

## INDONESIAN KENAF FIBER EXPORT POTENTIAL AS A RAW MATERIAL FOR VARIOUS INDUSTRY

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**Abstract:** This research is a qualitative descriptive study which aims to explore the kenaf fiber. From secondary data and interviews conducted with the Center for Fiber and Sweetener Plants (Balittas). Kenaf fiber from stems is the mainstay of exports. Indonesia has been exporting kenaf to Japan since 2010. The material being exported is Sterilized Kenaf Core Dry Kenaf. Even though kenaf is a plant commodity, the health certificate issued by the Agricultural Quarantine is a Health Certificate/HC. Based on data from the IQFAST automation system in the Surabaya Agricultural Quarantine work area, kenaf exports in 2019 until the first week of August were 76 tons or equivalent to Rp. 554 million. This has reached 88.8% of total exports in 2018 which reached 85.5 tons. According to IQFAST data, the export of Sterilized Kenaf Core Dry Kenaf during the first half of 2020 has been carried out 2 times with a total volume of 13,080 tons worth more than Rp. 9.53 billion rupiah to Japan.

**Keywords:** *export, kenaf, raw materials, various industries*

### 1. Introduction

Indonesia is a place where unique and useful plants grow. One of them is kenaf which is commonly known as Javanese jute. Kenaf plant (*Hibiscus cannabinus*) is a plant whose bark produces fiber. Kenaf is a fiber-producing plant besides similar plants such as hemp and roselle. The resulting fiber is an environmentally friendly natural fiber. The main product of kenaf is fiber for the raw material for making sacks, pulp materials, polypropylene composites in the polymer industry and car dashboards. Kenaf fiber is the most important natural fiber in the world (Santoso et al., 2015). Almost all parts of kenaf can be used as raw materials for various industries, but the mainstay is the fiber from the stems. Kenaf fiber has received attention from the industry in the last 10 years because of the various diversified products produced by kenaf fiber. Diversified products of kenaf fiber are textile raw materials (Indriani et al., 2013), fashion products (Masykur and Puspitasari, 2019), other paper (Kardiansyah and Sugesty, 2014; Tahir et al., 2011), the automotive industry (Hassan et al., 2017), construction (Akil et al., 2015), and others. Several advantages of kenaf fiber are in terms of cost, density, renewability, recycling, abrasiveness and biodegradability (Jeyanthi and Rani, 2012). This shows that from an economic perspective, kenaf has bright prospects and opportunities in the future (Sudjindro, 2012).

Based on the results of the 2010 TMM Natural Survey Report, kenaf plants in Indonesia cover the areas shown in table 1.

**Table 1. Spread of kenaf in Indonesia**

No	Location		Plantation Area (Ha)	
1	Jawa Barat	Garut	80	158
		Cirebon	78	
2	Jawa tengah	Blora	147	245
		Pati	98	
3	Jawa Timur	Lamongan	2150	2262
		Jombang	21	
		Nganjuk	34	
		Malang	36	
		Banyuwangi	21	
4	Kalimantan	Kutai Kartanegara	323	679
		Kutai Timur	206	
		Samarinda	150	
TOTAL				3344

The largest distribution of kenaf in Indonesia is in Bonorowo, Laren, Lamongan. Bonorowo land is land that turns into a swamp during the rainy season. Kenaf cultivation in Bonorowo land benefits the Kenaf cultivation process at the soaking stage of kenaf fiber. However, Bonorowo land is actually less potential land for plants because of low soil pH and nutrient content, high Fe and aluminum content, and water stagnation that is sometimes difficult to control (Purnomo et al., 2005). For the residents of Jabung Village, Laren District, Lamongan Regency, East Java, the kenaf plant is a side crop, the main crop being rice. Residents feel very lucky with this kenaf plant, because farmers do not need to clear their land during the rainy season. Apart from that, if there is kenaf, other plants cannot live. This makes it very easy to grow rice. Planting kenaf is easier because all you have to do is sow the seeds. Research by Indriani and Widiawati (2013) explains that natural fiber is an environmentally friendly raw material, because it is easily degraded and natural fiber plants have the ability to absorb CO<sub>2</sub> which is quite large, especially in kenaf plants. From the description above regarding the kenaf plant, the formulation of the problem arises: is kenaf fiber, which is a raw material for various industries, able to penetrate the export market? Specific Research Objectives: To find out and analyze the export potential of Indonesian kenaf fiber as a raw material for various industries including: fiber board (car interiors such as ceilings, doors and dashboards), geo-textile, soil remediation, pulp and paper, textiles, carpets, handicrafts and materials for animal pens to date. The largest importer is Japan. Research Urgency: Indonesian kenaf fiber has good quality and so has the potential to be exported as a raw material for various industries. In the process of making Kenaf Fiber, a zero waste program has been implemented so that it is more environmentally friendly. Specific research specifications This research is more specific in discussing the export potential of Indonesia's kenaf fiber as a raw material for various industries.

