A Comprehensive Study on

Jute Fiber

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2nd Edition

Author
Shamsuddin Muttaki
Chairman of the Management Board, CEO
Asia Jute

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DEDICATION

Jute is a versatile, natural fiber that has been used for thousands of years to make things such as rope, twine, Hessian bags, rugs, and much more, yet for last couple of decade it lost its world market due to over usage of polythene etc. But the recent world wide climate movement has further reminded us the necessity of jute since jute cleans the air, use less fertilizer, herbicides & pesticides, improves soil conditions. It also has high biological efficiency, sound agricultural practices and biodegradability. The 'green' credentials of jute bags and fabrics are excellent when it is rapidly growing worldwide awareness of environmental problems and of the need for sustainable development. Gopal Chandra and other farmers are washing Jute. This Ebook is Dedicated to those farmer, who are trying to return our golden history of Jute Fiber.

Author's Massage:

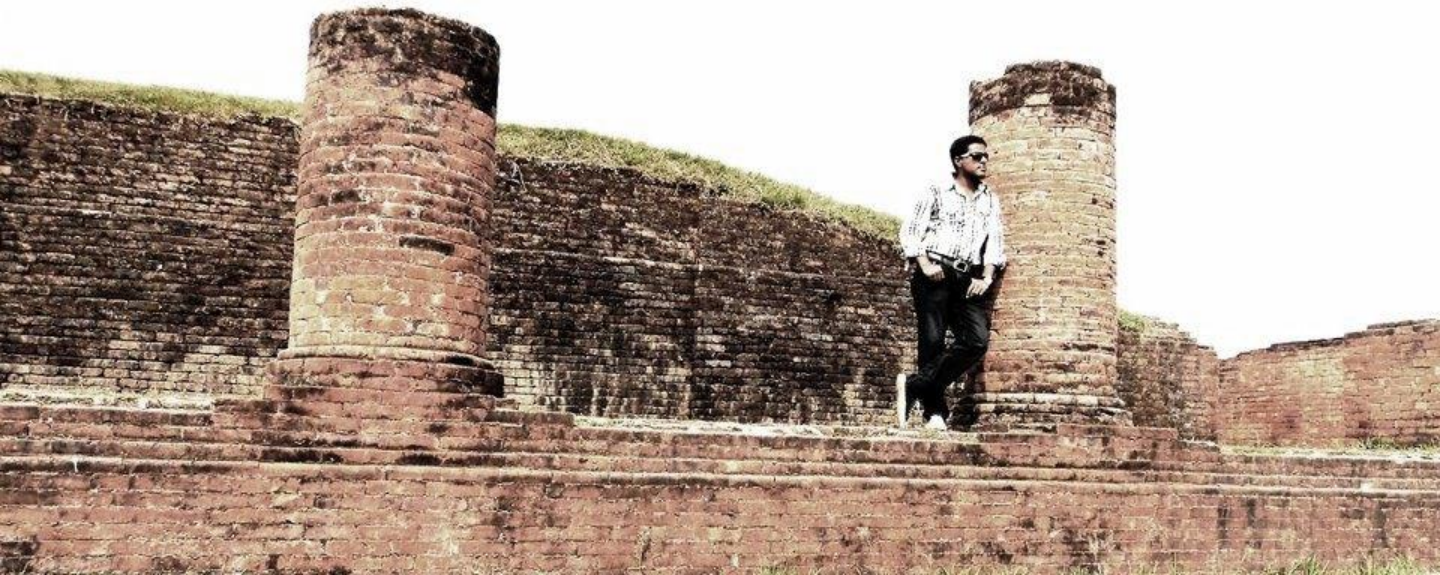
Hi, this is Shamsuddin Muttaki from Bangladesh. I am a small entrepreneur of **Asia Jute**. Accepting challenges is the foundation of my life & I always devote myself in performing my responsibilities. You will find me a totally dynamic, highly motivated & committed individual with pride in being spontaneous and communicative.

Currently, I am working for the development of jute products manufacturing process. Jute Market analysis, Economic condition of jute fiber products, Jute – Kenaf & Jute Cotton Blended yarn producing. I am also working for Diversified Jute products promotion.

Once upon a time Bangladesh was the largest jute producer country. There was 77 jute industry in Bangladesh. 80% Foreign Remittance was gained by Jute. Bangladeshi jute mills are decreasing and on the other side Indian jute mills are increasing day by day.

We have some duty to rise our hand to promote our jute & we are responsible for this. By promoting our jute we can re open our 56 jute industry & create employment for the nation.

If you have any enquiry about jute, please let me know what is your idea , problem or specific any questions. Please mail to: ***asiajute@gmail.com***



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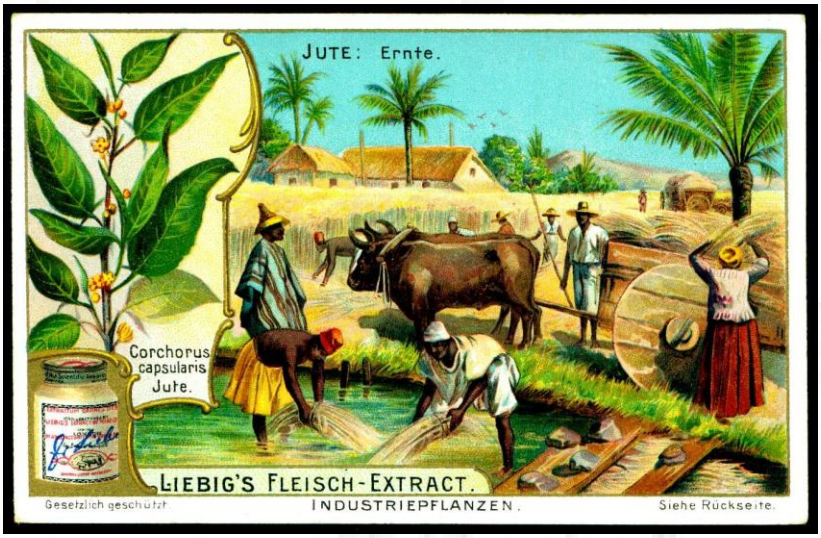
Jute is a natural fiber popularly known as the golden fiber. It is one of the cheapest and the strongest of all natural fibers and considered as fiber of the future. Jute is **second** only to cotton in world's production of textile fibers. India, Bangladesh, China and Thailand are the leading producers of Jute. It is also produced in southwest Asia and Brazil. The jute fiber is also known as **Pat, kosta, Nalita, Bimli or Mesta (kenaf)**. Jute is **a long, soft, shiny vegetable fibre** that **can be spun into coarse, strong threads**. It is produced from plants in the **genus Corchorus**, which has been classified in the family **Tiliaceae, or more recently in Malvaceae**. Jute fibres are composed primarily of the plant materials **cellulose** (major component of plant fibre) and **lignin (**major components of wood fibre). It is thus a **ligno-cellulosic** fibre that is partially a textile fibre and partially wood. It falls into the **bast fibre** category (fibre collected from bast or skin of the plant) along with kenaf, industrial hemp, flax (linen), ramie, etc. The **industrial term** for jute fibre is **raw jute**. The fibres are off-**white to brown, and 1–4 meters (3–12 feet) long**.



