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Hemp as an Agricultural Commodity

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Jean M. Rawson
Specialist in Agricultural Policy
Resources, Science, and Industry Division

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Summary

The terms “hemp” and “industrial hemp” refer to varieties of *Cannabis sativa* characterized by low levels of the primary psychoactive chemical (tetrahydrocannabinol, or THC) in their leaves and flowers. Farmers in more than 30 countries worldwide grow industrial hemp commercially for fiber, seed, and oil for use in a variety of industrial and consumer products, including food.

Because of the psychoactive properties of some varieties of *Cannabis* (which can grow virtually anywhere in the United States), the federal government began to control production in the late 1930s, under the Marihuana Tax Act (50 Stat. 551). The intent of this act was to allow production for industrial use (which the government actively encouraged during World War II), while discouraging production for use as a psychotropic drug. Since 1970, the production of all varieties of *Cannabis*, regardless of THC content and intended use, has been tightly regulated under the Controlled Substances Act (21 U.S.C. §§802 *et seq.*). As a result, all hemp or hemp-containing products sold in the United States must now be imported or manufactured from imported hemp.

In the early 1990s there began a sustained resurgence of interest in the United States in allowing commercial cultivation of industrial hemp. Farmers in regions of the country that are highly dependent upon a single crop, such as tobacco or wheat, have shown interest in its potential as a high-value alternative crop, although the economic studies conducted so far paint a mixed profitability picture. Over the past decade, more than 25 states have passed laws calling for economic or production studies, although no federal legislation has been introduced to date.

The Drug Enforcement Administration (DEA) reflects the current federal policy on industrial hemp. The DEA has been unwilling to grant licenses for growing small plots of hemp for research purposes (as authorized by some state laws), and it made an effort, beginning in 1999, to ban imports of hemp food products that could contain trace amounts of THC. DEA officials express the concern that commercial cultivation would increase the likelihood of covert production of high-THC marijuana, significantly complicate DEA’s surveillance and enforcement activities, and send the wrong message to the American public concerning the government’s position on drugs.

In September 2004, the Administration let pass the final deadline to appeal a February 2004 federal court decision prohibiting the DEA from enforcing a ban on hemp imports. This news brightened the market outlook for the seven-year-old Canadian hemp industry, to which, in turn, U.S. hemp proponents have looked for signs to suggest whether a domestic industry would prosper or fail.

This report will be updated if events warrant.

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Hemp as an Agricultural Commodity

Introduction

For centuries, the plant species *Cannabis sativa* has been a source of fiber and oilseed used worldwide to produce a variety of industrial and consumer products. Currently, more than 30 nations grow industrial hemp as an established agricultural commodity.¹ About 14 of those sell part of their production on the world market.

The terms “hemp” and “industrial hemp” refer specifically to varieties of *Cannabis sativa* characterized by low levels of tetrahydrocannabinol (THC, marijuana’s primary psychoactive chemical) in their leaves and flowers.² Like flax, the plant can produce both fiber and seed, although varieties better suited for one use or the other, as well as dual purpose varieties, have been developed. Cultivation practices also differ depending upon the variety planted.

Hemp fiber is amenable to use in a wide range of products including carpeting, home furnishings, construction materials, auto parts, textiles, and paper. Hemp seed, an oilseed, likewise has many uses, including industrial oils, cosmetics, pharmaceuticals, and food.³

The crop was widely grown in the United States from the colonial period into the mid-1800s; both fine and coarse fabrics, twine, and paper from hemp were in common use. However, by the 1890s, labor-saving machinery for harvesting cotton made the latter more competitive as a source of fabric for clothing, and the demand

¹ In this report, “hemp” refers to industrial hemp, “marijuana” (or “marihuana” as it is spelled in the older statutes) refers to the psychotropic drug (whether used for medicinal or recreational purposes), and “*Cannabis*” refers to the plant species that has industrial, medicinal, and recreational varieties. This report does not cover issues pertaining to medical marijuana. For information on that subject, see CRS Report RS20998, *Marijuana for Medical Purposes: A Glimpse of the Supreme Court’s Decision in United States v. Oakland Buyers’ Cooperative and Related Legal Issues*.

