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Industrial Hemp: Economic Blessing or Noxious Weed?

Karen Mundy

Many people think industrial hemp (hemp) provides a wonderful opportunity for increasing farmers' incomes and for replacing tobacco income. Maybe it does. If we want to take advantage of this opportunity, we need to consider some economic and political issues.

Hemp is *Cannabis sativa L.*, a member of the nettle family and a cousin of marijuana. Because of this relationship to marijuana, hemp production is banned. Most people, unaware of the differences, use the terms hemp and marijuana interchangeably. Hemp is an herbaceous annual and grows 4 to 15 feet tall. It has palmate leaves and a deep tap root. For industrial purposes, it is thickly sown to reduce branching.

History

Hemp is indigenous to central Asia and the East Indies. As early as 2700 BC in China, people were using hemp for fishnets, canvas sails, and rope. Between 140 and 87 BC in China and in the early 16th Century in Europe, hemp was manufactured into paper. It was the original homespun; the first American flag was made from hemp fiber.

Hemp was introduced into New England shortly after the Puritan settlements were established and reported to grow exceedingly well. In 1860 in Kentucky alone, nearly 40,000 tons of hemp were produced. Thirty-five years later, total United States production was 6,954 tons (USDA, 1895). The United States Department of Agriculture (USDA) attributes the production decline to the decrease in American shipbuilding, the introduction of manila hemp (*Musa textilis*), and increases in jute imports. The already declining market had been further exacerbated by high labor costs for hemp production and the introduction of synthetic fibers. Declines in hemp production continued until 1940 when, fearing that access to manila hemp would be cut off because of the war,

the United States government encouraged farmers to produce hemp. Production ceased in the early 1950s with the closing of the last hemp processing plant in the United States.

Today, hemp fiber is used for specialty papers like tea bags, filter paper, and currency. Although hemp fiber is used to add strength to recycled paper, 100 percent hemp paper is expensive relative to wood pulp paper. The increased cost is attributable to different equipment and technology required for hemp paper production than for wood pulp paper production and this technology has not been developed for large-scale use. Given its strength, hemp is used as a high quality, durable rug.

Newer uses for hemp fiber include insulations, input into fiberboard to give it strength without added weight, a concrete-like building product when mixed with lime, and high-quality bedding for horses. German-made BMW series 5 and 7 automobiles use hemp fiber in trunks and door panels. Polish researchers have shown hemp can act as a biological sponge for removing heavy metals from the soil. A New Jersey firm is researching the potential for hemp to be used to clean radioactive soils. This research, conducted about 50 miles from Chernobyl offers hope to those who want to return to their land in that area. From hemp seeds high-quality oils for food, cosmetics, shampoos, and industrial uses can be made. The meal produces flour and animal feed high in protein. Hemp has some 25,000 known uses.

Production

Hemp is a commodity similar to corn, wheat, barley, and soybeans in its acreage requirements. Hemp may have a lot of potential, but it will not help many small-scale tobacco

Karen Mundy is REAP Communications Coordinator in the Department of Agricultural and Applied Economics, Virginia Tech.





farmers. Most Virginia tobacco farmers raise only small acreages of tobacco: average acreage is 3.4 acres for burley tobacco and 20.6 acres for flue cured. Most Virginia burley tobacco growers are located in southwest Virginia where crop fields tend to be small because of the terrain.

The world is full of examples of an over-response to a temporary increase in price. Price increases occur. Many producers make long-term capital investments. Supply increases. The price falls, unless demand increases simultaneously. They lose money and go out of business. Will hemp producers fall into the same micro-macro trap?

Like many crops, hemp grows best in deep, well-drained aerated soils. It is sensitive to drought, water logging, and soil compaction. Typical yields in Southwestern Ontario are three to four tons per acre of baled hemp straw (Dragla).

Hemp is considered one of the most environmentally friendly crops available. When grown for the stalks, the plants are close together and shade out any weeds, eliminating the use of herbicides. Hemp grown for seed requires wider spacing and early emerging weeds may need to be eliminated. Because of its rapid growth, hemp takes more nutrients out of the soil than other agronomic crops. Studies have shown that small quantities of nitrogen and phosphorus increase yields. If retted¹ in the field, hemp recycles nutrients. Because of its deep tap root, it is effective in preventing erosion and aerating the soils. Some people believe that no insects attack hemp. However, research shows that some 300 insects will attack it, but the most serious are the European corn borer and the hemp borer. Southern and northern root knot nematodes can also pose a problem, although some resistant varieties have been bred (Ehrensing and Ditchfield).

Market

Lack of markets and high production and processing costs led to the demise of the hemp industry in much of the world. The industry is being revived in many European countries. The European Union, in 1998, paid \$310 per acre in subsidies to hemp growers (Agro-Tech, p. 6). Given their high yields and subsidies, European growers are profiting from hemp production.

Hungary is one of the largest exporters of hemp cordage, rugs, and fabric to the United States. Not all of the hemp used in Hungarian products comes from Hungarian growers.

