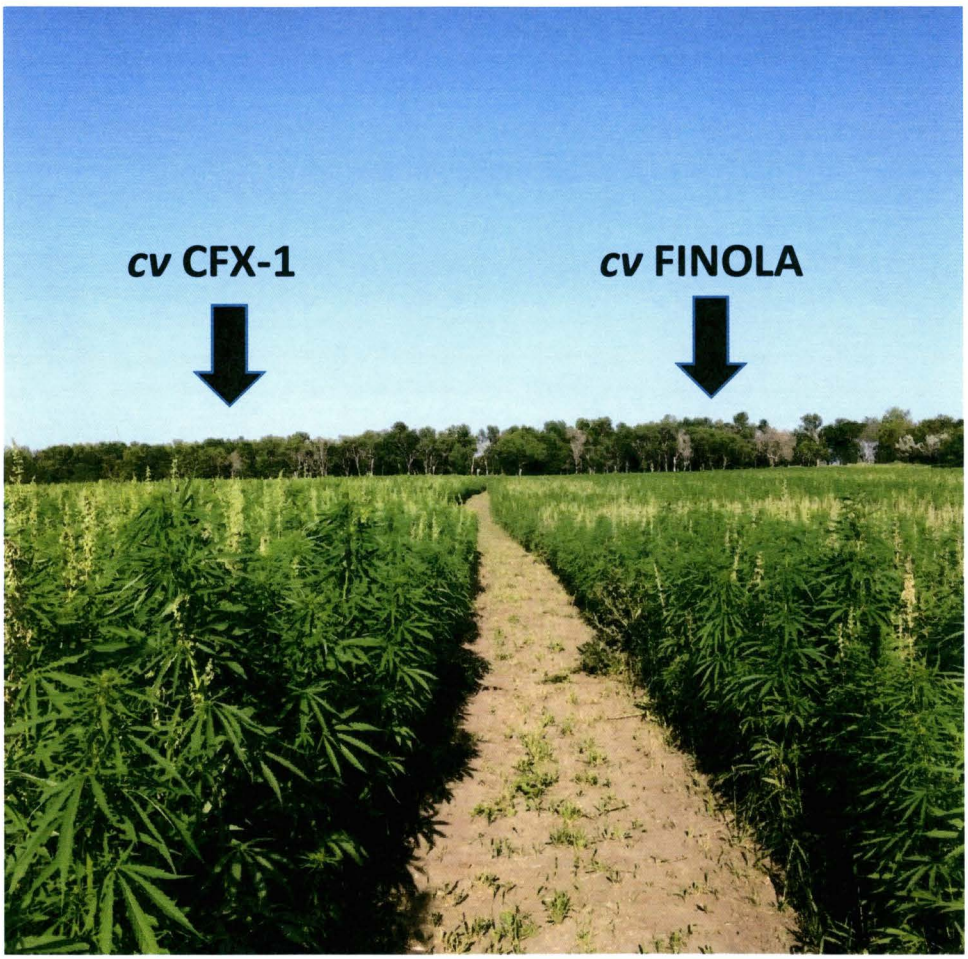


Photo 2. Industrial hemp pilot producer variety trial (Benson County July 2016).
Note: Monoecious plants - white stalks (male flowers) can constitute 10-20% or more of the plant stand.

2016 RESULTS - MATERIALS AND METHODS

In May of 2016, NDDA imported 2,175 pounds of industrial hemp seed through the three Manitoba suppliers; Hemp Oil Canada (*cv Finola*), Parkland Industrial Hemp Growers (*cv Canda*), and Hemp Genetics International (*CFX-1, CRS-1*). (Table 3a).

Table 3a. Site details for the 2016 NDDA Industrial Hemp Pilot Research Program.

