



# INDUSTRIAL HEMP FARMING AND ECONOMICS GUIDE

*"I really think industrial hemp has a lot of potential...It's a product native to Kentucky...It's a green crop - good for the environment...Not only would it help farmers in Kentucky, I believe it would lead to a manufacturing revolution in Kentucky"*

*- James Comer, Kentucky Agriculture Commissioner<sup>10</sup>*

Growing Warriors Hemp Harvest  
Mount Vernon, KY - August 12, 2014

## What is Industrial Hemp?

Industrial Hemp is the distinct oilseed and fiber varieties of the plant genera Cannabis. Similar to flax, hemp provides raw materials for both food and fiber. Hemp has absolutely no drug value.

## Hemp Research & Pilot Programs Authorized in the 2014 Farm Bill

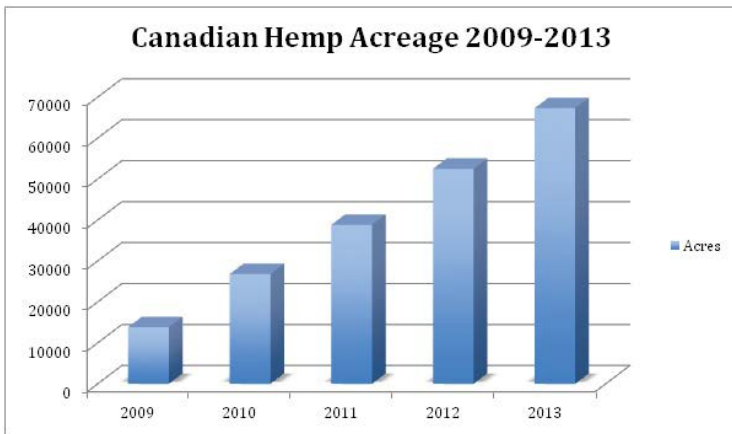
On February 7, 2014, President Obama signed the Farm Bill of 2013 into law. Section 7606 of the act defines industrial hemp as distinct and authorizes institutions of higher education or State departments of agriculture in states where hemp is legal to grow hemp for research or agricultural pilot programs. This is a big first step towards the reintroduction of hemp farming in U.S. Agriculture. Read our FAQs inside to learn more.

## Hemp Basics

- Hemp can be grown as a single end use, or dual-purpose crop for both hemp grain and fiber.<sup>8</sup>
- Hemp's growth period is ~ 100 - 120+ days.<sup>6</sup>

## Hemp: A Profitable Crop

- Canadian farmers have a gross profit average of \$200-\$400 CDN an acre for conventional hemp grain.<sup>8</sup>
- Hemp can be grown as a single end use, or as a dual-purpose crop for both hemp grain and fiber.<sup>8</sup>
- A bushel of hemp weighs 44 lbs.<sup>6</sup>
- The hemp stalk is composed of ~ 20-30% long fiber (bast) and ~ 70 – 80% short fiber (hurd).<sup>16</sup>
- Hemp seed super foods and hemp seed oil have a high concentration of essential fatty acids (Omegas 6 and 3 at the optimum ratio of 3:1) including the rare gamma linolenic acid, vitamins, minerals and dietary fiber. It is also a source of readily digestible protein.<sup>16</sup>



## Hemp Seed: Facts & Benefits

- Hemp seed and hemp seed oil have a high concentration of essential fatty acids (Omega 3 and 6 at the optimum ratio of 3:1) and include rare gamma linolenic acid, vitamins, minerals and dietary fiber. It is also an excellent source of readily digestible protein.<sup>16</sup>
- Hemp does not contain known allergens unlike soy.

## Yields

- According to Alberta Agriculture and Rural Development, Canadian average yields for hemp grain are between 600 to 800 lbs/acre (ac). The highest seed yield has topped 2,000 lbs/ac.<sup>3</sup>
- Manitoba Agriculture, Food and Rural Initiatives (MAFRI) reports an average from yields grown and managed for fiber, ranging from 1 to 6 tons/ac.<sup>11</sup>
- According to Agriculture and Agri-Food Canada production statistics, one acre of hemp yields an average of ~ 700 lbs of grain, which equals 50 gallons of oil and 530 lbs of meal. That same acre could yield an average of 5,300 lbs of straw, which could be processed into ~ 1,300 lbs of long fiber.<sup>2</sup>
- Field observations have reported average grain yields of

880-1320 +/- lbs/ac.