For centuries, jute has been an integral part of culture of Bengal, in the **entire southwest** of Bangladesh and some portions of **West Bengal**. During the British Raj in the **19th and early 20th centuries**, much of the raw jute fibre of Bengal was carried off to the United Kingdom, where it was then processed in mills concentrated in **Dundee**. Initially, due to its texture, it could only be processed by hand until it was discovered in that city that treating it with whale oil, it could be treated by machine.The industry boomed ("jute weaver" was a recognized trade occupation in the 1901 UK census), but this trade had largely ceased by about 1970 due to the appearance of **synthetic fibers**.**Margaret Donnelly**, a jute mill landowner in Dundee in the 1800s, set up the first jute mills in Bengal. In the 1950s and 1960s, when nylon and polythene were rarely used, one of the primary sources of foreign exchange earnings for the erstwhile United Pakistan was the export of jute products, based on jute grown in then East Bengal now Bangladesh. Jute has been called the "**Golden Fibre of Bangladesh**." However, as the use of **polythene** and other synthetic materials as a substitute for jute increasingly captured the market, the jute industry in general experienced a decline.During some years in the **1980s**, farmers in Bangladesh **burnt their jute crops when an adequate price could not be obtained. Many jute exporters diversified away from jute to other commodities**. Jute-related organisations and government bodies were also forced to close, change or downsize. The long decline in demand forced the largest jute mill in the world (Adamjee Jute Mills) to close in Bangladesh. **Bangladesh's second largest mill, Latif Bawany Jute Mills,** formerly owned by businessman, Yahya Bawany, was nationalized by the government. Farmers in Bangladesh have not completely ceased growing jute, however, mainly due to demand in the internal market**. Between 2004–2010, the jute market recovered and the price of raw jute increased more than 500%.**Jute has entered many diverse sectors of industry, where natural fibres are gradually becoming better substitutes. Among these industries are paper, celluloid products (films), non-woven textiles, composites (pseudo-wood), and geotextiles.In December 2006 the General Assembly of the United Nations proclaimed 2009 to be the International Year of Natural Fibres, so as to raise the profile of jute and other natural fibers.

Physical Properties of Jute:

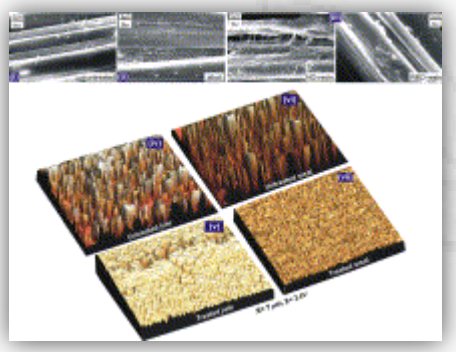


Fig. SEM and AFM photomicrographs of untreated and treated LCFs.
(i) untreated jute fibers,
(ii) alkali treated jute fibers,
(iii) neem oil (NO)–resin and rice bran oil (RBO)–resin treated jute fibers, in AFM topographic images,
(iv) untreated jute,
(v) neem oil–resin treated jute fibers,
(vi) untreated sisal, and
(vii) neem oil–resin treated sisal fibers.

Ultimate Jute Length: 1.5 to 4 mm.
Ultimate Diameter of Jute: 0.015 to 0.002 mm.
Length: 150 to 300 CM (5 to 12 Feet).
Jute Color: Jute fiber can be White, Yellow, Brown or Grey.
Strength of Jute: Tenacity (dry) 3.5 to 5 G/Den.But in wet conditions lower than dry.
Specific Gravity: 1.48
Moisture Regain of Jute: 13.75 % (Standard). It an absorb as much as 23% of water under high humid conditions.
Elasticity: Breaking Extension 1.8% and Elastic Recovery very low, less extension , high stiffness. Jute fiber is brittle and can hold less twist. So emulsion is added to make it soft.
Resiliency: Bad.
Dimensional Stability of Jute: Good on average.
Abrasion Resistance: Moderate.
Specific heat: 0.325

Chemical composition of jute:

Constituent	Percentage
Cellulose	65.2%
Hemi-cellulose	22.2%
Lignin	10.8%
Water soluble	1.5%
Fat and Wax	0.3%

Cellulose:
Cellulose of jute fiber is highly crystalline and it constitutes the main building materials of its ultimate cells. Degree of polymerization (DP) of jute is reported to be one of the lowest among the vegetable fibers. And according one estimate it is 1150.

Hemicelluloses:
Hemicelluloses like Cellulose is a chain molecular substance but is distinguishable from the latter in having a relativity short chain length (DP not more than 150) and being mainly composed of pentsans, hexosans, and uronic acid. It is soluble in 18% aqueous alkali.

Lignin:
Lignin is a complex polymer which functions as the structural materials in plants. Structural unit of lignin are aromatic alcohols with a phenyl propane backbone, such-as p-coumaryl alcohol etc.

lignin from all sources contains similar types of functional groups such as hydroxyl, methoxy, dioxymethylene, complex etc. which are increase the fiber strength and also reduce the flexibility and extension of the fiber.

Chemical properties of jute:

Effect of bleaching	:	Not affected by oxidizing and reducing agent.
Effect of acid and alkalis	:	Easily damager by hot dilute or cold concentrated acids. Cold weak acids do not affect it. Resistant to alkalis.
Effect of solvent	:	Resistant to organic solvent
Effect of sunlight	:	Poor sunlight resistant , scorches at high temperature.
Effect of heat	:	Burns rapidly. Solding red after glow.
Dye ability	:	Good affinity to basic days, but light fastness and wash fastness are poor.
Biological properties	:	Soured jute has good to excellent resistant to microorganism and insects.
Conductivity	:	Moderate conductors of heat and electricity.

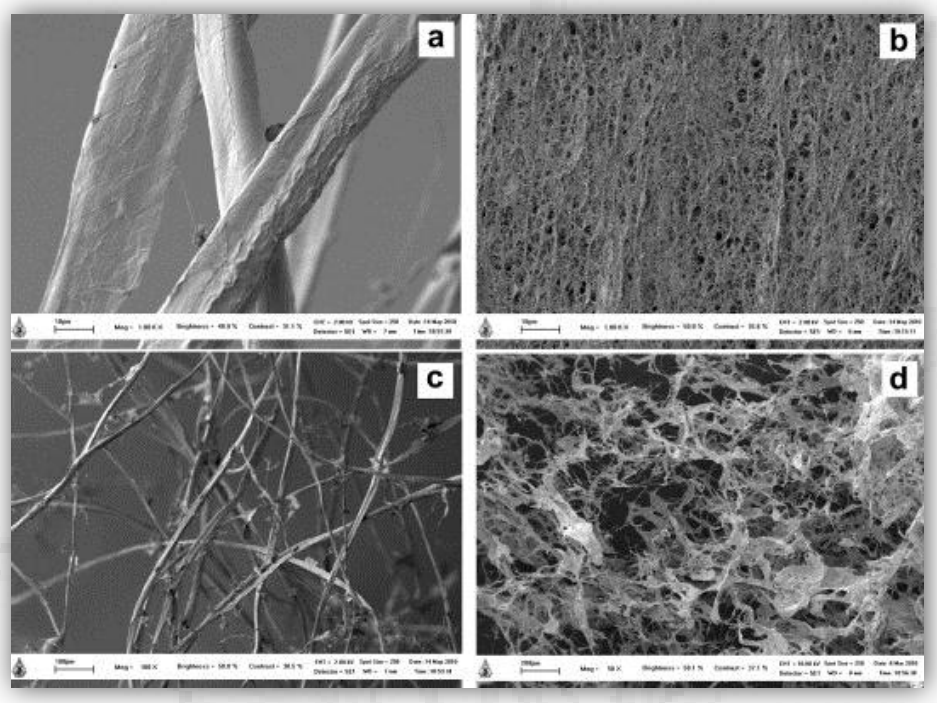


Fig. Scanning electron micrographs of
(a) jute,
(b) freeze-dried bacterial cellulose (BC),
(c) disintegrated jute (dis-Jute) and
(d) disintegrated bacterial cellulose (dis-BC) after freeze-drying.