² The European Union and Canada use 0.3% THC as the dividing line between industrial and potentially drug-producing *C. sativa*: cultivars having less than 0.3% THC legally can be cultivated under license, cultivars having more than that amount are considered to have too high a drug potential. A THC concentration of 1% is considered sufficient to have a psychotropic effect. Source: *Hemp: A New Crop with New Uses for North America* by Small, Ernest and David Marcus. In: J. Janick and A. Whipkey (eds.), *Trends in New Crops and New Uses*. Amer. Soc. of Hort. Sci. Press, Alexandria, VA. 2002. Available online at [<http://www.hort.purdue.edu/newcrop/ncnu02/v5-284.html>].

³ The term “hempnut” is used frequently to refer to shelled hemp seed used for food. The Industrial Hemp Information Network (Hemptech™) offers an online list of available hemp fiber, seed, and oil products, and their suppliers ([<http://www.hemptech.com>]).

for coarse natural fibers was met increasingly by imports. Between 1914 and 1933, in an effort to stem the use of *Cannabis* flowers and leaves for their psychotropic effects, 33 states passed laws restricting legal production to medicinal and industrial purposes only.⁴

Background and Current Status

In 1937, Congress passed the first federal law to discourage *Cannabis* production for marijuana while still permitting industrial uses of the crop (the Marihuana Tax Act; 50 Stat. 551). Under this statute, the government actively encouraged farmers to grow hemp for fiber and oil during World War II. After the war, competition from synthetic fibers, the Marihuana Tax Act, and increasing public anti-drug sentiment resulted in fewer and fewer acres of hemp being planted, and none at all after 1958.

The past decade has witnessed a resurgence of interest in the United States in producing industrial hemp. Farmers in regions of the country that are highly dependent upon a single crop, such as tobacco or wheat, have shown interest in hemp's potential as a high-value alternative crop, although the economic studies conducted so far paint a mixed profitability picture.

No legislation to legalize hemp has been introduced to date at the federal level. Some states, however, have considered a variety of initiatives with increasing frequency, especially since 1995. Between 1995 and 2002, 53 bills were introduced in state legislatures, and 25 of those passed, according to the 2002/2003 report of Vote Hemp, one of the industry's trade groups. Currently, at least 14 states have hemp-related laws in effect, Vote Hemp reports. Most of these call for scientific, economic, or environmental studies, and some authorize the planting of experimental plots. Nonetheless, the actual planting of *Cannabis*, even for state-authorized experimental purposes, is regulated by the federal Drug Enforcement Administration (DEA) under the authority of the Controlled Substances Act of 1970 (Title II of P.L. 91-513 (21 U.S.C. §§802 *et seq.*)).

Congress adopted in the Controlled Substances Act (CSA) the same definition of *Cannabis sativa* that appeared in the 1937 Marihuana Tax Act. The CSA definition reads:

The term marijuana means all parts of the plant *Cannabis sativa* L., whether growing or not; the seeds thereof; the resin extracted from any part of such plant; and every compound, manufacture, salt, derivative, mixture, or preparation of such plant, its seeds or resin. Such term does not include the mature stalks of such plant, fiber produced from such stalks, oil or cake made from the seeds of such plant, any other compound ... or preparation of such mature stalks (except the resin extracted therefrom), fiber, oil, or cake, or the sterilized seed of such plant which is incapable of germination.

⁴ Richard J. Bonnie and Charles H. Whitebread, *The Marihuana Conviction: A History of Marihuana Prohibition in the United States* (Charlottesville: University Press of Virginia, 1974), p. 51.

The statute thus retains control over all varieties of the *Cannabis* plant by virtue of including them under the term “marijuana” and making no distinctions between low- and high-THC varieties. The language exempts from control the parts of mature plants — stalks, fiber, oil, cake, etc. — intended for industrial uses.