- Ontario yields average 30 bushel (bu)/ac for Conventional and 22 bu /ac for Organic hemp.<sup>18</sup>

## Canadian Hemp Prices

(Not advisable to grow hemp without a buyer contract)

- Price depends on the contractor. In 2011, according to MAFRI, hemp grain contracts based on clean dry weight ranged from \$0.70 - \$0.90/lb for conventional and 30 - 40% higher, or \$1.00-\$1.15/lb for certified organic.<sup>12</sup>
- In 2012, 52,650 acres of hemp were licensed in Canada.<sup>1</sup>

## The U.S. Hemp Market is Rapidly Growing

- SPINS marketing data from 2013, published February 28, 2014, shows a 24% growth in hemp foods and body care products to \$184 million in retail value.<sup>5</sup>
- The Hemp Industries Association has reviewed sales of clothing, auto parts, building materials and various other products, and estimates the total retail value of hemp products sold in the U.S. in 2013 was nearly \$581 million.<sup>5</sup>

## Industrial Hemp: A Beneficial Rotation Crop

Hemp grows well in rotation after green manure crops such field peas, clover or alfalfa and with other legumes or pulses, grain crops such as barley and oats, grasses and potatoes.<sup>8</sup>

Note: Avoid rotating hemp with other broadleaf crops i.e. canola, sunflower and corn due to common disease, and pest pressures, and spice and gluten crops due to flavor and gluten contamination.<sup>8</sup>

## Fertilizer

- Grown best in fertile soil that's rich in nitrogen and phosphorous.<sup>8</sup>
- Fertility requirements: 75 - 100 lbs/ac actual Nitrogen, 50 ~ 70 lbs/ac actual.<sup>6</sup>
- Phosphorus, Potassium and Sulfur should be applied where deficient.<sup>6</sup>
- Good fertility and agronomy leads to weed control.<sup>6</sup>
- Conventional hemp is fertilized similar to a high yielding wheat or canola crop.<sup>6</sup>
- Organic hemp production benefits from a perennial legume such as alfalfa, in heavily well-manured composted fields or after summer fallow.<sup>6</sup>
- Soil testing is recommended to determine soil fertility.<sup>6</sup>

## Planting Hemp

- Hemp is an annual crop that should be sown shallow (0.5 - 1in.) into well-drained, warm (42-50°F) soil that is damp and weed free.<sup>6</sup>
- Seeding rates for most grain varieties range from 25-30 lbs/ac.<sup>15</sup>
- The crop can be seeded using conventional seeding equipment - i.e. air seeders/drills, disk-press drills, hoe-press drills.<sup>8</sup>
- Reduce fan speeds to the canola seeding setting to avoid cracking the seed.<sup>20</sup>



## Agronomic Benefits

- Hemp naturally suppresses weeds and returns nitrogen back to the soil.<sup>7</sup>
- Great rotation grain that can help break disease cycles.<sup>7</sup>
- Preliminary research showed that rotating hemp after soybeans decreased the nematodes cyst populations.<sup>8</sup>
- Hemp requires low to zero chemical inputs.<sup>8</sup>
- Hemp is both frost and drought tolerant but cannot handle standing water as seedlings.<sup>7</sup>
- Hemp can be seeded later than other crops and it can be re-seeded if required.<sup>7</sup>
- A hemp crop is day length sensitive thus it sets grain about the same time each year.<sup>7</sup>

## Harvesting

- In Canada, grain harvesting is typically a two-step process i.e. combining the grain followed by stalk cutting and baling.<sup>7</sup>
- The retted stalks are baled at 12% moisture or incorporated back into the field.<sup>7</sup>
- Operators should watch for fiber wrapping on moving parts.<sup>7</sup>
- Minor on farm equipment modification may be required to ease harvest.<sup>7</sup>
- Harvesting methods vary depending on if the cultivar is grown for seed/grain only, fiber only or for dual purpose.<sup>7</sup>
- Fan and air speeds should be reduced to prevent cracking of the hull.<sup>7</sup>
- Dual purpose varieties should be harvested at 17-25% moisture and moved immediately from field to drying bin.<sup>20</sup>