Microscopic structure of jute:

- Jute fibers show several elements bundle together.
- There are more or less polygonal in shape with sharply defined angles.
- Between two separate elements, there is a narrow medium layer.
- The lumen is about as wide as the was and is round or oval in cross section.
- Longitudinally the lumen shows constriction or irregular thickness of cell wall.
- Towards the end of the fiber the lumen broadens out considerably causing the cell wall to become very thin.
- Externally the fiber is smooth and lustrous and has no ion for transverse makings.

Botanical species of jute:

There are 40 botanical species of jute among them The principle two botanical species of jute as follows:

White jute (*Corchorus capsularis*):

Several historical documents (including, Ain-e-Akbari by Abul Fazal in 1590) state that the poor villagers of India used to wear clothes made of jute. Simple handlooms and hand spinning wheels were used by the weavers, who used to spin cotton yarns as well. History also states that Indians, especially Bengalis, used ropes and twines made of white jute from ancient times for household and other uses.

Properties :

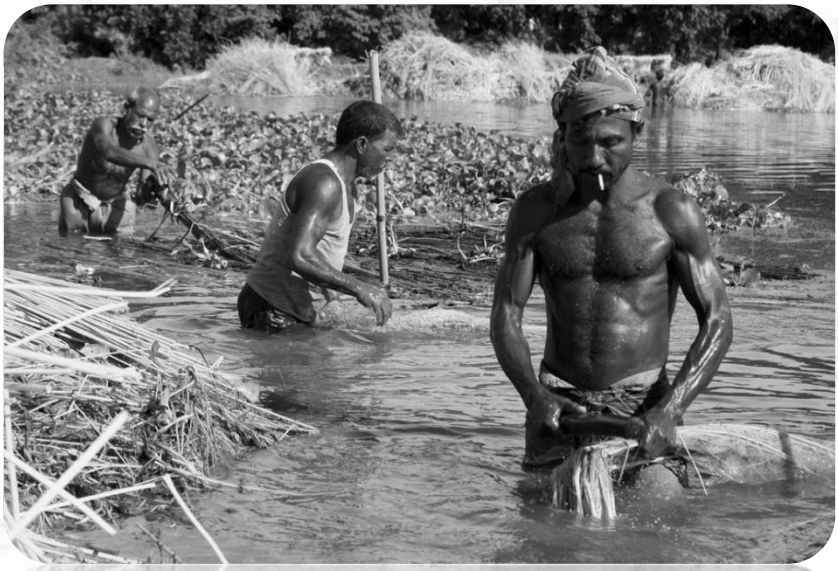
- Leaves taste bitter.
- The leaves are green in color.
- Flowers are yellow in color.
- Bark of the stem is brown.
- Speed pods are short and circular and
- The jute plant of this type annual and grows from ends.
- It is about 6 – 12 inch long
- ½ to ¾ inch in diameter.

Tossa jute (*Corchorus olitorius*) :

Tossa jute (Corchorus olitorius) is an Afro-Arabian variety. It is quite popular for its leaves that are used as an ingredient in a mucilaginous potherb called molokhiya,popular in certain Arab countries. The Book of Job in the Hebrew Bible mentions this vegetable potherb as Jew's mallow.Tossa jute fibre is softer, silkier, and stronger than white jute. This variety astonishingly showed good sustainability in the climate of the Ganges Delta. Along with white jute, tossa jute has also been cultivated in the soil of Bengal where it is known as paat from the start of the 19th century. Currently, the Bengal region (West Bengal, India, and Bangladesh) is the largest global producer of the tossa jute variety.

Properties :

- The jute plant of this variety is annual and collected from seeds.It is similar to capsularis variety.
- The leaves are lovely green in color.
- Leaves taste not so bitter.
- Dark yellow flower.
- Two to three feet high.
- Speed pods are long and circular in shape &
- Quarter inch in diameter.



Requirements of jute cultivation:

- ❑ High temperature to 95®F with a minimum 80®F during the pried of growth.
- ❑ Well preventive soil or fairly fine texture
- ❑ Suitable seeds
- ❑ Rainfall over 40''
- ❑ A sufficient supply of water for retting the plants and washing the striped fibers.
- ❑ Sufficient supply of skilled labor to handle the crop at the proper time.
- ❑ Facilities for placing the fibers in the market.

Cultivation of jute:

Jute seeds are small. Therefore, a view fine preparation of the land is necessary. The country plough made of wood is used generally for ploughing the land, which does not invent the soil very well. So the land is ploughed and cross-ploughed at least repeated about 6-8 times.

Climate and soils:

Jute requires a warm and humid climate temperature between 24®C to 37®C. Constant rain or water-logging is harmful. The new gray alluvial soil of good depth, receiving salt from annual floods, is best for jute. Flow ever jute is grown widely in sandy loams and clay loams.

Sowing methods:

There are generally two methods of sowing. Such as –

- ❑ Broad cast sowing
- ❑ Line sowing.

Broadcast sowing:
In broadcast sowing, the seeds are thrown by hand and by the method known as cross sowing. This method permits uniform distribution of the seeds over the ground.

Line sowing:
Line sowing is done where machine ploughing and machine sowing are used. This method permit easy weeding and thinning of plants as well as gives better yield both in quality and quantity.

Time of sowing:
Corchorus capsularies variety can be sown any time after January depending upon the position of lands and weather condition. But corchorus olitorius variety should not be sown before March because plants have a tendency of branching premature flowering and reveling to wild bush forms without proper growth if seen too early. In fact time of sowing and harvesting generally depends upon the weather condition and position of bands in the respective areas.

Weeding and Training:
When the plants are about 1'-2' high, first weeding is carries out. When the plants are about 3'-4' high, weeding and training are carried together and this is again repeated when the plants are about 2'-3' high. IN between these periods weeding is carried out if necessary. This process must be done at the current time with minimum of delay.

Harvesting Time:
The value of jute lies in its fiber. The quality and quantity of fiber are dependent upon the maturity of plants. Therefore selection of proper harvesting time is very important. Jute is harvested any time between 120 days to 150 days when the flowers have been shed, early harvesting gives good healthy fibers. The plant from 8 to 12 feet high are cut with stickles at or close the ground level. In flooded land, plants are up rooted. The harvested plants are left in field for 3 days for the leaves to shed.

