

Advancements of Kenaf in the USA  
Kenaf Paper and Nonpaper Developments

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On behalf of the American Kenaf Society, I would like to thank the Association of Non-wood Paper Promotion of Japan for inviting me to speak here today. In particular, I would like to thank Mr. Takashi Kadoya, the Chairman of the Association of Non-wood Paper Promotion for his kind assistance. I am glad for the chance to share information with you about our common interest, kenaf.

#### Introduction

In the U.S. there are different interest groups that influence the development of kenaf as an alternate source of fiber for paper production.

One interest group is the existing wood pulp companies in the U.S. They are not interested in any alternative. These companies own large timberlands. They also own equipment for harvesting and processing trees. They have built very large pulp mills designed for trees. They do not want to change to a non-wood fiber, yet.

The average U.S. consumer is another interest group. However, they do not understand the environmental problems of paper production, and believe that recycling is good enough.

Another factor, the large environmental groups, should be teaching the public about solutions, but they do not. They have been compromised by corporate and timber industry influence. Timber industry initiatives called “Sustainable Forestry Initiative” and other similar names are being accepted by environmental groups as a solution to the problem of global deforestation.

The situation is probably difficult for Japan to understand. U.S. people should know better, but advertising media sends a message that says, “buy more stuff” and forget about any environmental problems. This kind of advertising is why the interest in kenaf in the U.S. is still low.

Finally, the amount of money allocated to kenaf research by the government is very small. Since 1997, most of the money has been eliminated. This government policy is due to budget restrictions, and food safety issues. The lack of funds has slowed the pace of research and development. Despite the lack of government funding, many individual research scientists are finding a way to continue their work with kenaf.

The U.S kenaf industry is developing, slowly. Almost 10,000 acres of kenaf are being grown in the year 2000 growing season in various parts of the United States. Today I will discuss some of the companies that are active in the growing, harvesting, processing, and marketing of kenaf products. I will also provide a description of the current research activities being conducted at Universities and Government facilities.

I will also describe the activities of the American Kenaf Society, including a review of the February 2000 3<sup>rd</sup> Annual conference held in Corpus Christi, Texas. I will also discuss our October 2001 conference to be held in the Rio Grande Valley of Texas, where major kenaf growing and processing operations exist.

## Discussion

### Commercial Activities

There are numerous small farm operations where kenaf is grown and used locally for animal bedding, absorbants, and other products. These farms might grow from one acre to fifty acres of kenaf per year. There are some individuals and companies who promote kenaf without having actual experience or knowledge. This group sometimes makes it hard to get a clear picture of the actual situation in the U.S. There are only a few businesses with a history of long-term commitment to kenaf and its success.

The four main areas of commercial kenaf activity in the U.S. are in Georgia, Texas, Mississippi and New Mexico.

Georgia is a southern state located just above Florida. It is called the "Peach State." Georgia is a prime agricultural area that produces peanuts, tobacco, cotton and peaches.

In Georgia, the company ANKAL is currently developing a large-scale kenaf based industrial project. The proposed project will produce particleboard from kenaf core, and high purity kenaf bast fiber for sales to specialty paper applications and other non-paper applications. Andrew Kaldor, founder of ANKAL was one of the first to promote the concept of separation of the kenaf bast fiber from the core so that higher values could be realized. ANKAL has been growing and processing kenaf fiber in Georgia since 1995, and has produced and sold bast fiber and a consumer product called Dr. Kenaf's cat litter, made from kenaf core.

Recent work at the University of Georgia has included an analysis of the best areas to grow kenaf in that state and detailed production costs based upon prior cropping experience. A recent study established that pre-harvest variable costs (exclusive of land) will be around \$160 per acre for non-irrigated kenaf and \$267 per acre for irrigated kenaf. Irrigated kenaf yields are almost double dry land yields. This study shows that kenaf can compete well with other crops in Georgia, including cotton. The best areas for producing kenaf in Georgia are generally in the southern Georgia.

## Texas

Texas is one of the biggest states in land area, and is called the “Lone Star State.” Cattle, cotton, sheep and rice are all major agricultural products.