Trial County	Research Focus	Cultivar	Acres
LaMOURE	Grain yield	CANDA	15
LaMOURE	Grain yield (comparison on two soil types)	CANDA	14 + 1
GRANT	Grain yield	CRS-1	5
	Grain yield	CFX-1	5
BENSON	Variety performance, grain yield	CFX-1	7.5
	Variety performance, grain yield	FINOLA	7.5
FOSTER	Variety performance, grain yield, processing, marketing	CANDA	7.5
	Variety performance, grain yield, processing, marketing	FINOLA	7.5

Previous crops were spring wheat, flax, corn, or soybeans. There are no registered pesticides (insecticides, herbicides, fungicides, nor seed treatments) for use in industrial hemp crops. With this being the case, producers were very cognizant to select their cleanest fields. In all but one instance, the growers pre-treated their fields with glyphosate to contain any early season weed growth. Hemp grows best under warmer soil conditions, and hence is planted later than other commercial crops. This late planting may allow for an additional flush of weeds that can be eliminated by the pre-plant burn-off application of glyphosate. Most fields were fertilized by the growers either the previous fall, or prior to planting.

Planting took place between May 24 and June 13, 2016. Growers used a range of newer and older planting equipment and there were no apparent seed flow problems (Table 4). The Grant County trial field was sandy with a less firm seed bed. Plant depth and dry conditions may have been the cause for the observed thin plant stand. Planting density should be set to achieve 10-12 live seeds/square foot. Planting should take place once soils warm and into a firm and moist seed bed. Hemp is highly photo sensitive, and planting later will reduce the crop height, but not result in lower yields, nor later maturity. Early May plantings favor producing very tall plant stands (suitable for fiber production) but will not provide significant gains in earlier harvesting nor seed yields. Final plant heights were between 4.0' to 7.2' tall.

Table 4. Planting equipment used by the Pilot Program producers 2016.

County	Planting Equipment (May 24-June13)
LAMOURE	Case 6200 Double disc press drill
GRANT	Concord Hoe Air Drill Dutch with openers and disc closers
BENSON	Haybuster 107 Seed Drill
FOSTER	JD 1990 Air Seeder

Table 3b. Site details for the 2016 NDDA Industrial Hemp Pilot Research Program.

County	Hemp Var	Soil Type	Planting Depth (in)	Planting Row Spacing (in)	Final Plant height (in)
LAMOURE 1	Canda	Svea Barnes Loam	.75 ± .25	6	60
LAMOURE 2	Canda	Svea Barnes Loam	.75 ± .25	6	86
LAMOURE 3	Canda	Svea Barnes Loam	.75 ± .25	6	63
GRANT 1	CRS-1	Sandy loam	.5-.75	10	84
GRANT 2	CFX-1	Sandy loam	1-1.25	10	84
BENSON 1	CFX-1	Heimdal-Emrick Loam	.5-1	7	85.2
BENSON 2	Finola	Heimdal-Emrick Loam	.5-1	7	56.4
FOSTER 1	Canda	Clay loam	.75	7.5	78
FOSTER 2	Finola	Clay loam	.75	7.5	48

SAMPLING INDUSTRIAL HEMP - THC CONTENT

NDDA staff collected random samples from each hemp field to evaluate the THC content in the foliage and involucral leaves of the hemp inflorescences. Sampling was timed when approximately half of the seeds were resistant to compression (Photo 3). The THC content in hemp is known to peak when the seeds begin to ripen. Seed forms quickly, usually about 10 days after the first flower.

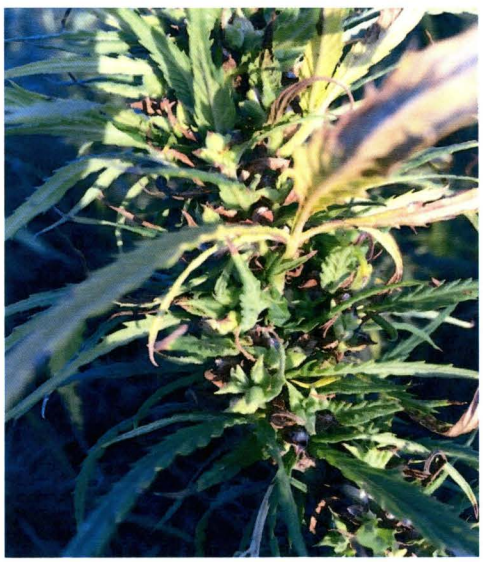


Photo 3. Industrial hemp stage at sampling time for THC analysis (2016).