The Fiber Extraction

The jute plant's fibers lie beneath the bark and surrounded the woody central part of the stem. To extract the fibers from the stem, the process is carried out in the following stages :

Retting of Jute:

Retting is the process by which the fiber is removed from the stalk. Then the fibers are washed in clear water. Jute is a natural fiber. Jute is a natural fiber. The plant is easy to cultivate and harvest. The fiber is obtained by retting. Retting is process in which the fibers in the bark are loosened and separated from the woody stalk due to the removed of pectins; gums etc.Tish is done by the combined action of water and microorganisms. During retting, disintegration of the tissues starts from the interior of the stem and extends of the outside, liberating the fiber boundless from the wood. The presence of periderm on the stem surface hampers retting and lowers the fiber quality. At lower temperature and running water retting process may take about one month.

Cutting of Jute:

Cutting of jute is usually done by hand with ‘dao’.The cut stemps are tied into bundles of about 9 to 142 inches in diameter.The bundles are then laid on the ground for a period to allow the stem to soften fall off.The bundles are then taken to aonvenient location of water. These are then arranged in layers in ponds.

Stripping of jute fiber:

Stripping is the process of removing the fibers from the stalk after the completion of retting. To judge the right time for striping the fibers from the retted plants of the ponds or cannels where the plants have been kept for retting. When is found that fibers can be separated from the stem each stripping. Washing and drying of the fibers should be done as quickly as possible. There are two methods of stripping. They are,

Stripping by hand

Bunch stripping

Stripping by hand:
The bundles of stems are removed from water, allowed to drain off and then each stem stripped separately. Fibers are made up into handful and then washed.

Bunch stripping:
The worker stands in water. He takes some stems in his left hand and beats the roads of the steams cloth a wooden mallet. When the roots ends are sufficiently crushed, they are broken off. Loose fibers are then drawn to permit easy separation from the rest of the stems. The stripped of fibers are then washed.

Washing and drying:
Extracted fibers are washed in clean water. The dark color of fibers can be removed by dipping them in tamarind water for 15 to 20 min and again washed in clean water. After squeezing excess water the fibers are hang on bamboo railing for sun drying for 2-3 days. The fiber is graded into tops, middles, B, C and X-bottom. Packing into kutcha bales about 250 pounds for use in the home trade. They are transport to market or direct in jute mills.

Bailing and Packing
After grading the jute they packed in bales about 250 pounds for use in the home trade. They are transported to jute market or direct to jute mills.

Jute fibers are graded according to three qualities of fibers. They are-
On a basis of fiber properties:

I. Length
II. Strength
III. Fineness
IV. Color
V. Lusture
VI. Roots and cleanliness and uniformity in color.

On the basis of color:
There are two colors-

- ✓ White and golden
- ✓ Brown to red

Corresponding to the main varieties *capsularies* and *olitorius.*
On the basis of export:

- A bottom
- B bottom
- C bottom
- X bottom

On the basis of quality of raw jute

- Pucca grading
- Kutcha grading

Pucca grading:
Raw jute from which roots have been cut.

White jute:
Bangla white special (BWS):
White or creamy
Finest texture
Very good luster, clean, well hackled
Completely free from any defects
Entirely free from red ends

Bangla White-A (BW-A):
White to light cream
Fine texture
Strong and very good luster, clean
Completely free from red ends and any blemish

Bangla White-B (BW-B):
Light cream to straw color
Good texture
Strong and good luster, well hackled
Free from blemish and red ends excluded

Bangla White-C (BW-C):
Light grey or light reddish to straw color
Sound strength
Average luster
Clean but free from croppy or hard gummy
Tops and roots and red soft ends are permissible.

Bangla White-D (BE-D):
Any color
Average strength
Occasional bark and specks permissible
Slightly croppy and gummy tops permissible
Red ends also permissible

Bangla White-E(BW-E):
Any color
Any strength but free from perished fibers
Unretted jute

Tossa jute:
Bangla Tossa Special (BTS):
Uniform golden or reddish color
Finest texture
Very strong
Very good luster
Clean cut and well hackled
Completely free from any defects.

Bangla Tossa-A(BT-A):
1
Uniform sliver grey to golden color
Fine texture
Strong and good luster
Clean cut and well hackled
Completely free from any blemish.
2.
Uniform light golden to reddish color
Fine texture
Strong and good luster
Clean cut and well hackled
Completely free from any blemish.

Bangla Tossa-B (BT-B):
1.
Light to medium grey color
Sound clean
Good texture
Average luster
Clean cut and well hackled
Free from any defects
2.
Light grey or reddish excluding dark gray color
Sound clean
Good texture
Average luster
Clean cut and well hackled
Free from any defects

Bangla Tossa-C (BT-C):
Mixed colors
Average strength
Occasional bark and soft specks allowable
free from runners
Slightly croppy and gummy tops permissible
Well cut and hackled but free from black root ends.

Bangla Tossa-D(BT-D):
Mixed colors
Average strength
Occasional bark and specks allowable
Free from runners
croppy and gummy tops permissible
Rough cut and hackled
Free from black root ends

Bangla Tossa-E(BT-E):
Any color
Any strength but free from unretted jute
Stick and perished fibers
Rough cut and hackled bark and hard Centre permissible

Kutcha grading:
Raw jute from which roots have not been cut.
Kutcha bales are graded as follows-
Tops
Middle
Bottoms
B-bottoms
C-bottoms
X-bottoms

Tops:
Very strong fiber
Excellent color and luster
Free from all defects
Cutting not more than (White 15% Tossa 10%)

Middle:
Strong sound fibers
Average color and luster
Free from all specks runners and harsh crop end (White 25% Tossa 15%)

Bottoms:
Sound fibers
Medium strength
Free from all hard centered jute (White 30% Tossa 20%)

B-bottoms:
Sound fiber
Medium strength
Not suitable for higher grade(White 35% Tossa 25%)

C-bottoms:
Medium strength
Any color
Free from runners and choppiness.

X-bottoms:
Weak, harsh jute
Free from tagled jute and stick

Habijabi:
Tangled jute
Free from any dust and cuttings

Classification of jute according to the quality
(Geographical distribution according to Bangladesh):

- ✓ Jat
- ✓ District
- ✓ Northern

Jat:
Jat is the finest quality jute with firm
It has good color and length
It has good luster
This type of jute fiber grows in the district of Mymensingh, Dhaka and Comilla.

District:
District jute is close to jat in quality.
The fiber is not uniform in textures and strands
Its color varies from light ream to dull grey
Its length is shorter.
There are two types of District jute. They are-
Hard district
Soft district

Hard district:
The hard district jute is better than the soft district.It mainly grows in the district of Faridpur

Soft district:
This type of jute grows in district of Noakhali,Pabna,Barisal,Jessor,Khulna,Sylhet,Lower Comilla,Chittagong and some part of Dhaka.

Northern:
Northern jute is of somewhat inferior quality.
The fiber is dull-colored fluffy hairy and barky
Generally medium length and weak.
This type of jute grows in District of Rangpur, Dinajpur, Bogra and Rajshahi.

Specky Jute:
If the Jute Fibers are not rotted and washed properly; the barks of jute adhere to the fibers and causes them speck. Speck in jute is a major defect which lowers the quality of Jute fibers.

Rooty Jute:
This kind of Jute Defects occurs due to various reasons such as under retting of the root ends of Jute fibers and if the root portion is not completely under water during ratting.