For many years the most publicized efforts to commercialize kenaf in the U.S. are occurring in the southern tip of Texas. Brownsville Texas is one of the most southern parts of the continental United States. The Rio Grande is the river dividing the United States of America and Mexico. The Rio Grande River Valley in this region contains very fertile soils, and a large agricultural base. The conditions for growing kenaf are ideal in this area.

Since 1980, Dr. Charles Taylor has led an effort to build the first kenaf newsprint mill in this area. Formerly named Kenaf International, this project entered into a partnership with Kafus Industries Limited in an effort to obtain financing for the development of a kenaf industrial park, which would include a 135,000 metric ton newsprint mill.

KPM Lasara L.P. is Kenaf Paper Manufacturing and it is a 90% Kafus owned subsidiary. This entity would build and operate the newsprint mill. Kenaf Industries of South Texas, another 90% Kafus owned subsidiary, would supply raw kenaf fiber to the mill and develop other products made from kenaf fiber. Kafus Industries Ltd. is the parent company. Founded in Canada, the company is working to develop environmentally and economically sound products. The Kafus Industries Ltd. company structure is a complicated one with many diverse areas of business. The kenaf operation in South Texas is only one small part of a bigger company.

Kafus Industries has recently experienced troubling financial and production problems. These problems include delays in the operation of new Medium Density Fiberboard (MDF) facilities in California and New York. The company is not meeting its revenue projections and reported losses of over U.S. \$24 million dollars in 1999 and another U.S. \$9 million in the first quarter of 2000.

The management reaction to the losses has been to remove both the company founder and the company president from the board of directors. A new board of directors and other changes has cast a cloud of uncertainty over the short and long term status of the south Texas operations. The company declined to provide any information for our discussion today. We do know that there is a kenaf industrial park in Raymondville, Texas. It is very near Lasara, Texas.

The recent activity includes the growth of about 2,300 acres of kenaf in 1998, 5,600 acres in 1999 and as much as 7,000 acres of kenaf in this year (2000). Since this is the largest single growing operation in the U.S. the kenaf harvesting methods being developed are some of the most advanced in the country.

Cameco Industries Inc. is a subsidiary of John Deere Company. John Deere is one of the oldest and biggest manufacturers of farm equipment in the U.S. The Cameco division is developing kenaf harvesting equipment adapted from sugar cane harvesting equipment. In this very southern region, there are no frost conditions to kill the kenaf plant. The harvest equipment must be able to process green kenaf in this area. Other areas of the U.S. receive a killing frost in the autumn and those regions use other types of harvesting equipment.

After harvest, the fiber separation operation produces high purity bast and core fiber. The purity of the kenaf bast fiber produced here is very high, 95% and higher. One product being produced today is biocomposites. The biocomposites are made from kenaf bast fiber and resins (polypropylene) to form a panel, which can be molded, into interior car parts, such as doors and headliners. Ford Motor Company is one of the customers for these products. The core material is being marketed to other specialty applications such as oil absorption.

#### Texas Research Ongoing

Rio Farms Inc. of Monte Alto Texas is a unique public private partnership effort whose purpose is to serve the needs of lower Rio Grande Valley farmers. Since 1941 Rio Farms Inc. has been engaged in beneficial research on cotton, sugar cane, and kenaf since 1981.

Rio Farms worked closely with both the United States Department of Agriculture's Agricultural Research Service, which conducted extensive kenaf research in Weslaco, Texas and with Texas A&M University's kenaf project at Beaumont, Texas. Both the USDA and Texas A&M suffered discontinued funding for kenaf research in 1997.

Under the leadership of Charles Cook, of Novartis Seeds and Andrew Scott of Rio Farms and in cooperation with Charles Taylor of Kafus, this South Texas contingent have made great strides in the commercialization of the kenaf crop and other nonwood fiber crops.