## Disease

- Hemp has very little disease and pest problems that have caused economic impacts.<sup>7</sup>
- No pesticides are registered for hemp grain production in Canada.<sup>8</sup>
- Sclerotinia stem rot can be an issue in wet weather and improper rotations.<sup>7</sup>
- Grey mold/head blight have been noted.<sup>7</sup>
- Some insects such as grasshoppers, bertha armyworms and cut worm have been seen in hemp stands.<sup>7</sup>

## Storage of Hemp Grain

- Harvested grain should be dried immediately under aeration to 8 or 9% moisture to retain grain quality.<sup>8</sup>
- Grain driers are can be used if harvested at high moisture content.<sup>8</sup>
- Quality parameters include: intact hull, maintenance of quality and nutrition parameters.<sup>8</sup>
- Storage bin should be closely monitored to avoid hotspots from forming.<sup>8</sup>
- Contracts require: Clean, dry grain, containing no plant or foreign materials.<sup>8</sup>

## Water

- Irrigation is very rarely used in the cultivation of industrial hemp as a well-established hemp crop will have a large rooting system that allows it to extract water from deep within the soil.<sup>19</sup>
- Once the hemp canopy has established it is relatively tolerant of drought.<sup>7</sup>
- Drought conditions and waterlogging can result in reduced seed/grain and fibre yields.<sup>4,8</sup>
- In the Parkland and Eastern regions of Manitoba, which are main hemp production areas, there is an average of ~ 11-13 in. of rainfall per growing season where hemp is grown without the use of irrigation.<sup>8</sup>
- The southern part of Alberta, which is irrigation country, receives ~ 8 in. of total rainfall during the growing season and depends upon irrigation for consistent high yields.<sup>8</sup>
- Other regions in Canada that cultivate industrial hemp with profitable economic returns, receive ~ 8-13 in. of rainfall per growing season without the use of irrigation.<sup>8</sup>

**Canadian Hemp Crop Production Costs 2013 (Canadian Dollars Per Acre) - Guidelines: Manitoba Agriculture Food and Rural Initiatives, Eastern Manitoba Costs<sup>13</sup>**

A. Operating Cost	Hemp Grain	Hemp Fiber
Seed & Treatment	\$40.00	\$64.75
Fertilizer	\$67.10	\$67.10
Herbicide	\$0.00	\$0.00
Fungicide	\$0.00	\$0.00
Insecticide	\$0.00	\$0.00
Fuel	\$17.80	\$19.28
Machinery Operating	\$13.50	\$13.50
Crop Insurance	\$19.73	\$0.00
Other Costs	\$7.75	\$7.75
Land Taxes	\$5.55	\$5.55
Drying Costs	\$20.00	\$0.00
Interest on Operating	\$5.26	\$4.89
<b>B. Fixed Costs</b>		
Land Investment Costs	\$50.00	\$50.00
Machinery Depreciation	\$36.00	\$31.50
Machinery Investment	\$9.00	\$7.88
Storage Costs	\$3.52	\$3.52
<b>C. Labor</b>	\$26.25	\$26.25
<b>Total Costs (Per Acre)</b>	<b>\$321.46</b>	<b>\$301.97</b>



## Hemp Research & Pilot Programs Authorized in Sec. 7606 of The Farm Bill

On February 7, 2014, President Obama signed the Farm Bill of 2013 into law. Section 7606 of the act defines industrial hemp as distinct and authorizes institutions of higher education or State departments of agriculture in states where hemp is legal to grow hemp for research or agricultural pilot programs. Since hemp has not been grown in the United States since 1957, there is a strong need for research to develop new varieties of hemp that grow well in various states and meet the current market demands. To view the entire bill, go to [www.VoteHemp.com/7606](http://www.VoteHemp.com/7606).

### What is industrial hemp and how is it defined in the Farm Bill?

Industrial hemp is the non-psychoactive, low-THC, oilseed and fiber varieties of the plant *Cannabis sativa*. Hemp has absolutely no use as a recreational drug. Section 7606 of the Farm Bill defines industrial hemp as “the plant *Cannabis sativa* L. and any part of such plant, whether growing or not, with a delta-9 tetrahydrocannabinol concentration of not more than 0.3 percent on a dry weight basis.”