Croppy Jute:
If the top end of the fibers is rough, black and hard then stripping is insufficient which causes croppy jute.

Knotty Jute:
This kind of knotty jute defects is caused by insect bite in the jute plants.

Hunka:
This type of Jute is hard and barky caused by insufficient removal of hard bark from jute.

Mossy Jute:
Mossy grows in stagnant of water. The mosses adhere to the Jute fibers causing Mossy Jute.
Glossy Jute:
Highly lustrous jute fiber sometimes creates problems. This kind of highly lustrous jute fiber is named as Glossy Jute.
Flabby Jute:
Hairy Jute fiber defects are created due to over retting and careless stripping of Jute.
Runners:
Long hard and broken ribbon like fibers caused careless stripping and washing.
Dazed Jute Fibers:
The Jute fibre which has lost it's strength and luster due to over retting or excessive moisture in it.
Heart Damage:
This kind of defects caused for badly damage rotten or tendered fibers.
Weak fibers:
Over retting is the main cause of weak fibers, also due to under drying and sorting in moist condition.
Sticky or Woody:
In the top end at the jute plant is not stripped properly from the fiber, the brow pieces of the plant remain the fiber ceurecl this defect. It is due to over retting of lower part of the plant is under retting of lower part of the plant is under retting of the top end.
This all about the Jute Fiber Defects or Faults and reasons.

Advantages of Jute Fiber:

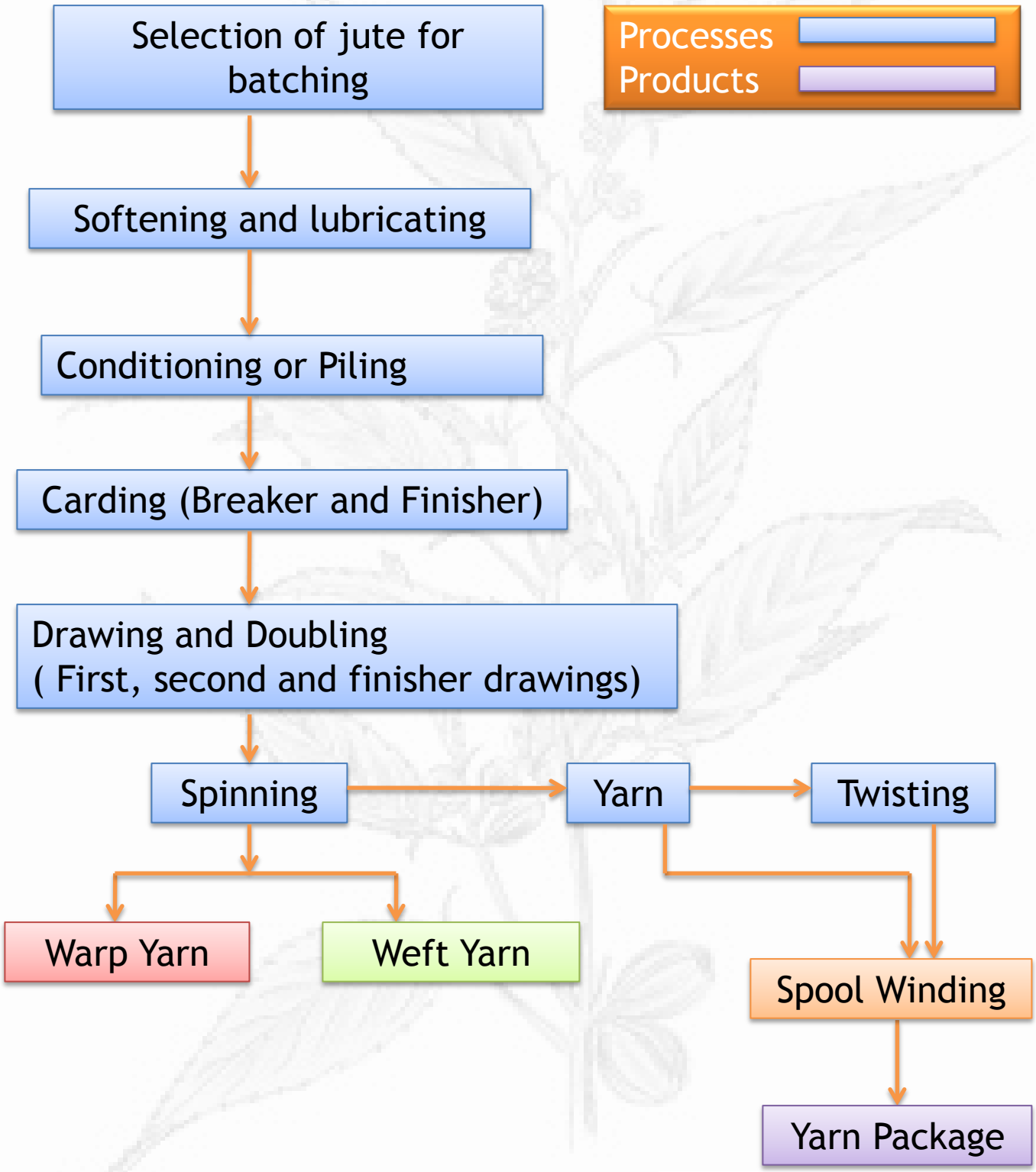
- ❑ Jute Fiber has great antistatic properties; so that any kind of static charges are not produced during Jute Product making or using.
- ❑ Jute is a insulating fiber and this is why it can be used to make cloth which would be used in electrical works.
- ❑ Temperature is passed in this fiber slowly because of the low thermal conductivity.
- ❑ Moisture Regain properties is good enough (about 13.75%).
- ❑ Produce no irritation in skin.
- ❑ 100% Biodegradable; so it is environment friendly fiber like Cotton.
- ❑ Cheap in market.
- ❑ Available in the market and the overall productivity of Jute Fiber is good.
- ❑ Tensile strength is high.
- ❑ Jute Fabric is highly breathable and comfortable to use.
- ❑ Can be widely used in Agriculture Sector, Textile Sector, Woven Sector and Nonwoven Sector.
- ❑ Jute Fiber can be blended with Natural and Synthetic fibers.
- ❑ Can be died by Basic, Vat, Sulpher and Reactive Dyes.

Disadvantages of Jute Fiber Using:

- ❑ The crease resistance of Jute is very low.
- ❑ Drape Property is not good enough.
- ❑ Create Shade effect and becomes yellowish if sunlight is used.
- ❑ If Jute is wetted it lose it's strength.