Their investigations include kenaf (*Hibiscus cannabinus* L.), and also sunn hemp (*Crotalaria juncea* L) and Roselle (*Hibiscus sabdariffa* L.). In 1998 the new varieties of kenaf called Dowling and Gregg were released. These new cultivars provide improved stalk fiber yield, high bast fiber percentage, and resistance to lodging. Gregg also offers improved tolerance to root-knot nematodes (*Meloidogyne incognita*), and to *Cristulariella moricola*, a foliar damaging fungi. Additional new cultivars are also under development.

In a separate project, cold tolerant varieties are being developed. These cold tolerant varieties will provide the ability to grow kenaf over a broader geographic area. Another crop management tool being studied is the use of airborne video imagery.

Video imagery may be useful in identifying plant stress. Because kenaf grows so tall, it is not possible to observe all problematic areas of a given field. Aerial observation allows the identification of problem or potential problem areas so that those areas can be managed better, through either application or early harvest.

## Mississippi

Mississippi is called the “Magnolia State.” Magnolia is a tree that gets an attractive flower in the springtime. Cotton, soybeans and rice are major agricultural products from this state. Located in what is called the “Deep South” Mississippi is one of the poorest states in the U.S. The need to create jobs may be one reason why kenaf has received more attention in this state than some others have.

Commercial activity in Mississippi began in 1989, when a congressman named Jamie Whitten appropriated funding to develop a kenaf industry. An industrial park was formed in the Delta region, along the Mississippi River. This area has historically produced cotton. The soils are generally very fertile and well suited to the production of kenaf. The farmers in this region began growing kenaf in large volume in 1991. Between 1991 and 1993, they produced over 13,000 acres. In recent years, the acreage is much lower. This year, there are less than 1,000 acres of kenaf being grown in this region.

The commercial activity centers on a company called Kengro, which owns and operates the kenaf fiber separation facility located in Charleston, Tallahatchie County. Kengro supplies kenaf core material to the Core Products operation, which processes separated kenaf core into different sizes, sterilizes it, and markets it into various types of absorbents and animal bedding. Kengro sells bast fiber to specialty paper companies and for limited other paper and non-paper applications.

From 1995 until 1997, the Mississippi MatLine operation produced nonwoven mats for use in erosion control, ornamental flower establishment, vegetation establishment, and lawn establishment. In 1997, an electrical fire ignited the kenaf and caused the facility to burn to the ground. It has not been rebuilt.

In 1997 and 1998 International Paper Company conducted activities in Mississippi and several other southern states. International Paper is currently the second largest paper company in the world. They have a pulp mill at Moss Pointe, Mississippi. The long-term fiber supply for this mill was a concern for management. They decided to investigate kenaf as an alternate to wood fiber.

Starting in 1997, they grew nearly 2,000 acres of kenaf in Texarkana, Texas. Texarkana is on the border of Texas and Arkansas. This planting was on poor soil and was poorly managed through the harvest. But the results were good enough that they conducted additional growing trials in 1998. In the 1998 trials, they grew kenaf in five sites in Mississippi, and seven other sites in Louisiana, Alabama, and Arkansas. The results of these tests were mixed. One unfortunate occurrence was that a hurricane (Georges) damaged three of the test fields, and damaged the Moss Pointe pulp mill.

The damage to the pulp mill was so severe that the mill was closed. Since International Paper no longer had the pulp mill in this area, the fiber supply was unneeded so they discontinued the kenaf research.

### Mississippi State University

Mississippi State University is the leading University for kenaf research work in the U.S. They have been performing kenaf research since 1989. They have more scientists researching kenaf than any other University. The work they perform includes economic assessment, improved agronomics, herbicide labeling, genetic improvement, tissue culture, and transgenic kenaf.

### New Mexico

New Mexico is known as the “Land of Enchantment.” It is one of the largest states and contains varied climate zones. Parts of the state are high desert climate, parts are forested mountains, and other parts are farm regions. Cattle, cotton and soybeans are major agriculture crops.

The Southwestern U.S. offers hot dry conditions. Annual rainfall is limited to less than 12 inches. Most of the rainfall is in the summer months, which is beneficial to farmers. Supplemental irrigation water is available in most parts of the region, at a variable cost. Kenaf responds well to the high heat of this region.

