

Vision Paper

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Vision Paper
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Thomas Rymyszka is the president and founder of KP Products, Inc., in Albuquerque, New Mexico, USA, doing business as Vision Paper, and he serves as a director for the Bio-Based Manufacturers Association, the American Kenaf Society, and Adelante, Inc.

- Year founded: 1989
- Ownership: Private
- Headquarters: New Mexico, USA
- Product categories: Printing and writing paper
- Employees: 6 to 10
- Approximate gross sales: \$750,000

Company Background

KP Products Inc., doing business as Vision Paper, was founded in 1989 with the mission “to economically produce the most environmentally positive paper products.” The inspiration for the business was an article in *US News and World Report* (Sheets 1989) detailing the kenaf-based newsprint demonstration project. The project was conducted by Kenaf International, a private company located in Texas, and the U.S. Department of Agriculture (USDA). Rolls of newsprint were produced from kenaf and tested by multiple newspapers. The successful project demonstrated that farm-grown kenaf could be used to produce competitive quality paper at an equally competitive price. Having a background in sales and marketing and manufacturing, I was captivated by the idea of replacing trees in papermaking and the myriad of environmental and social benefits that could accrue. The next 12 months were spent investigating the concept of treeless paper, and in January of 1990, I moved from New York City to Arizona to work exclusively on building a kenaf-based paper company.

Kenaf: An Alternative Fiber Crop

Kenaf (*Hibiscus cannabinus* L.) is a fast-growing annual plant, related to cotton and okra, that has been proven suitable for mechanical planting and harvesting and for mechanical and chemical pulping and bleaching. Planted by farmers in the spring, it grows 12 to 15 ft tall in 4 to 5 months. Its fibrous stalk contains an outer

bast fiber similar to softwood (e.g., pine) and an inner core similar to hardwood (e.g., maple). It is a hardy crop able to outcompete most weeds and resistant to most insects and diseases. Its growth requires fewer agricultural chemicals than most other crops.

During its Search for New Fiber Crops program, the USDA screened over 500 plants to determine their potential for use for pulp and paper manufacturing (Kugler 1988). The agency conducted extensive research with kenaf over the past 40 years and identified it as “the most promising nonwood fiber plant” (Kugler 1988, 3).¹ Additionally, many state universities have been researching kenaf in their regions over the past five to ten years, resulting in an accumulation of useful crop productivity data. Commercial kenaf plots over the past ten years have demonstrated that yields of 6 air-dry short tons per acre can be achieved in many parts of the world. At 6 tons per acre, kenaf is cost-competitive with wood as a raw material for pulp and papermaking in most parts of the United States. If kenaf follows the same pattern of other new crops, yields can be expected to increase significantly over the next 20 years, further reducing raw material costs.

Product Development Background

In 1991, the company was the first in the world to produce paper made from 100% kenaf and processed without the use of chlorine bleaching chemicals. By 1996, the company was producing the first printing papers containing blends of kenaf and postconsumer recycled wastepaper (PCW). In 1999, the company produced the first kenaf-content copy paper containing 10% kenaf and 30% PCW. In 2000 the company produced its first “white” kenaf printing paper, containing 100% kenaf, and the first kenaf-content coated paper, containing 20% kenaf and 30% PCW.

The preliminary manufacturing and marketing of the products has been challenging. In the beginning years of the company, most of the wood-based paper industry took the position that it was impossible to make higher quality paper from kenaf and the only thing it was good for was low-value newsprint. A perception that higher

value products could and should be produced motivated an effort to prove the concept through actual production and sales of such products.

Lacking the type of financial resources needed to build a dedicated pulp and paper mill, the company has made arrangements with existing mills that specialize in pulping nonwood fibers, most commonly flax. These manufacturing arrangements are less than ideal because the mills are generally based on older technology, lack the equipment necessary to process the whole kenaf stalk, and, because of their specialized nature, are not cost-competitive with large-scale wood pulping operations. The high price paid for pulp is offset to a degree by the very high quality. This high quality allows the production of better grades of paper, which can be sold at a premium and still be competitive in certain market segments. Under the existing manufacturing arrangements, the company is not able to produce commodity grades at a competitive price.

The higher price challenge is not an inherent disadvantage to kenaf but merely a reflection of the current processing capabilities. Through years of experience with agricultural production and manufacturing processes, the company has developed business relationships and know-how that have proved invaluable in subsequent phases of development.

Developing the Production Model

The company plans to build and operate a series of state-of-the-art pulp mills based on agriculturally produced raw material (on purpose fiber crops that do not contain silica). The mills will utilize clean and cost-effective chemistry and will hold economic and environmental advantages over conventional wood-based pulping and bleaching technology. The mill design approach was guided by the desire to minimize energy and water use and to eliminate toxic discharges. Social values inherent in the design and planning include a safe and healthy work environment and making a positive contribution to the local community.

Based on practical experience and engineering verification, these mills should have a production cost advantage compared to wood. Ini-

tial engineering work indicates that kenaf pulp can be produced at a cost roughly 20% lower than a comparable wood pulp, with a substantially smaller environmental footprint.