SOME IMPORTANT FEATURES OF JUTE:

- Jute fibre is 100% bio-degradable and recyclable and thus environmentally friendly.
- It is a natural fibre with golden and silky shine and hence called The Golden Fibre.
- It is the cheapest vegetable fibre procured from the bast or skin of the plant's stem.
- It is the second most important vegetable fibre after cotton, in terms of usage, global consumption, production, and availability.
- It has high tensile strength, low extensibility, and ensures better breathability of fabrics. Therefore, jute is very suitable in agricultural commodity bulk packaging.
- It helps to make best quality industrial yarn, fabric, net, and sacks. It is one of the most versatile natural fibres that has been used in raw materials for packaging, textiles, non-textile, construction, and agricultural sectors. Bulking of yarn results in a reduced breaking tenacity and an increased breaking extensibility when blended as a ternary blend.
- The best source of jute in the world is the Bengal Delta Plain in the Ganges Delta, most of which is occupied by Bangladesh.
- Advantages of jute include good insulating and antistatic properties, as well as having low thermal conductivity and a moderate moisture regain. Other advantages of jute include acoustic insulating properties and manufacture with no skin irritations.
- Jute has the ability to be blended with other fibres, both synthetic and natural, and accepts cellulosic dye classes such as natural, basic, vat, sulfur, reactive, and pigment dyes. As the demand for natural comfort fibres increases, the demand for jute and other natural fibres that can be blended with cotton will increase. To meet this demand, some manufactures in the natural fibre industry plan to modernize processing with the Rieter's Elitex system. The resulting jute/cotton yarns will produce fabrics with a reduced cost of wet processing treatments. Jute can also be blended with wool. By treating jute with caustic soda, crimp, softness, pliability, and appearance is improved, aiding in its ability to be spun with wool. Liquid ammonia has a similar effect on jute, as well as the added characteristic of improving flame resistance when treated with flameproofing agents.
- Some noted disadvantages include poor drapability and crease resistance, brittleness, fibre shedding, and yellowing in sunlight. However, preparation of fabrics with castor oil lubricants result in less yellowing and less fabric weight loss, as well as increased dyeing brilliance. Jute has a decreased strength when wet, and also becomes subject to microbial attack in humid climates. Jute can be processed with an enzyme in order to reduce some of its brittleness and stiffness. Once treated with an enzyme, jute shows an affinity to readily accept natural dyes, which can be made from marigold flower extract. In one attempt to dye jute fabric with this extract, bleached fabric was mordanted with ferrous sulphate, increasing the fabric's dye uptake value. Jute also responds well to reactive dyeing. This process is used for bright and fast coloured value-added diversified products made from jute.


Selection of jute for batching
Processes
Products
Softening and lubricating
Conditioning or Piling
Carding (Breaker and Finisher)
Drawing and Doubling
(First, second and finisher drawings)
Spinning
Yarn
Twisting
Warp Yarn
Weft Yarn
Spool Winding
Yarn Package


Warp Yarn
Weft Yarn
Twisting
Warp Spool Winding
Reeling
Beaming/ Dressing
Bundle Yarn
Cope Winding
Spool Winding
For Shuttle loom
For shuttle less looms
Weaving
Finishing
Jute Bags
Bag Making
Hessian Cloth, CBC

Raw jute in the form of bales are processed in jute mills to produce hessian, sacking, jute yarn, bags, and other useful products. Raw jute bales from jute fields or suppliers, carried by trucks are unloaded are stacked in the jute mills gowdown.

In the **selection process**, raw jute bales are opened to find out any defect and to remove the defective portion from the mora by experienced workers.

Raw jute bales are of two types i.e. 150 kg weight and 180 kg weight with or without top portion cutting.

The bales are assorted according to end use like Hessiean weft, Sacking wrap, Sacking weft etc. After selection, jute bales are carried to softning section by workers called Gariwala and Bajawala.

In **softning process** jute morahs are made soft and pileable. Two methods are used for softning; use of softening machine and use of jute good spreader.
Generally an emulsion plant with jute softner machine is used to lubricate and soften the bark and gummy raw jute.
The emulsion plant consists of gear pump, motor, vat, jet sprayer, nozzles, emulsion tank and the jacket. In this softning process jute becomes soft and pileable and suitable for carding.

Carding is a combining operation where jute reeds are splitted and extraneous matters are removed. Jute fibres are formed into ribbon called "sliver". There are three different carding sections:

(i) breaker carding
(ii) Inner carding
(iii) finisher carding

In the **Breaker carding** machine soften jute after piling is feed by hand in suitable weight. The machine by action with different rollers turns out raw jute in the form of jute sliver for finisher carding. In this process root cutting is necessary before feeding the material to the hand feed breaker carding machine.

Drawing is a process for reducing sliver width and thickness by simultaneously mixing 4 to 6 sliver together. There are three types of Drawing Frame machine. In most mills 3 Drawing passages are used in Hessian and 2 Drawing passages are used in Sacking.

- Finisher carding machine make the sliver more uniform and regular in length and weight obtained from the Breaker carding machine.
- Finisher carding machine is identical to the Breaker carding machine, having more pair of rollers, staves, pinning arrangement and speed.
- Nearly 4 to 12 slivers obtained from Breaker carding machine is fed on this machine.
- The material thus obtained is send to drawing section.

The slivers obtained from finisher carding machine is fed with four slivers on to the first drawing frame machine. The **first drawing** frame machines makes blending, equalizing the sliver and doubling two or more slivers, level and provide quality and color. This machines includes delivery roller, pressing roller, retaining roller, faller screw sliders, check spring, back spring, crimpling box etc..

In **second drawing**, the Second Drawing Frame machine obtain the sliver from the First drawing machine and use six slivers and deliveries per head. The Second Drawing machine makes more uniform sliver and reduce the jute into a suitable size for third drawing.

In the **third drawing**, the Third Drawing frame machine uses the sliver from second drawing. The Third Drawing machine is of high speed makes the sliver more crimpled and suitable for spinning. The comparison of the three drawing process:

Spinning is the process for producing yarn from sliver obtained from Third drawing. The jute spinning frame machine is fitted with slip draft zone and capable of producing quality yarns at high efficiency with auto-dofting arrangements also.

Drawing Process	Efficiency Range(%)	Productivity Mt/mc/shift
1st Drawing	55 - 73	1.75 - 2.2
2nd Drawing	64 - 74	1.62 - 1.9
3rd Drawing	67 - 70	1.31 - 1.4

Jute producing countries in the world:

Major jute producing countries are Bangladesh(Mayemansingh, Rangpur, Dhaka, Faridpur, Jassore, Pabna) and India(West Bengal, Coochbihar, Tripura, Assam, Orissa). Attempts have been made to grow jute in Nigeria, many other parts of Africa, Brazil, Japan, China an Burma. But the best qualities of jute produced in Bangladesh and India. Large amount of raw jute produce in Bangladesh. Global jute and Allied fiber production chart is given below ,

	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004
Bangladesh	731.5	814.7	924.7	793.3	963.0
China	164.0	126.0	136.0	155.0	165.0
India	1404.0	1620.0	1890.0	2060.6	1977.3
Indonesia	7.5	7.0	10.2	6.8	7.0
Myanmar	26.5	27.8	50.8	41.9	42.0
Nepal	15.7	15.2	16.4	17.0	17.5
Thailand	47.2	29.7	56.0	41.0	57.0
Vietnam	11.3	14.6	14.6	20.5	12.5
WORLD	**2496.3**	**2698.3**	**3144.9**	**3185.6**	**3292.0**

SOURCE: FAO In '000 metric tons.