## **2. Research Methods**

The research method used is descriptive qualitative, which will describe the export potential of kenaf fiber in Indonesia as a raw material for various industries. This research will go through 4 stages: 1) data collection; 2) Data reduction; 3 data presentation; and 4) verification and conclusion Data is taken from the data. From the data collected, the researcher then analyzed the relationship from the data obtained and concluded. The following is an overview of the stages of the research: 1) Data collection stages, data were collected by interview method, namely data collected from the Head of Balittas (Sweeping Plants and Fiber

Research Agency) Malang Prof. Nuraini and document sources, namely data collected from literature and journals which discusses the kenaf plant, as well as data published through the Balittas Malang Website, 2) The stages of data reduction, Data reduction is the process of selecting, focusing attention on simplification, abstracting and transforming rough data that emerges from the records that appear in the field and remove unnecessary so that the data can produce meaningful information and make it easier to draw conclusions. 3) The stages of presenting data, Presenting data is one of the activities in preparing reports on the results of research that has been carried out so that the data that has been collected can be understood and analyzed according to the desired objectives. 4) Verification and conclusion stages. verification is the process of determining the truth of a statement using empirical methods and scientific testing to ensure a truth Conclusion is the final stage in the data analysis process. In this section the researcher presents the conclusions of the research that has been conducted

### **3. Research Results and Discussion**

#### **Bonorowo Laren Land Potential**

Based on world market demand for environmentally friendly kenaf fiber, developing countries such as Indonesia, Vietnam, Malaysia, the Philippines, Thailand, Bangladesh and India have a great opportunity to become a producer of kenaf fiber because these countries have natural resources that support. The high consumer interest in kenaf fiber requires preparation and development of planting techniques and development areas. Kenaf development in Indonesia is carried out on Bonorowo land, peat land, and red and yellow podzolic land. Each type of land used has its own characteristics so that the cultivation techniques are slightly different. Generally, the process of growing kenaf until it produces kenaf fiber is soil preparation, spreading of seeds, irrigation, fertilizing, weeding, pest control, harvesting, soaking, harvesting, and drying. Bonorowo land is land with seasonal flooding. This land is found in the regions of East Java and Central Java, one of the areas of East Java is in the Lamongan area to be precise in the village of Laren. The Bonorowo Laren area is the largest kenaf planting area in Indonesia. When flooded, Bonorowo Laren land cannot be used for food crops, except for planting kenaf. This is because the kenaf stem will grow adventitious roots if the stem is submerged in water. The best time for planting kenaf is in September-October. In the Bonorowo land, especially the Bonorowo Laren land, irrigation is done by taking water from the Bengawan Solo river, but irrigation is done if the summer is too extreme. The advantage of planting kenaf in Bonorowo land is that soaking the kenaf stems is done directly on the flooded Bonorowo land, not requiring a special pond. The red and yellow podzolic land used for kenaf development is located in South and East Kalimantan, planting time in February-March. This land has a low pH, high Fe and Al concentrations and is sensitive to erosion. The high content of Al makes kenaf sprouts poisoned so that the growth of kenaf is stunted (Heliyanto et al., 1998; Marjani et al., 2009). Kenaf planting on peatlands is in the West Kalimantan region, the best planting time is from March to April (Kangiden et al., 1996). The characteristics of peatlands are rich in organic matter, microelements (Zn, Cu, and Mn), but low soil pH and frequent waterlogging due to the ebb and flow of sea water. Tidal behavior is difficult to control (Sastrosupadi & Santoso, 2002). On red-yellow and peat podzolic lands, there is an additional processing step, namely liming the soil. This aims to normalize the soil pH value. In addition, the soaking of the kenaf stems is carried out in the prepared immersion pond (Santoso, B., 2014).