Market Development

In order to develop markets for the higher volumes of pulp that the mill project(s) will produce, a concentrated effort was initiated to educate the marketplace as to the benefits of kenaf for papermaking. The education campaign was initially geared to fighting misinformation from both the existing industry and, surprisingly, certain elements of the environmental community. Industry groups issued statements that it would be necessary to cut down the forests to make room to grow the kenaf, that it could not be cost effective, and that forests make better habitat than farms. Misguided associations to hemp (*Cannabis sativa*, also known as marijuana) were drawn, even though the plants are not related. Certain environmental interests argued that kenaf paper would harm recycling efforts, because if people choose kenaf paper, they would not be buying postconsumer recycled paper. This argument misses the idea that it makes more sense to recycle kenaf, which grows in 4 to 5 months, than to recycle trees, which take 20 years or more to grow. Why some activists would work to prevent the emergence of an alternative raw material for papermaking is unclear. Virgin fibers must be added to the recycling stream. As the kenaf industry grows, an increased percentage of recycled fibers will originate from kenaf instead of trees. Although some of this opposition was sophisticated and expected, some was surprisingly naive.

Some have suggested that a life-cycle assessment (LCA) is needed to quantify kenaf's environmental profile. This suggestion arises from parties interested in advancing the science of LCA and identifying the strengths and weaknesses of the LCA process. A fair LCA is not simple to perform when an industry is in a fledgling state. Weighting the value of diversifying the crop mix, food safety and security, rural economic development, and a host of other agricultural and social benefits versus the impacts of the timber

industry and its resource extraction practices is generally beyond the scope of LCA methods.

A literature search of USDA and university research publications shows clear evidence of kenaf's advantages as a raw material for paper pulp, especially related to lower energy and chemical use (White et al. 1970; Werbler and Kugler 1992; Sabourin 1992).

Environmental Benefits

The positive environmental attributes of kenaf include the lower chemical use on the farm, previously mentioned, and a higher CO₂ absorption rate than trees. When grown on a large scale for paper production, kenaf can provide a significant carbon sink annually. Replacing pulpwood with kenaf would allow more forest systems to be left intact. This would preserve habitat and protect watersheds. By reducing demand for pulpwood, tree farms can be managed as more diverse mixed-species plots grown in longer rotations and producing higher value lumber-quality wood instead of low-quality pulpwood. Although readers of the *Journal of Industrial Ecology* grasp their importance, the benefits of carbon sequestration and its positive contribution to alleviating global warming are generally too complex for use in marketing.

For the agricultural community, kenaf provides an additional option in crop rotation plans, and when grown on a wider scale it would help diversify the crop mix, which can reduce surpluses and the need for crop subsidies. Introducing this new crop to rural areas would also create jobs where they are badly needed.

In the processing of kenaf, lower chemical levels and less heat are needed to make pulp. Lignin is the glue that holds the fibers of a plant together. Because kenaf contains 25% to 50% less lignin than a tree, it is easier to pulp. As a manufacturer, we are committed to totally chlorine-free bleaching, thus eliminating the problems associated with organochloride compounds. The relative ease of processing allows for cleaner technology in the pulp mill, specifically the elimination of sulfur-based chemicals, which produce the rotten-egg smell commonly associated with kraft pulp mills. Also, the residual black liquor resulting from the pulping is envi-

ronmentally less problematic because the low levels of lignin in kenaf allow the use of milder pulping chemicals.

Market Realities

Our biobased kenaf paper competes for sales with tree-based papers, which are also biobased. We do not perceive any advantage to using the term “biobased” in our marketing materials for that reason. The environmental and social benefits of kenaf are compelling, but they must be supported by competitive quality and cost. Our perception is that, whereas some buyers would pay some premium for an environmentally preferable product, most buyers in the industry segment that we have targeted choose products solely based upon price and technical qualities. In order to capture a significant percentage of the market, and subsequently have a measurable environmental impact, Vision Paper products must be equal on a price/performance basis. The company must also have a sophisticated marketing and distribution capability so that the product is convenient to purchase.

Conclusion

Vision Paper was founded for the purpose of developing kenaf as an alternative to trees for paper. An environmental and social ethic is the core component of the business philosophy, not an offshoot or transitional process. The company's belief is that the growing world population and consumption trends indicate a need for the advancement of alternatives to finite natural resources that are extracted at a significant cost to future generations. Entities that work to advance the concept of a biobased economy face many challenges from existing companies and practices. Perseverance and demonstrations of product and business success are necessary to influ-

ence a large-scale supportive shift in government and public perception and policy.

Note

1. Editor's note: For a history of efforts to produce industrial raw materials from agricultural resources, see the article by Finlay (2003) in this issue of the *Journal of Industrial Ecology*. Nonwood fibers for papermaking were also discussed in the roundtable discussion published in the special issue of the *Journal of Industrial Ecology* on the industrial ecology of paper and wood (Roundtable 1997).

References

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