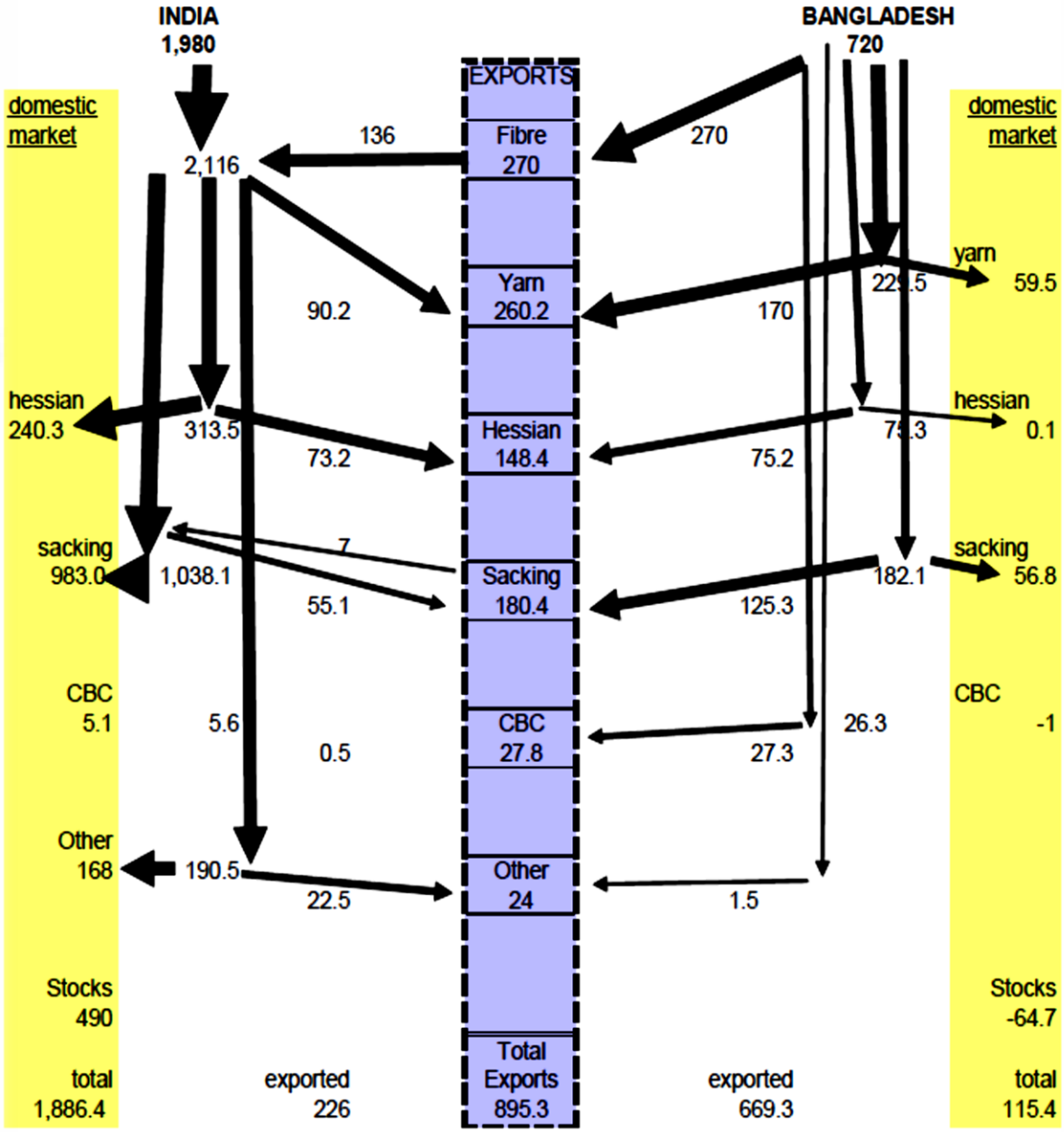
More then 98% of total world production of jute grown in three south Asian countries. They are,

- Bangladesh
- India
- Nepal

In 2001-2005 Bangladesh, India and Nepal has produced 98.2% of total world production of jute. Bangladesh contributed 35. 4%, India contributed 62.19% and Nepal 0.61% to the total world production of jute. Jute production in South Asian countries is given below ,

World	India	Bangladesh	Nepal	TOTAL INDIA,BANGLADESH, NEPAL
100%	62.19%	35.4%	0.61%	98.2%
2465	1533	827.75	16.83	2423

Market and market shares of jute good products:
Jute distributed in world market in this way,



BANGLADESH

The jute industry in Bangladesh is primarily export oriented. Raw fibre is exported as well as jute manufactured goods. The range of products produced is similar to India but the structure of the industry is different. On the one hand there is the Government owned BJMC with 22 or so mills, running the bulk of the operational looms and the semi-privately owned BJMA with 12 operating mills. On the other hand there is the BJSA with over 40 mills. This is an association of private sector yarn producers. In statistical terms the BJMC and the BJMA output all of which are composite fabric mills are here shown together.

❑ Bangladesh provides over 90% of the world's raw jute and allied fibre exports. Raw jute exported each year ranges between 300,000 and about 350,000 tons. India, Pakistan and China between them take about 250,000 tons with India accounting for half.

❑ Jute fiber availability in Bangladesh is generally in the range 750,000 to 850,000 tons in recent years. As noted earlier about 300,000 tons is exported and about 45,000 tons is consumed in village consumption, which leaves about 500,000 tons for use in the national mills.

❑ Depending on availability of finance and thus how many mills are operating, the BJMC and BJMA mills now use an estimated 250,000 tons of the national crop of raw material. The BJSA mills (which year on year continue to increase output), will soon use about a similar amount for yarn production.

❑ During the early 1990s the combined output of the BJMC & BJMA was around 450,000 tons and the BJSA (Yarn mills) was less than 100,000 tons. In effect during the last decade the manufacture and export of yarn has largely substituted for the decline in the production and export of Sacking, Hessian, and Carpet Backing Cloth.

❑ The internal consumption of jute goods in Bangladesh is about half the amount per capita compared to that of India.

❑ The amount of jute goods consumed internally in Bangladesh is in the range 100,000 tons per year. There has been a slow build up of internal consumption over the years, in 1970 – 30,000 tons, 1980 – 40,000 tons, 1990 – 50,000 tons and in 2000 – 80,000 tons. It would be reasonable to anticipate a little over 120,000 tons by the year 2010.

Broadly the current annual Bangladesh jute market profile is :

Local consumption of fibre at village level	**45,000 tons**
Local consumption of mill manufactured jute goods.	**90,000 tons**
Total local/internal consumption	**145,000 tons**
EXPORT OF JUTE IN BALED FIBER FROM	**300,000 tons**
BJMC and BJMA exports of Sacking	**100,000 tons**
Hessian	**50,000 tons**
Carpet Backing	**20,000 tons**
BJSA EXPORT OF YARNS (Includes BJMA yarn shipments)	**230,000 tons**
TOTAL EXPORTS OF JUTE GOOS IN MANUFACTURED FROM	**400,000 tons**
TOTAL RAW JUTE AND JUTE EXPORT	**700,000 tons**

Worldwide the current annual breakdown of jute may be assumed as follows,

Heavy sacking bags,	India	1,000,000 tons
(700- 1,100 grams)	Bangladesh	180,000 tons
	China	100,000 tons
	Pakistan	45,000 tons
	Myanmar	30,000 tons
	Nepal	20,000 tons
	Ivory Coast	10,000 tons
	Others (est.)	15,000 tons
	TOTAL	1,400,000 tons
Hessians, (includes	India	320,000 tons
Cloth or bags,	Bangladesh	70,000 tons
and wide or	China	30,000 tons
specialised fabrics).	Pakistan	10,000 tons
	Brazil	10,000 tons
	Others (est)	20,000 tons
	TOTAL	460,000 tons
Jute Yarns & Twines	Bangladesh	240,000 tons
	India	140,000 tons
	China (est)	15,000 tons
	Pakistan (est)	10,000 tons
	Others (est)	10,000 tons
	TOTAL	415,000 tons