**Kenaf fiber consists of: Fruit fiber, stem fiber and leaf fiber**

**Fruit Fiber consists of:**

- 1) Cotton fiber is a big commodity that we actually feel the benefits of every day, but we are not well aware of it. Because when it is in our hands as consumers, sometimes cotton is not in the form of cotton. But it has changed in the form of other consumption objects. Cotton itself is obtained from the cotton tree. The cotton tree itself comes from Sanskrit, which is named Karpasa. This tree has the shape of a medium tree and is not too big and is found in many tropical areas, one of which is in Indonesia. What we often know as cotton basically refers to the fine fibers of the cotton tree that cover and protect the seeds of the cotton tree itself. This fine fiber is then harvested and taken to then be processed into various kinds of human needs. Use of cotton fiber: As previously mentioned, some of us may not be aware of what cotton fiber is used for, even though we often feel it. The following are some of them: a). In the manufacture of threads, threads made from cotton fibers can be processed as basic materials for textile factories and convection, or they can be sold directly in rolls as production materials from tailors. b) The main material for the manufacture of fabrics and textile materials. Typically, this fabric is often used by textile manufacturers to produce fabrics, such as: napkins, handkerchiefs, bed sheets and bed covers c) The main material for clothing and clothing needs is made of cotton. The advantages of clothing and clothing materials made from cotton fiber include: absorbs sweat, strong, cools when it's hot and warm when it's cold, easy to vary in screen printing. d) Beauty cotton and electronic cleaning cotton using alcohol. e). The main ingredient is powder sponge because it has a very fine texture and is also soft for the face, f) Bandages and wound plasters, g) Ornaments and decorations .
- 2) Kapok fiber, kapok is one of the trees that live in native rain forests in South America and then spreads to West Africa through its seeds which drift between the continents of South America and Africa. In the tropics, this tree has been planted since the 1940s to produce a supply as a stuffing product for car seats and life jackets. Kapok are fine hairs attached to the seeds that grow on the fruit after the white or pink flowers that have fallen before. The sight of the kapok tree itself is a beautiful sight, with and without the flowers. High above the rainforest canopy, the majestic cottonwood trees stand tall and during the flowering season, clusters of pink, white or yellow flowers bloom at night. In the forest, the kapok tree itself is a tree that is easily identified because of its large trunk (up to 3 meters in diameter) and spikes. The flowers often bloom before the leaves appear. The smell during flowering is less pleasant, the flowers of this tree have a sharp odor. This smell can attract fruit bats which are believed to help pollinate and also disperse seeds. Kapok seeds are brown and round like peas. In the nooks and crannies between the kapok tree trunks, it has a very inviting appeal. Benefits of Kapok: Until now, the function of kapok fiber is used as a raw material for absorbing oil, heat insulators, sound absorbers, wound dressings and fillers for interior products such as chairs, mattresses, pillows and bolsters (Official, 2007:63).> Other benefits of kapok : Asthma medication, Wound diarrhea medicine, Antioxidant and antidiabetic, Commodity, Plush pillow, Non-toxic and chemical free, Hypoallergenic, Sleep better, maintain health, Kapok is durable and can be washed, Environmentally friendly, Very Commercial, and as food cattle

**Fiber Stems,** Fibers have stems that rise up. Its size reaches 3 or even 4 meters with sharp thorns attached to its surface. For the diameter of the stem is not too big even thin. Most of the kenaf plant species have slanted stems with a single color. In general, the color of the

stem is green, both for plants that have just been planted and for plants that are ready to be harvested. The trunk of the kenaf plant has no branches. There are only a few twigs that bind the leaves. At first glance, this plant looks like a bamboo plant, but there are differences in the book. Kenaf is a plant that is widely spread in Lampung, West Java, Central Java, East Java and South Kalimantan. The outside of the kenaf fiber rod has a rougher texture than the inside. Kenaf fiber is widely used as a variety of industrial materials, one of which is textile. Kenaf fiber is used as a supplementary material in the manufacture of textiles blended with cotton and polyester fibers. Kenaf fiber can also be used as a basic material for paper.

**Leaf fiber.** The leaves of the kenaf plant are oval in shape, most of which are green. The bones are not very clear but have a neat texture with two opposing branches. On the sides of the leaves it looks jagged. It is present on both sides with a type of serration that is pointed at the end. On each stalk there are 5 leaves with one leaf facing upwards, while the remaining 4 leaves facing right and left.