Strictly speaking, the CSA does not make *Cannabis* illegal; rather, it places the strictest controls on its production, making it illegal to grow the crop without a DEA permit. DEA officials confirm issuing a permit for an experimental plot in Hawaii in the 1990s (now expired), and they confirm that DEA still has not ruled on an application submitted in 1999 by a North Dakota researcher.⁵ Hemp industry officials assert that the security measures the DEA requires are substantial and costly, and deter both public and private interests from initiating research projects requiring growing plots.⁶ All hemp products sold in the United States are imported or manufactured from imported hemp materials.

Foreign Hemp Production and U.S. Consumption. In all, more than 30 countries in Europe, Asia, and North America grow hemp, although most banned production for certain periods of time in the past. The United States is the only developed nation in which industrial hemp is not an established crop. Great Britain lifted its ban in 1993 and Germany followed suit in 1996. In order to help reestablish a hemp industry, the European Union instituted a subsidy program in the 1990s for hemp fiber production.⁷

In 1998, Canada authorized production for commercial purposes, following a three-year experimental period and a 50-year prohibition. As a condition of receiving a license to grow industrial hemp, Canadian farmers are required to register the GPS coordinates of their fields, use certified low-THC hemp seed, allow government testing of their crop for THC levels, and meet or beat a 10ppm standard for maximum allowable THC residue in hemp grain products.⁸ Agriculture Canada (the Canadian department of agriculture) estimates that more than 100 farmers nationwide are growing hemp, with the majority in central and western Canada.⁹

The retail value of all hemp-based products imported and sold in the United States is difficult to estimate accurately because the USDA trade database includes

⁵ Communication from Dana Jamison, Congressional Liaison Office, U.S. Drug Enforcement Administration. November 24, 2004.

⁶ “The State of Hemp in America Today: State Legislative Action Builds,” *Vote Hemp Report 2002-2003*, Bedford, MA, p. 8.

⁷ Small and Marcus, page 321.

⁸ Health Canada is the agency that regulates Canadian hemp production. The regulations are viewable online at [http://www.hc-sc.gc.ca/hecs-sesc/ocs/hemp/hemp_producers.htm]. Additional information is available on the Canadian Food Inspection Agency website: [<http://www.inspection.gc.ca/english/plaveg/seesem/indust/hemchae.shtml>].

⁹ Agriculture Canada. “Canada’s Industrial Hemp Industry,” dated December 2003, available online at [http://www.agr.gc.ca/misb/spcrops/sc-cs_e.php?page+hemp-chanvre].

only five categories of products.¹⁰ Imports that do not fall into one of those categories may show up in any one of several others. For example, hemp seed imports are not catalogued separately, but may be included under “other edible seeds” or one of several other seed-related categories. Hemp fiber used in furniture, building materials, carpets, cordage, or paper potentially could be listed under one of eleven different categories. Available data show that in 2003, the value of U.S. hemp imports under the five existing categories was \$7 million. This figure excludes all hemp seed and hemp nut (shelled seed) imports, as well as imports of both edible and non-edible hemp-containing products.¹¹

The countries exporting hemp products to the United States vary considerably from year to year. Over the last five years, the most consistent exporters of raw and processed hemp fiber to the United States have been China, the Philippines, Poland, Romania, Canada, and India. The leading exporters of hemp oil have been the Netherlands, Switzerland, the United Kingdom, the Republic of South Africa, and Italy. However, according to industry reports, Canadian growers are expanding production of varieties for health food and bodycare uses. Consequently, Canada could be poised to become a major source of U.S. hemp seed and oil imports.¹² This prospect brightened further in September 2004 when a long-standing legal dispute over U.S. imports of hemp foods finally ended.

Legal Dispute over Hemp Foods. In late 1999, the DEA acted administratively to demand that the U.S. Customs Service enforce a zero-tolerance standard for the THC content of all forms of imported hemp, and hemp foods in particular.