Established Canadian hemp sampling protocols involved collecting the top 2-2.5 inches of 60 randomly selected industrial hemp inflorescences. The samples were evenly split into two 30-plant sets. Each set for THC analysis were bagged, and labelled and one set was couriered immediately to the federally accredited laboratory MedScan Laboratory Inc., in Williston, ND. The second duplicate sample set was sealed and retained by the pilot producer as a backup-set. Standard published analytical methods were followed by MedScan Labs to determine the delta-9-tetrahydrocannabinol (THC) content. The results of the analyses are shown for each field in Table 5. In all cases the THC content found in these plant parts were at trace levels. The THC content from the nine fields sampled, amounted to only 0.7% to 14% of the allowable THC content by dry weight.

Table 5. Delta-9 THC in industrial hemp samples, at seed ripening stage.

Producer	Cultivar	% THC** (dry weight)
LaMOURE	CANDA	.002
	CANDA (2 fields)	.012 + .037
GRANT	CRS-1	.007
	CFX-1	.007
BENSON	CFX-1	.007
	FINOLA	.008
FOSTER	CANDA	.004
	FINOLA	.044

PEST ISSUES

No significant insect pest pressures were seen at any site. Cutworm, Bertha armyworm, corn borers (photo 4a), Lygus bugs, aphids and grasshoppers on occasion can be a problem.

Bees were found to be very numerous at flowering time at several field locations, as were lady beetles.

Weed pressure was particularly light on all fields, except for some volunteer wheat at the Benson County location; and at the Grant County location where there was a mixture of annual weeds in one field under a thin crop stand and an open canopy (Photo 4b). Sandy soil, with uneven and inconsistent planting depth were attributed to the spotty emergence. Lack of significant rain through June resulted in a poor plant stand with significant weed issues and lower yields. The extra handling at harvest was necessary to remove the moist weeds, and dry down the hemp seed to a safe level for storage (10-11% moisture content).

Both wheat and wild buckwheat (*Polygonum convulvulous*) are problematic as it is most difficult to separate out of hemp seed. Wheat also may cause issues with processors who hope to maintain gluten-free facilities. Ideally, all fields need to have a low inherent weed population as there are no registered pesticides for use in hemp production. Growers are strongly urged to apply a pre-plant spray of non-residual herbicide (such as glyphosate or glufosinate-ammonium) to contain any early season weed growth. Hemp is very competitive against weeds. It emerges very rapidly (3-4 days) in warm/moist soils and can quickly shade and outcompete weeds. Growers commented on how quickly hemp develops.

Photo 4a. European corn borer infesting a hemp stalk (Grant County 2016).

Photo 4b. Thin canopy, dry conditions encourages weed development (Grant County) 2016.

No plant diseases were observed. Hemp is reported to be susceptible to some seedling diseases such as *Pythium* and *Rhizoctonia*. *Sclerotinia* (white mold) and *Botrytis* are also said to be the most serious foliar diseases for hemp. The foliar diseases generally form at the top of the plant in the inflorescences.

HARVESTING INDUSTRIAL HEMP

All harvesting was completed in September 2016. Harvest equipment is listed in Table 7. The hemp crop was straight cut, and no difficulties were reported, other than the combine speed being run intentionally slow to avoid any potential plugging or wrapping issues with the volume of green material. Some growers in Canada swath the crop; however, it is prone to sprout. Normally the seed moisture content at harvest should be 18-19%; and seed is considered dry and safe for storage 10% moisture. Hemp plants may appear quite green at normal harvest time. The seed matures rapidly at this stage and may shell out readily during the harvest operation (Photo 5).