**The classification of the benefits of kenaf consists of:**

- 1) **General use,** Kenaf is similar to coconut plants in terms of function because almost all parts of the plant can be used for raw materials for various industries. Kenaf wood is also very good as an industrial raw material particle board for various purposes such as furniture, doors, windows, sills, house wall coverings and handicrafts.
- 2) **Use of fiber** Kenaf is a type of fiber-producing plant besides roselle and jute. The part of the kenaf plant that is used for industry in general is the fiber. Fiber produced from the bark. The fiber has a limp texture, strong and shiny color. Fiber produced from kenaf is used for rigging materials and raw materials for making gunny sacks as packaging for agricultural products such as sugar, grain, rice, coffee, cocoa, copra, pepper and cloves.
- 3) **Use for industry** Kenaf fiber has a fairly high selling value. Kenaf fiber is also often used as a raw material for various industries such as: fiber board, geo-textile, soil remediation, pulp and paper, textiles, and carpets. Kenaf is used as a material for making inner car doors on vehicles. Fiber board is a type of processed wood that is made to replace solid wood. Fiber board has the characteristics of fine fibers, a smooth surface, is cheaper, has low water absorption and is able to muffle sound and is light. This fiber board can be used for car interiors such as ceilings, doors, dashboards.
- 4) **Use for Animal Husbandry** Kenaf leaves contain 24% crude protein. The content is good for poultry feed. Kenaf seeds also have a fat content of 20% which is good for cooking oil because it contains a lot of unsaturated fatty acids, namely Oleic and Linoleic. Kenaf seed dregs are used as livestock material. Japan and the United States use kenaf for bedding for horse stables.

**Kenaf Export Commodity,** Indonesia has been exporting kenaf to Japan since 2010. Japan is the main importer of kenaf as bedding material for horse stables. Demand for Kenaf from Lamongan Regency by breeders from Japan continues to increase every year. The material being exported is Sterilized Kenaf Core Dry Kenaf. Even though kenaf is a plant commodity, the health certificate issued by the Agricultural Quarantine is a Health Certificate/HC (animal health certificate) not a Phytosanitary Certificate/PC (plant health certificate) which is usually used as health insurance for plant commodities. This happened because the Japanese used a fiber-producing plant, the origin of kenaf, as a material for bedding for horse stables.



**Export Value Volume**, Based on data from the IQFAST automation system in the Surabaya Agricultural Quarantine work area, kenaf exports in 2019 until the first week of August amounted to 76 tons or Rp. 554 million. This has reached 88.8% of total exports in 2018 which reached 85.5 tons. According to IQFAST data, the export of Sterilized Kenaf Core Dry Kenaf during the first half of 2020 has been carried out 2 times with a total volume of 13,080 tons worth more than Rp. 9.53 billion rupiah to Japan as a base for horse stables. Kenaf (*Hibiscus cannabinus*) is a fiber-producing plant besides rosella and jute. Fiber as an industrial raw material is used to make fiber board, geo-textile, soil remediation, pulp and paper, textiles, carpets, handicrafts, and so on. This fiber board can be used as a car interior such as ceilings, doors and dashboards. Until now, Japan is the main importer of kenaf as a material for livestock enclosures. Actually, Kenaf is not an animal quarantine commodity. However, because of its designation as a base for horse stables, Japan requires it to attach a Health Certificate / KH 17 from Indonesia. According to the Surabaya Agricultural Quarantine data, Kenaf exported 3 times from January to August 9 2019, with a volume of 76 tons and a value of more than Rp. 554 million rupiah. The Ministry of Agriculture through the Agricultural Quarantine Agency conducted "Release of Export of Sterilized Kenaf Core Dry to Japan" at PT. Global Agrotek Nusantara (G.A.N), on 9 August 2019 in Lamongan. In Indonesia, PT. G.A.N is the only manufacturer of kenaf that has been officially recognized by Japan. Kenaf exports to Japan have been carried out since 2010, and this time the export release is the 100th container. Export release of 38 tons of kenaf worth Rp. 277 million was carried out by the Head of the Surabaya Agricultural Quarantine accompanied by the Head of the Lamongan Regency Plantation, Food Crops and Horticulture Office, and the Director of PT. G.A.N. Meanwhile, the Director of PT. G.A.N., Prambudi revealed that the system used is a partnership with kenaf farmers and in the process of making kenaf they have implemented a "zero waste" program, or no waste so it is more environmentally friendly. This partnership can be well established because kenaf is an alternative crop that is planted after the rice planting season. "It is hoped that this significant export value will increase the country's foreign exchange and indirectly improve the welfare of farmers, especially in East Java. Especially with the implementation of partnerships with farmers by PT. G.A.N," explained Musyaffak Fauzi, Head of the Surabaya Agricultural Quarantine.