The DEA followed up, in October 2001, with publication of an interpretive rule in the *Federal Register* (66 FR 51530) explaining the basis of its zero-tolerance standard. It held that when Congress wrote the statutory definition of marijuana in 1937, it “exempted certain portions of the *Cannabis* plant from the definition of marijuana based on the assumption (now refuted) that such portions of the plant contain none of the psychoactive component now known as THC.”¹³ The DEA’s interpretation made hemp with any THC content subject to enforcement as a controlled substance.

¹⁰ These are: hemp oil, true hemp yarn, true hemp fabric, true hemp raw or processed but not spun, and true hemp raw other.

¹¹ USDA, Foreign Agricultural Service, U.S. Trade Internet System: Imports. Available at [<http://www.fas.usda.gov/ustrade/>].

¹² Canadian Hemp Trade Alliance. *US Hemp Industry Victory Good News for Canadians*. Press release. February 6, 2004. Available at [<http://www.hemptrade.ca>].

¹³ Both the proposed rule (which was published concurrently with the interpretive rule) and the final rule gave retailers of hemp foods a date after which the DEA could seize all such products remaining on shelves. On both rules, hemp trade associations requested and received court-ordered stays blocking enforcement of that provision. For more information on the legal history of hemp, contact the CRS American Law Division.

Hemp industry trade groups, retailers, and a major Canadian exporter filed suit against the DEA, arguing that congressional intent was to exempt plant parts containing naturally occurring THC at non-psychoactive levels, the same way it exempts poppy seeds containing trace amounts of naturally occurring opiates (21 U.S.C. §802 (19)(20)). Industry groups maintain that (1) naturally occurring THC in the leaves and flowers of *Cannabis* varieties grown for fiber and food is already at below-psychoactive levels (compared with drug varieties); (2) the parts used for food purposes (seeds and oil) contain even less; and (3) after processing, the THC content is at or close to zero. U.S. and Canadian hemp seed and food manufacturers have in place a voluntary program for certifying low, industry-determined standards in hemp-containing foods.¹⁴

On February 6, 2004, the U.S. Court of Appeals for the 9th Circuit permanently enjoined the enforcement of the final rule (68 FR 14113, published March 21, 2003). The Court stated that “the DEA’s definition of ‘THC’ contravenes the unambiguously expressed intent of Congress in the CSA and cannot be upheld.”¹⁵ The possibility that the government might appeal the ruling remained alive for several months, but in late September 2004 the Administration let the final deadline pass without filing.

U.S. and Canadian companies involved in supplying North American markets foresee a surge in market potential.¹⁶ Proponents of federal legislation to allow U.S. farmers to grow hemp as a commodity assert that the resolution of this long-standing legal uncertainty should help that effort.¹⁷

Review and Analysis of Economic Studies

Hemp proponents base their economic arguments for legalizing the crop on its potential value as a component in a wide array of industrial and consumer products, and thus its potential as a profitable alternative crop for farmers. They contend that a commercial hemp industry would generate its own profitable niche markets, even where conventional or alternative commodities already exist, and that basing estimates of future profitability on the current usage of imported hemp ignores the crop’s larger potential.

¹⁴ Background information on the TestPledge Program is available at [<http://www.TestPledge.com>]. The intent of the program is to assure that consumption of hemp foods will not interfere with workplace drug testing programs or produce undesirable mental or physical health effects.

¹⁵ *Hemp Industries Association v. Drug Enforcement Administration*, 357 F.2d (9th Circuit 2004).

¹⁶ The Canadian Hemp Trade Alliance’s most recent sector information report reads: “As the US does not permit hemp farming, there is a large captive market for Canadian production south of the border. In 2004 the market outlook for hemp seed products and derivatives is stronger than ever, thanks to recent court victories.” Available online at [<http://www.hemptrade.ca/en/trade/sector-info.ihtml>].

¹⁷ October 12, 2004 communication with a representative of Vote Hemp.