They import from Romania, the largest hemp exporter in Europe. France is the primary source of viable, certified hemp seed. China, where hemp production was never banned, is the world's largest producer of hemp seed used primarily for oil and meal. China also leads the world in fiber production followed by Korea, the Russian Federation, Chile, France, and Turkey. Hemp production in China has steadily decreased since 1987. According to Wang and Shi, this decrease is the result of internal policies dictating what and how much of certain crops should be produced. The Chinese government's assessment of the relative value of hemp suggests that they are not finding it as profitable as other crops, in spite of an increasing market price. Even with the increasing interest in hemp in the United States, we import only a small portion of what is available from other countries (Vantreese).

Because hemp production is illegal in the United States, determining its profitability is difficult. The market for hemp dictates both production practices and net returns. Hemp grown for fiber alone or for fiber and grain produces an estimated net return of \$320 per acre; for certified seed, \$600 per acre; for grain, \$220 per acre; and for grain alone, \$128 per acre. However, those estimates are for early adopters. Long-run estimates are \$120 per acres for fiber or fiber and grain and \$340 per acre for certified seed (Vantreese, p. 23).² Since hemp is not produced in the United States, no one really knows what the impact of increased production will be on net returns. These estimates are based on the best information available: they are informed best guesses.

Estimated net returns from hemp do not come close to the \$1,220 per acre net returns from flue-cured tobacco production (Wise and Reaves). Tobacco profits are associated with the tobacco program. The tobacco marketplace would not support the tobacco prices that result from government programs. If alternative crops could offer comparable net returns, farmers would have already adopted those crops.

Processing facilities for the hemp stalk need to be within 50 miles of production because of high transportation costs associated with its bulk. Storage is often cited as another limiting factor for potential processors. Hemp is harvested once a year and must be stored for year-round use. Wood pulp can be harvested more on an as-needed basis.

The hemp picture is not entirely bleak. New technology developed primarily in Europe has helped with production labor. Unfortunately, processing technology does not appear to have kept pace with production technology. Presently,

¹ Retting is the process used to break down the pectin that holds the fiber to the woody core. It takes 14 to 21 days and requires turning once or twice for even retting.

² Thompson, Berger, and Allen provide budgets updated from a 1993 Kentucky study.





little incentive exists in the United States for investment in research and development given the legal issues surrounding hemp production. When research and development do occur, they will, undoubtedly, result in efficient, state-of-the-art facilities.

Kenex, a privately owned and operated hemp processing plant in Ontario, Canada, began operation with the 1998 growing season. It processes hemp into fiber for finishing by other companies. It contracts with growers to provide hemp. According to company information,

Variety selection and processing techniques will be a key in satisfying various market demands and will therefore be directed by Kenex....[As part of the company philosophy,] “no chemical treatments are being used in the production of the hemp or the processing of Kenex products. . . . Kenex is committed to developing hemp as a renewable source of industrial fiber (“About Kenex”).

Kenex is clearly targeting the environmentally concerned consumers who are willing and able to pay for environmentally friendly products.

Two other plants will be built in Manitoba. Consolidated Growers and Processors (CGP), the moving force behind these plants, is a public venture founded in 1997. It is the first multinational hemp processor. Parkland Industrial Hemp Growers will be the first of their plants to be built. Construction on the US\$16.5 million plant was slated to start in September, 1999. None of the construction money is public funds, but the municipal governments agreed to about US\$330,000 in roads and infrastructure. The manager of Consolidated said the plants will process 220,000 US tons of fiber and 33,000 US tons of seed annually. This quantity would require about 50,000 acres of hemp production (MacKenzie).

August 9, 1999, US Customs Service impounded nearly 20 tons of birdseed from Canada enroute to a California pet-food distributor. The birdseed, made of sterilized hemp seeds, contains less than 0.0014 percent tetrahydrocannabinol (THC). Why was it impounded? The Drug Enforcement Agency’s (DEA) tolerance for THC is 0—their justification for seizing the birdseed. *The New York Times*, October 3, 1999.

Like Kenex, CGP is contracting with growers for their hemp. Unlike Kenex, CGP is not controlling varieties and cropping, harvest, and storage practices. Because of the bulk and weight of the stalks, both Kenex and CGP are looking for growers within a 50-mile radius of their plants.

Thompson, Berger, and Allen; and Vantrees from Kentucky; Ditchfield from Australia; Gettman, studying the hemp industry for The Hemp Company of America; and the Department of Agriculture and Marketing, Nova Scotia, have all addressed marketing issues in-depth.

These researchers all agree that the market for hemp is in the development stage and is, currently, only a niche market. The products are expensive for consumers primarily because of the high costs associated with importing raw material and processing. With the limited research and development for hemp processing and the size of the facilities, processing costs may not drop significantly in the near future.