### What is the purpose of Section 7606?

The U.S. House passed the hemp amendment to the Farm Bill in order to allow research to begin on industrial hemp and determine whether commercial production of hemp would be beneficial for American farmers and businesses.

### What states currently have laws making industrial hemp legal?

California, Colorado, Delaware, Hawaii, Kentucky, Illinois, Indiana, Maine, Montana, Nebraska, North Dakota, Oregon, South Carolina, Tennessee, Utah, Vermont, Washington and West Virginia.

### Are there any rules or regulations that I must follow once I am registered and certified by the department of agriculture?

Each state that allows hemp farming may promulgate its own regulations regarding industrial hemp research and pilot programs. Anyone authorized by the state to conduct research must follow the state regulations AND grow industrial hemp as defined under Section 7606. Varieties of cannabis with more than 0.3% THC on a dry weight basis are not authorized under Section 7606.

### I am a farmer and I am interested in growing industrial hemp. Does Section 7606 authorize me to grow hemp?

Farmers in states where hemp is legal may be able to grow hemp for research purposes under Section 7606. In order to be in compliance, the farmer must be certified by and registered with the State department of agriculture AND conducting research or a pilot program approved by the State department of agriculture. We recommend you contact your State department of agriculture for more information.





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# HIA Introduces Farming Memberships

## What are farming members?

Farming members are a new and distinct group of HIA members in addition to Supporting & Full Business members. For the first time in fifty-eight (58) years, hemp farmers are emerging in states allowed to conduct hemp pilot projects (SEC 7606 of the Farm Bill). HIA's farming membership provide service to the contemporary hemp farmer. With more than 130 members, HIA's network connects farmers with suppliers, buyers, distributors, retailers and more...

## What are the benefits to farming members?

- Legislative impact awareness, support & advocacy via Vote Hemp
- Free copy of the Industrial Hemp Farming & Economics Guide
- Access to [www.hempfarmersnetwork.com](http://www.hempfarmersnetwork.com), an exclusive forum for hemp farmers.
- Access to members-only web page, including exclusive discounts • HIA Membership Directory
- Recieve the HIA E-Newsletter
- Attend the members-only Annual HIA Conference
- Discounted registration fees to public HIA events. (Farmer's Symposium, Hands-on Hemp Building Course & more...)
- Participate on HIA Farming Committee
- Become elegeible to become your state-chapter's Hemp Farming Ambassador

## The Hemp Farming Membership Dues:

*Descriptions & Typology from USDA & Economic Research Services  
April 2013 (latest version)*

- 1. Small-scale family farm - \$75**  
Small-scale family farms are owned and operated by the operator and individuals related to the operator. These farms have sales less than \$350k.
- 2. Large-scale family farm - \$150**  
Large-scale family farms are owned and operated by the operator and individuals related to the operator. These farms have sales or \$350k or more.
- 3. Non-family farm - \$500**  
Non-family farms include any farm where the marjority of the business is not owned by the operator and individuals related to the operator. These farms have no sales limit.

**Visit [thehia.org](http://thehia.org) to learn how to apply for a HIA Farming Membership & join a network of agricultural trailblazers!**

## Our Hemp Heritage: The USA has a Long History of Hemp Farming Dating to Colonial Times!

- Industrial hemp has been grown in the U.S. since the first European settlers arrived in early 1600's.
- The Declaration of Independence was drafted on hemp parchment paper.
- George Washington, Thomas Jefferson and John Adams all grew hemp and actively advocated for domestic hemp production.
- Hemp was a staple crop of 1800's American agriculture and is reflected in town names like "Hempfield" and "Hempstead".
- Hemp was handled by the U.S. government like any other agricultural crop until 1937 following passage of the Marihuana Tax Act.
- More than 150,000 acres of hemp were cultivated as a part of the USDA's "Hemp for Victory" program during WWII.



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### Get Involved Today!

Write your U.S. Senators and Representatives today and ask that they support the Industrial Hemp Farming Act.

<http://capwiz.com/votehemp/home/>

Call for a Pro-hemp Resolution to your Board members

Join Hemp History Week the largest campaign with events held in all 50 states to return hemp farming to America.

### Questions

Please contact us: [Farmer@thehia.org](mailto:Farmer@thehia.org)

**The Hemp Industries Association**

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