

# Hemp: A Sustainable Alternative For Minnesota Farmers

Author: Daniel Higgins , Advisors: Derek Larson and Diane Veale Jones

## Environmental and Economic Comparison of Hemp and Corn Results

### Abstract

Corn is currently the dominant crop produced in Minnesota accounting for 28.5% of all farm receipts. Corn is being produced in the greatest quantity and there are known environmental costs it brings.

Environmental costs include lake eutrophication, water resource depletion, ecosystem disruption, and species loss from pesticide and fertilizer use. Hemp is a sustainable alternative crop that could minimize environmental impacts while competing with similar economic profits for Minnesota farmers

Hemp has been cultivated in different stages of American history, but recent confusion over hems’ legal status has made it illegal to grow without permission from the Drug Enforcement Agency. Hemp cultivation has shown environmental benefits by minimizing chemical inputs required. Removing restrictions on hemp shows potential that it can be economically viable crop while improving the overall welfare of the environment it grows on.

### Methods:

Acquiring the chemical and water requirements needed for growing both crops was done with primary and scholarly articles and studies. Once this information was found, a comparison of the requirements was done to find the environmentally preferable crop.

After finding which crop was environmentally healthier, the economic costs, prices, and profits of the crops were analyzed. Scholarly articles gathered from the United States Department of Agriculture, Economic Research Service, and more were pivotal for this information.

The Economic Research Service provided the costs of producing a bushel of corn. The USDA gave information on how much corn prices are currently. Using both costs and price, an average estimated profit per acre growing corn was established.

Hemp’s economic costs and price were harder to find, however, a summation from five different studies from different companies including University of Kentucky and the USDA were key.

The summation of the studies included all costs that could be associated with growing hemp like transportation, labor, and many more. Using the costs with potential profits, hems’ estimated profit per acre was also established (Depending on what hemp was grown for).

Hemp and corn’s economic viability was measured with the profit per acre estimates comparing and analyzing them together.

Lastly, hemp’s legal situation was discussed along with new legislation that is attempting to make hemp legal once again. This section takes legal documents and past archives into account for hems’ standing.



Corn  
VS.  
Hemp



	Environmental Advantages	Environmental Disadvantages	Economic Advantages	Economic Disadvantages
<b>Corn</b>	Needs 18-22 inches of rain, Similar requirements to hemp for water needs	Requires higher amounts of fertilizer (Averaged 199lbs/acre in MN) Requires herbicides Requires Pesticides (Corn used 35% of all pesticides applied in 2004 on U.S. soil)	U.S. domestic markets used 11.25 billion bushels of corn in 2009/10 Established markets with rising corn prices Profit per acre generated with current prices/costs was \$494.1 growing corn Established infrastructure and R&D Receives subsidies	No disadvantages economically when compared with hemp due to corn’s price surge and established infrastructure
<b>Hemp</b>	Requires less fertilizer (120lbs/acre max) Similar requirements to corn for water needs (17-23 inches) Can be met by natural rainfall Requires no herbicides Rare occasions when pesticides are needed	No disadvantages when compared with corn other than similar to slightly higher water requirements	Can be used in numerous industries (textiles, clothing, food, energy) Potential for advances in yield and markets since little to no R&D has been conducted with hemp One study showed profits per acre at \$605.91 for hemp seed (old study from 1998)	Receives no subsidies No R&D conducted to improve yield, infrastructure, efficiency, and technology aspects Fewer markets and demand allowed to grow linked with cultivation legality issue in U.S. Profit per acres growing hemp estimates ranged from -\$241.30 to \$316.45 (much lower than corn)

From this table hemp’s environmental advantages can be clearly seen along with its economic disadvantages. Hemp rarely requires pesticides and no herbicides. On average hemp requires close to 80lbs per acre less of fertilizer when compared with corn. Despite these positives hemp has no markets in the U.S. and does not receive any subsidy money to allow infrastructure and investment. Corn’s domestic markets are quite large demanding over 11 billion bushels of corn in 2009/2010. Economically, corn can produce higher profits per acre and has established known infrastructure current in the U.S. This can be attributed to corn’s established industry that receives vast annual subsidies. The overall message that should be clear from these findings is that hemp can produce environmental benefits; however, without removing legal restrictions and allowing investment, hemp cannot be economically viable. There are no infrastructure or markets which have direct impacts on the economic viability of hemp.

### Recommendations/Solutions

Public support along with farmers’ support to push legislation like Ron Paul’s Industrial Hemp Farming Act of 2009 needs to happen first. Once there is enough support and strength to legalize industrial hemp (not marijuana) research and development should be put forth. Research allows for possible increased yields from new hemp varieties, and development allows for efficient and smooth infrastructure around hemp cultivation. Both aspects allow hemp to open new markets and be substituted in others. Corn has larger markets but hemp has not been allowed the chance to grow freely establishing itself an equal size market. Hemp can be used in textiles, clothing, food, and many other industries due to its strong fiber and seeds. Hemp is a safer crop for the environment, however, corn price and profits cannot be passed up. Removing legal barriers and allowing research and development to be done on hemp can provide the potential for a sustainable competitive crop by creating new technological innovations. Overall farmers must keep their wallets in mind and will choose corn for its higher profit return and lack of restrictions on growing.