Seed cleaning was required in all instances to reduce the amount of moist foreign material in the sample and lower the moisture content to a safe level for storage and processing.

Normal yields obtained in Manitoba are 800-1200 lbs/acre. The pilot producers were pleased with the results and harvested between 895 to 1266 lbs/acre – right in line with Canadian yield expectations for these varieties. Unfortunately, the Grant County test site yielded only 219 lbs/acre due to in part to a sparse plant stand and very dry conditions at the end of May into early July (Table 6). In fact, the May-August rainfall was only 4.8" at the Elgin NDSU Station. The variability in yields should caution potential growers willing to grow hemp on stubble with low soil moisture reserves.

Table 6. Monthly rainfall totals- Pilot sites (2016)

	Rainfall Totals (Inches)			
	Foster	**LaMoure**	**Grant**	**Benson**
May	**1.1**	**3.7**	**0.8**	**2.2**
June	**1.6**	**2.8**	**0.7**	**3.5**
July	**4.5**	**3.9**	**1.6**	**4.5**
August	**3.6**	**3.0**	**1.7**	**0.8**
September	**1.8**	**3.9**	**2.3**	**3.0**
TOTALS	12.6	17.3	7.1	14.0

Photo 5. Harvesting industrial hemp (LaMoure County).

Table 7. Harvesting equipment used by the pilot program producers in 2016.

County	Harvesting Equipment (Sept 10-22)
LAMOURE	JD5680 combine with JD 635 Flex Draper Head
GRANT	NH CR 940 Twin Rotor Combine with NH 30 foot draper head
BENSON	JD 9650 cylinder walker with 30 foot rigid head
FOSTER	JD 8770 with JD flex head

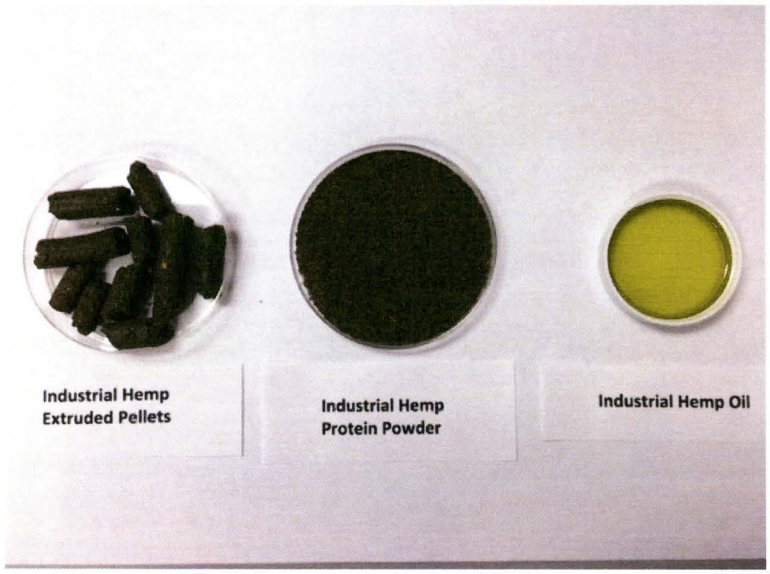
Because industrial hemp does appreciably branch/tiller, the stubble that remains is composed of long individual fibrous stocks that are tough to work down and generally moist such that burning will not be very effective (Photo 6). Normally the stubble is left standing over the winter and then rolled in spring to produce a dense soil cover to facilitate successful burning.

Photo 6. Post-harvest crop residue management (LaMoure County) 2016.