Some supporters of industrial hemp legalization also argue that it could have renewed value as a strategic crop for defense preparedness purposes, in line with its role in World War II. In 1994, President Clinton issued an Executive Order, EO 12919, entitled “National Defense Industrial Resources Preparedness,” which was intended to strengthen the U.S. industrial and technology base for meeting national defense requirements. The order included hemp under the category of “food resources,” which it defined to mean, in part, “all starches, sugars, vegetable and animal or marine fats and oils, cotton, tobacco, wool, mohair, hemp, flax, fiber and other materials, but not any such material after it loses its identity as an agricultural commodity or product.”¹⁸ It could be argued that the government has already recognized that industrial hemp is capable of contributing to national defense needs and to the readiness of U.S. defenses during times of peace as well as national emergency.

Opponents of industrial hemp point out that U.S. agricultural history illustrates the great difficulty of bringing promising alternative crops into profitable commercial use. USDA has supported research on alternative crops and industrial uses of common commodities since the late 1930’s. Currently, under the Critical Agricultural Materials Act of 1984 (P.L. 98-284), the supplemental and alternative crops provisions of the 1985 and 1990 omnibus farm acts and other authorities, the federal government supports about \$15 million annually in research and development on alternative crops at USDA and state laboratories.¹⁹ Some alternative crops that have become established in certain parts of the United States — kenaf (for fiber) in Texas, jojoba (for oil) in Arizona and California, and amaranth (for nutritious grain) in the Great Plains states, for example — have benefits similar to those ascribed to hemp, but are not complicated by having a drug variety within the same species.

One of the first economic analyses of industrial hemp’s potential as a profitable crop for U.S. farmers was a report prepared by USDA’s Economic Research Service in 2000. ERS based its domestic production assumptions on import data covering hemp fiber, yarn, and fabric, but excluding seed and oil. The report concluded that:

U.S. markets for hemp fiber ... and seed ... are, and will likely remain, small, thin markets. Uncertainty about long-run demand for hemp products and the potential for oversupply discounts the prospects for hemp as an economically viable alternative crop for American farmers.²⁰

The more recent study by Small and Marcus (2002) reflects the fact that interest in the crop in the United States has deepened since ERS calculated its negative forecast. It concludes:

¹⁸ For more information on this EO and on the laws that relate to the production, shipment, importation or regulation of hemp in the United States, call the CRS American Law Division.

¹⁹ USDA/Agricultural Research Service Budget Office and USDA Explanatory Notes for FY2005.

²⁰ U.S. Department of Agriculture. Economic Research Service. *Industrial Hemp in the United States: Status and Market Potential*. ERS Report AGES001E. January 2000.

It often takes 10 to 15 years for the industry associated with a new agricultural crop to mature. While it is true that foreign imports have been the basis for hemp products in North America for at least a decade, North American production is only 4 years of age in Canada Viewed from this perspective, the hemp industry in North America is still very much in its infancy ... and is likely to continue experiencing the risks inherent in a small niche market for some time. [However,] hemp ... has such a diversity of possible uses, is being promoted by extremely enthusiastic market developers, and attracts so much attention that it is likely to carve out a much larger share of the North American marketplace than its detractors are willing to concede.²¹

A December 2003 report from Agriculture Canada draws an even more positive conclusion, based on its reading of consumer interest:

Hemp's remarkable advantages are hard to beat: it thrives without herbicides, it reinvigorates the soil, it requires less water than cotton, it matures in three to four months, and it can yield four times as much paper per acre as trees. Hemp can be used to create building materials that are twice as strong as wood and concrete, textile fiber that is stronger than cotton, better oil and paint than petroleum, clean-burning diesel fuel, and biodegradable plastics. In addition, it can produce more digestible protein per acre than any other food source. These advantages are in tune with the environmental and health preferences of today's North American public. The growing curiosity of consumers, the interest shown by farmers and processors, and Canada's excellent growing conditions for industrial hemp allow optimistic views for its future.²²