Gettman, in a 1996 survey of hemp entrepreneurs, projected retail sales for 1996 to be \$13.7 million. This estimate is based on the 55 firms that responded to his survey. He also found over 1,200 different items for sale in a wide variety of categories: clothing, accessories, headwear, bags, food, footwear, twine, and cosmetics. The average price of these goods he estimated to be \$39.19.

In the whole scheme of United States agriculture, hemp sales nationally represent a very small portion of the total sales. In 1997, hemp sales in the United States reached \$50 million (Ackerman). Total United States agricultural sales were \$196.9 billion. Total Virginia agricultural sales were \$2.34 billion. However, global hemp sales increased from \$3 million in 1993 to \$75 million in 1997. This rapid increase suggests an expanding market for hemp products. Can Virginia producers find a way to take advantage of this potential?

Politics

Both hemp and marijuana contain the psychoactive chemical tetrahydrocannabinol (THC). Hemp contains less than 0.3 percent. Some varieties have been developed that contain 0 percent. Marijuana contains 3 to 15 percent. Hemp also contains Cannabidiol which counteracts the effects of THC. A 1979 French study found it takes 10 mg. of THC to get “high”: the equivalent of 50 to 100 cigarettes of hemp cultivated for paper or other industrial uses (*Plantes Medicinales et Phytotherapie*, p 3.) This relationship to marijuana is the reason hemp production was declared illegal in the United States and many other countries around the world. Currently, most countries have legalized hemp production for research and industrial use. Many of these countries have strict regulations regarding its production, however.



The United States is the only major country in the world that still bans hemp production. Ironically, this continued ban is in spite of having signed the 1961 United Nations *Control of Cannabis, of the Single Convention on Narcotic Drugs*, Article 28 which says, “This Convention shall not apply to the cultivation of the cannabis plant exclusively for industrial purposes (fibre and seed) or horticultural purposes” (Vantreese, p. 17). However, the DEA asserts “zero tolerance” for any substance containing THC. In 1970, the passage of the Comprehensive Drug Abuse Prevention and Control Act effectively outlawed hemp and removed the registration process.

With the federal structure of licensing procedures now removed, the states would seem to have the authority to regulate the cultivation and . . . processing of industrial hemp and encourage the renaissance of the industry if they so desire. (Dwyer, p. 20).

The Office of National Drug Control fears “Legalizing hemp production may mean the defacto legalization of marijuana cultivation” (Ackerman). DEA’s argument is that policing marijuana production would become impossible if hemp production were to be permitted. But the North American Industrial Hemp Council, represented by former CIA Director R. James Woolsey, opposes the legalization of marijuana. The government spent \$7.2 million irradiating ditchweed, a variety of wild hemp. The irony of this effort is that an Australian study found “The pollen from industrial hemp can inundate and fertilise [sic] illegal crops of marijuana, effectively reducing the drug value of the next generation” (Ditchfield, p. 2). In addition, the density at which hemp needs to be grown is not conducive to marijuana production: it is so dense that it shades out the smaller marijuana plant.

Criticism of groups wanting to legalize hemp is based on the perception that they have an agenda other than improving the income of farmers while providing an environmentally friendly way of accomplishing that goal. The criticism is aimed at the potential for increased marijuana production and the difficulty in policing it.

Gettman argues that as the market for hemp increases, the pressure on policy makers to respond to the DEA’s prohibition on hemp production will also increase. This pressure seems to be occurring as states pass their own legislation to require DEA to legalize hemp for research purposes.

DEA permits require a 10-foot high woven wire fence topped with razor wire around the entire research plot, 24-hour security guards, and lights around the plots.

Twelve states, including Virginia (HJR 94), have passed legislation to legalize hemp production for research purposes. The Drug Enforcement Agency (DEA) claims it has never refused to issue a permit to grow hemp for research purposes. The cost of compliance with their permits, however, imposes a major disincentive to research.

Clearly, a catch-22 situation exists for hemp production, processing, and marketing: processing costs are high due to small-scale facilities because of the limited supply. The high processing costs lead to high prices for the product, which leads to a limited market. None of these issues will be addressed until the policy issues surrounding hemp production are addressed.

Should hemp be adopted? Many people think so. Hemp could help farmers—but probably not tobacco farmers with small-scale operations. Hemp not only increases the options for crop rotations, it has many environmental benefits.

A big question is, “Does it make money for the grower?” The answer is, “Yes, if...” IF the legal issues are resolved. IF companies invest in research and development for production, harvesting, and processing that are efficient and cost-effective. IF the market is expanded beyond the current high-end niche market.

If one of the goals of the Joint House Resolution 94 is to provide a viable alternative crop for Virginia farmers, the market must be rebuilt. If hemp production proves profitable, however, farmers in other states will also begin to produce it. The ability of Virginia farmers to capture profits through hemp production may, therefore, be short-run at best.

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****Virginia Association of Biological Farmers Conference**, keynote address by Dr. Elaine Ingham, "Understanding the Soil Food Web." March 3 and 4 at Camp Blue Ridge, Montebello. Contact Bo Holland at 804-263-8218 for more information.

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