INDUSTRIAL HEMP PROCESSING

All grain was processed at Healthy Oilseeds LLC., located in Carrington, ND. The grain was crushed to extract hemp oil, the remainder milled to produce either a finely-ground high-protein flour or, extruded into pellets (Photo 8). Seed contains 30-35% oil of a desirable fatty acid profile; and flour contains around 25% protein. Reliable foreign markets for these commodities exist. A grain dehuller is also being considered in the future as the markets for industrial hemp commodities increase. Dehulled hemp or "hemp hearts" are a high demand commodity. The fiber stalks remained in the field.

Photo 7. Processed industrial hemp commodities.



Representative samples of each of the above commodities (Photo 7) have been sampled (Photos 8a, 8b) by NDDA staff following a U.S Drug Enforcement Administration (DEA) request, then couriered to MedScan laboratory to analyze for cannabidiol (CBD), and THC. Cannabidiol (CBD) is produced at higher levels than THC in hemp and is then extracted for its supposed medicinal properties (i.e. anticonvulsive, anti-epileptic and anti-microbial). As expected, the final analytical step of the processed commodities has shown low THC content (Table 8). This should result in unencumbered trade of the hemp commodities being held by the pilot producers.

Photo 8a: (Left) Hemp meal sampling

Photo 8b: (Right) Hemp oil sampling

Table 8. THC and CBD content contained in harvested and processed samples.

COMMODITY	Mass % THC	ug/g THC	Mass % CBD	ug/g CBD
Seed	0.124	1243	0.638	6384
Flour	0.008	82	0.015	153
Pellets	0.007	74	0.101	1009
Oil	<0.001	<1	<0.001	<1

In addition, samples of roasted grain will also be germination tested by the North Dakota State Seed Department to verify seed sterility prior to any sale or movement. Other uses for industrial hemp are shown below (Table 9), and are anticipated with as acres and processing capabilities increase.

Table 9. Industrial hemp uses

Food Uses	Hemp Oil Product Uses	Hemp Fiber Product Uses
Confectionary items	Cooking	Fabric
Beer	Salad Dressing	Insulation
Flour	Dietary Supplements	Carpeting
Feed	Body Care Products	Paneling
Dietary	Fuel	Pulp and Paper
Snacks	Detergents	Recycling Additive
Non-dairy Milk and Cheese	Spreads	Automobile Parts
Baking	Paint	Animal Bedding and Mulch

Economics of Industrial Hemp

All the grain was transported to the sole processor, Healthy OilSeeds LLC in Carrington, ND. The proprieter provided an extra incentive to encourage grower delivery, and paid a premium ($1.00/lb). At the time of writing, typical industry returns range from $0.62 to $1.00 USD.

Each grower penciled out their individual costs to produce the hemp crop. Current seed cost is approximately $2.25/lb (approx $56.00/acre). Three of the four growers (Table 10) had decent returns. Only one grower had poor returns, but will market his products separately to improve the bottom line.

Table 10. Economic analysis by growers on the profitability of Industrial Hemp under the NDDA Industrial Hemp Pilot Research Program (2016).

Grower County	Acres Planted	Yield (lb/A)	Yield (bu/A)	GrowerCosts $/A	Gross Return $/lb **	Net Profit $/A
LaMoure	30	1266	28.8	$441.73	$1	$824.27
Foster	15	895	20.3	$387.27	$1	$507.53
Benson	15	1171	26.6	$303.85	$1	$867.51
Grant**	10	219	5.0	$330.35	Unknown	Unknown

Conclusions

Industrial hemp holds promise as a viable alternative crop for North Dakota producers. Based upon the industrial hemp grower experiences, the crop appears to be well adapted over most of North Dakota's agricultural conditions. Generally the field trials had low weed pressures, good plant stands, and lacked significant diseases and other pests. The pilot program growers were comfortable growing the new crop and were able to plant, maintain, and harvest hemp without significant modifications to their current farming equipment and practices. Both the seed yields and economic returns were impressive for the first time growers.

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