The Canadian Hemp Trade Alliance (CHTA) provides some statistical information on the current status of sector development. CHTA estimates that Canadian farmers planted between 6,700 to 8,000 acres of hemp in 2004, the fourth year of increasing acreage after a drastic oversupply situation in 1999 caused acreage to plummet in 2001 to the lowest levels since the crop was legalized in 1998. The harvesting, shelling, and processing technologies for conventional oilseed crops in Canada are suitable for handling hemp grown for seed. There are no pesticides or herbicides registered in Canada for use on hemp. The crop grows quickly and densely and is suitable to being grown chemical-free.

Farmers who obtain organic certification for their hemp seed receive premium prices. CHTA reported a market price of 50 to 60 cents (C\$) per pound for conventional hemp seed, and an 85-cent/pound market price for certified organic seed in winter 2003-2004. CHTA estimates that annual retail sales of Canadian hemp seed products is in the US\$20 million to \$40 million range.

In contrast, the Canadian hemp fiber industry is not as developed. Because the crop was not grown for 50 years, no government or private research funds were spent until recently on breeding fiber varieties or tackling the problems associated with

²¹ Small and Marcus, p. 321.

²² Agriculture Canada. "Canada's Industrial Hemp Industry," available online at [http://www.agr.gc.ca/misb/spcrops/sc-cs_e.php?page+hemp-chanvre].

harvesting and processing.²³ Similarly, the infrastructure for efficiently transporting and handling the heavy, bulky product is lagging.

The finest fiber comes from outer-core, or bast fibers, of the plant, while the inner core fibers are suitable for low-end industrial use, such as in building products. Markets for both must be developed simultaneously in order to be economical. According to CHTA, the highest quality hemp fiber is obtained primarily from varieties specially bred and cultivated for that purpose, and can sell for several hundred dollars per ton. The fiber from dual-use varieties (an attractive option for Canadian growers of hemp for seed and oil) generally is not in the highest quality range, and is not competitive with other waste fibers, such as straw or wood.

Proponents of reintroducing hemp as a commodity crop in the United States are watching the Canadian experience with interest. It also is important to keep an eye on the larger picture. The world market for hemp products is relatively small, and China, as the world's largest hemp fiber and seed producer, has had and likely will continue to have major influence on market prices and thus on the year-to-year profits of producers and processors in other countries.²⁴ Canada's head start in the North American market for hemp seed and oil also would likely affect the profitability of a start-up industry in the United States.

Regardless, at least for the time being, government policy on the issue is reflected in the DEA's arguments against commercial hemp production. These are that commercial cultivation would increase the likelihood of covert production of high-THC marijuana, significantly complicate DEA's surveillance and enforcement activities, and send the wrong message to the American public concerning the government's position on drugs. DEA officials and a variety of other observers also express the concern that efforts to legalize hemp — as well as those to legalize medical marijuana — are a front for individuals and organizations that would like to see marijuana decriminalized.²⁵

²³ One example of recently begun hemp fiber research is a collaborative effort of the National Research Council of Canada and Hemptown Clothing, Inc., to develop a new enzyme technology to produce a softer and whiter hemp fabric, among other things. Information from the Research Council is available online at [http://www.nrc-cnrc.gc.ca/education/sti-inno_hemp_e.html].

²⁴ Fortenbery, T. Randall and Michael Bennett. "Opportunities for Commercial Hemp Production." *Review of Agricultural Economics*, Volume 26, Number 1, Spring 2004. Pages 97-117. The time period covered in this study ends with the year 2000.

²⁵ For more information on legislative and executive branch actions concerning illegal drugs, see CRS Issue Brief IB10133, *War on Drugs: Legislation in the 108th Congress and Related Developments*. For information on issues pertaining to medical marijuana, see CRS Report RS20998, *Marijuana for Medical Purposes: A Glimpse of the Supreme Court's Decision in United States v. Oakland Cannabis Buyers' Cooperative and Related Legal Issues*.