**Export Requirements.** As one of the requirements for entering the Japanese market, the process of making kenaf must implement a zero waste program, or there is no waste in the process. Before being exported to Japan, kenaf must be distilled first by heating. Japan requires that Kenaf who enter Japan must be free of Foot and Mouth Disease (FMD), Rinderpest and African Swine Fever (ASF). Therefore, it is necessary to guarantee animal health and safety for kenaf in the form of a Health Certificate/HC (animal health certificate). The world's demand for natural fibers from fiber plants, such as kenaf, is very high, currently the supply of kenaf fiber can only meet 60% of the need. The problem in the development of kenaf in Indonesia to support industries that use kenaf fiber is the existing marketing system. Currently, the existing marketing system for kenaf fiber is monopoly on supply of kenaf fiber from an investor to the main user. 99% of the Kenaf fiber planting in Indonesia is in Lamongan, East Java. Every year the planting area is between 10,000-20,000 ha. PT Global Agrotek Nusantara (GAN) manages it, whose kenaf fiber is sold to PT Toyota Boshoku Indonesia. Currently, farmers produce fiber, all of which are accommodated by PT GAN. This company fosters farmers by providing seed loans, costs for tillage, tillage and maintenance. Loan repayments are made after harvest by deducting from the purchase price.

Every year production is around 3,000-4,000 tons of fiber, while the demand is 7,000 tons so that imports range from 3,000-4,000 tons. Kenaf fiber imports are obtained from Vietnam, India and Bangladesh. Kenaf was developed in bonoworo land (flooded land) which is always inundated during the rainy season. This land is decreasing, so we have to switch to other marginal lands such as dry, acid, peat and tidal land. Currently Balittas has produced the kenaf variety for land like this. The superior varieties of kenaf that have been produced by Balittas are KR 11 for Bonorowo land; KR 14 and KR 15 for red and yellow podzolic land (PMK); and KR 9 and KR 12 for dry land. These varieties can be planted at any time because they are less affected by photoperiodicity. The main problem faced if planted outside Bonorowo is that production costs increase because the retting costs increase. Retting is the process of soaking, extracting into fiber at a cost of 60% of the total production cost. To overcome this, Balittas is developing dew retting, which is retting using the services of micro-organisms that decompose pectin and pentosan which are effective, the application uses only a small amount of water, so the cost of the extraction process can be saved.

The prospect for the use of kenaf in the world is quite good, as evidenced by the demand for seed exports from Balittas. However, Balittas only produces source seeds and does not produce spread seed classes, so that demand for seed exports cannot be fulfilled. In the current development of kenaf, PT GAN, which already has a license agreement with Balittas, has met the needs of farmers' seeds for spreading superior seeds of the KR -15 variety. The current Kenaf fiber marketing system is a single market for kenaf fiber users, namely PT Toyota Boshoku and fiber suppliers, namely PT GAN, which are bound by a cooperation agreement. PT Toyota Boshoku can only buy kenaf fiber and cannot receive it from other parties. Toyota Boshoku processes kenaf fiber into door trim, seat frames, seats, package trays and carpets. Kenaf is used because it is strong and light so that the weight of the vehicle is reduced and it is more fuel efficient. Kenaf is not only used in the automotive industry, but also for other industries, for example, investors from Malaysia and South Korea are interested in processing the seeds into oil. The high content of linoleic and linolenic acid is good for nutrition and cosmetics, so that the skin's moisture is maintained and it is not slippery. In addition, investors from Japan are working on using kenaf plant biomass as an energy source by utilizing nanotechnology. The remaining biomass from kenaf fiber, namely kenaf core, can be used for G2 bioethanol tires, paper, paper and other materials that require a small amount of cellulose. For the marketing of kenaf commodities, particularly kenaf fiber and fiber plant biomass, it is necessary to improve the marketing system, so that commodities can develop that can meet the needs of industries that use kenaf fiber and biomass, both domestically and abroad.

#### **4. Conclusion**

Based on the description above, it can be concluded that kenaf fiber has prospects and is very likely to penetrate the export market as a basic material for various industries. Indonesian kenaf fiber has the potential to be used as a raw material for various industries. So that it is appropriate that the amount of production and the quality of kenaf must continue to be increased. Every effort is made in order to increase the amount of supply and quality so that it can meet the needs of domestic kenaf fiber and export needs. environmentally friendly. Kenaf fiber has good prospects for development as a raw material for various industries to meet domestic demand, reduce imports, and increase its utilization.

### **Implications**

A more in-depth and detailed study of raw material availability, use, product innovation of kenaf fiber, and its technoeconomic feasibility study is needed to develop the use of Indonesian kenaf fiber as an industrial raw material. Creative and innovative products based on kenaf fiber need to be developed to increase the added value of kenaf fiber and increase the value of Indonesia's exports.

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