Albuquerque, New Mexico is the home of KP Products Inc. KP Products Inc. is the parent company of Vision Paper. Vision Paper is the first U.S. company to make one-hundred percent kenaf printing paper, and also the first to blend kenaf and recycled waste paper. This company is currently making and selling kenaf-based paper by working with existing mills and farmers. The company is working to build the first small-scale kenaf pulp mill, based on soda-AQ pulping and chlorine-free bleaching.

New Mexico State University is the agricultural college, located in Las Cruces. They operate the ten Agricultural Science Centers, which are located across the state. In the year 2000, New Mexico State University initiated kenaf-growing trials in Eastern New Mexico to establish the crop economics and best agricultural practices for the local farmers.

### Public Sector Research

In addition to these efforts, various state universities and other public entities are performing kenaf research work on a regular basis. At the United States Department of Agriculture’s Agricultural Research Service (USDA-ARS) laboratory in Peoria Illinois, researchers are working with private industry to investigate the potential for processing kenaf black liquor into binders and fertilizers. Additionally, researchers at the USDA’s Forest Products Laboratory in Madison, Wisconsin are performing kenaf-pulping trials in conjunction with private industry.

## State Universities

Illinois – The University of Illinois has conducted agronomic and product development research on kenaf since 1994. This research has included fiber board and particleboard developments.

Kansas State University – Specialists at KSU in Manhattan KS are developing kenaf textile applications and researching chemical softening agents as well as blends of kenaf and cotton.

Kentucky – At the University of Kentucky studies have included basic agronomics, the potential for growing kenaf on reclaimed strip mines, and the potential of using kenaf as a silage crop.

Colorado – Colorado State University has been researching the agronomic performance of kenaf in Western Colorado for the past four years.

North Dakota - North Dakota State University began researching kenaf in 1998 and has conducted kenaf-growing trials in some of the most northern locations of the U.S.

These activities and developments are very encouraging for kenaf. There are still many challenges ahead. Funding for research and commercialization efforts is needed. Many people believe in the benefits of kenaf. It is our mission to increase the awareness of this crop and all of the good results that come from kenaf non-wood paper.

## American Kenaf Society

In closing, I want to share some information about our American Kenaf Society. One new development that will help advance kenaf in the U.S. is the formation of the American Kenaf Society. The American Kenaf Society is a registered nonprofit membership organization that was chartered in 1997. Its members include nearly all the scientists and researchers who actively work with kenaf. There are also business members, and a growing number of international members.

The Objectives of AKS are to:

1. Provide a mechanism for communication concerning common needs and interests in kenaf research, production processing, product development, and marketing.
2. Facilitate continued development of the kenaf industry.
3. Provide, in cooperation with other organizations and institutions, effective distribution of educational and scientific information on kenaf to all interested parties.

The American Kenaf Society sends newsletters to members as a vehicle for information exchange. In addition, more formal exchanges are made at the annual conferences. Conference proceedings are published and distributed. Copies of the past annual proceedings (1998, 1999 and 2000) may be ordered for \$25 each copy from the American Kenaf Society, Box 1658, Vernon, TX 76385. Our web page contains all of the contact and schedule information for the society. [www.kenafsociety.org](http://www.kenafsociety.org)

The February 2000 conference was held in Corpus Christi, Texas. There were 58 paid registrants, twenty-one technical papers, and eight poster presentations.

On October 13-14, 2000, the American Kenaf Society will participate with the Japan Kenaf Association in an International conference being held in Hiroshima. The U.S. delegation will include six presentations. For further information contact the Japan Kenaf Association, c/o Global Environmental Forum, 1-9-7, Azabudai, Minato-Ward, Tokyo 106-0041, Japan, Fax +81-3-5561-9737.

The next American Kenaf Society conference will be held in the Rio Grande Valley of Texas in October 2001. This conference will be large because we are cooperating with other groups to hold a joint session. We are soliciting sponsors and plan to have some equipment demonstrations included. More details will be available in October. Please check our web page at [www.kenafsociety.org](http://www.kenafsociety.org) for details. I invite you all to consider attending this international conference.