→ **Jute Bags** :

Jute Hand Bags , Jute Beach Bags, Jute Shopping Bags, Jute Sling Bags, Jute Christmas Bags, Jute Sacking Bag, Jute Promotional Bags, Jute Bottle Bags, Jute Hessian Cloth Bags, Jute Hydro-Carbon Free Bags, Jute Food Grade Bags

→ **Jute Handicrafts:**

Notebook, Pen holder, Greeting cards, Photo frame, file folder, Gift Box, Memo Box, Tissue Box, Slip Pad Holder, Jute Wall Hangings, Jute Coasters, Jute Table Mats, Jute Hammocks, Jute Lamp Shades, Jute Stationery

→ **Jute Textile:**

Jute Hessian Cloth or Burlap, Jute Geo Textiles, Jute Yarn, Jute Hydro-Carbon Free Cloth, Jute Carpet Backing Cloth (CBC), Jute Canvas,

→ **Jute Apparel:**

Jute Jacket, Jute Footwear, Jute Fashion Accessories

→ **Jute Furnishings:**

Jute Mats & Durries, Jute Cushion Covers, Jute Fabrics, Jute Blinds, Jute Rugs, Jute Carpets

→ **Industrial Jute Goods:**

Jute Felt, Jute Webbing

JUTE BAGS


BAG FOR LIVES


adidas


my bag
eco bag


The Sustainable Way


Stratford-upon-Avon


THE NATIONAL TRUST


Waitrose


eat your greens

APPAREL

Office accessories

Footwear:








FURNISHINGS

Decorations:

A.R.A Jute Mills Ltd.
House No. 55-I, Road No.9A Dhanmondi R/A,
Dhaka 1205
Phone : 88-02-8115392, 8115394
Fax : 88-02-8113898
Email : shubrota@tradescanbd.com

ABC Agency
62/1 Purana Paltan (2nd Flr)
Dhaka 1000, Bangladesh
Phone : 88-02-9550992, 9555813
Fax : 88-02-9563296
Email : abcjute@bdcom.com

Ahad Jute Mills Ltd.
55 Purana Palton, Azad Center (3rd Flr.),Dhaka-1000, Bangladesh
Phone : 88-02-9567533, 0421-74064
Fax : 88-02-9553439, 88-0421-72337

Akij Jute Mills Ltd.
Akij Chamber, 73 Dilkusha C/A Dhaka 1000,
Bangladesh
Phone : 88-02-9667023-5, 9560864
Fax : 88-02-9569537, 9564519
Email : akijute@akij.net

Al-Haj Aminuddin Jute Mills Ltd.
House-79, Road-11/A, West Dhanmondi R/A,
Dhaka 1209
Bangladesh
Phone : 88-02-9113085
Fax : 88-02-8113267
Email : mahai@bol-online.com

Alijan Jute Mills Ltd.
18 Rajuk Avenue, Lal Bhaban
Stadum East Gate
Dhaka 1000
Phone : 88-02-9556251
Fax : 88-02-9562076
Email : sonali@bol-online.com

Anwar Jute Spinning Mills Limited
27 Dilkusha C/A
Dhaka 1000, Bangladesh
Phone : 88-02-9564033-7
Fax : 88-02-9564020, 9667755
Email : mail@anwargroup.com

Aziz Fibres Ltd.
93 Motijheel C/A, (3rd Floor)
Aziz Bhaban, Dhaka 1000, Bangladesh
Phone : 88-02-7112326-8, 9562691
Fax : 88-02-9559675
Email : info@azizpiepes.com

B.S. Jute Spinners Ltd.
50 DIT Extension Road, Eastern View (7th Flr),
Dhaka 1000 Bangladesh
Phone : 88-02-8321297, 9353068
Email : bsjsl@bdcom.com

Bangladesh Jute Association
77 Motijheel C/A
Dhaka Bangladesh
Phone : 88-02-9552916
Fax : 88-02-9552916

Bangladesh Jute Mills Corporation
Adamjee Court, 115-120 Motijheel C/A, Dhaka
1000, Bangladesh
Phone : 88-02-9558182-86, 9557118
Fax : 88-02-9567508, 9564740
Email : bjmc@bttb.netbd

Bengal Jute Industries Ltd.
216 Outer Circular Road (2nd Flr) Bara
Moghbazar, Dhaka 1217
Bangladesh
Phone : 88-02-9333851, 9351139, 9331344,
9144457
Fax : 88-02-8318392
Email : bengal@bd.drik.net

Charmuguria Jute Mills Ltd.
House-79, Road-11/A, West Dhanmondi, Dhaka 1209 Bangladesh
Phone : 88-02-9113085
Fax : 88-02-8113267
Email : mahai@bol-online.com

Chittagong Jute Mfg. Co. Ltd.
Ispahani Building (2nd Flr), 14-15 Motijheel C/A, Dhaka, Bangladesh
Phone : 88-02-9555192-5, 9556386
Fax : 88-02-9565319
Email : ispahani@bangla.net

Corofin Jutex Corporation
128, Malek Mansion (6th Flr), Motijheel C/A, Dhaka 1000, Bangladesh
Phone : 88-02-9572170
Fax : 88-02-7161801
Email : corofin@bdonline.com

Creative International
Road New 14, Old 29 Hosue 7 Dhanmondi, Dhaka 1209, Bangladesh
Phone : 88-02-9143158, 9138139-40
Fax : 88-02-9122847
Email : cretativeinet@hotmail.net

Faridpur Jute Fibres Ltd.
218 New Elephant Road (2nd Flr) Dhaka 1205, Bangladesh
Phone : 88-02-9673168, 9663481
Fax : 88-02-8612373
Email : faridpur@bangla.net

Fatima Alyaf Tala-E Jute Inds. Ltd.
Haq Chamber (2nd Flr), 3 DIT Avenue Motijheel C/A,
Dhaka- 1000, Bangladesh
Phone : 88-02-9560081, 9565668
Fax : 88-02-9565662, 9565669
Email : fairgrup@citechco.net

Ferdaus Jute Mills Ltd.
House-121, Road-9/A, West Dhanmondi, Dhaka 1209
Bangladesh
Phone : 88-02-8115329, 9131141
Fax : 88-02-8113267
Email : mahai@bol-online.com

Islam Khan Jute Mills Ltd.
50 Purana Paltan Lane, 1st Flr
Dhaka, Bangladesh
Phone : 88-02-9349132
Fax : 88-02-9334806
Email : ikmr@bangla.net

Janata Jute Mills Ltd.
SMC Tower, 3rd Flr, 33 Banani C/A, Dhaka, Bangladesh
Phone : 88-02-9888419
Fax : 88-02-9881027
Email : jasahuq@bdonline.com

Jute Spinners Ltd.
House 98, Road 9A(New), Dhanmondi R/A, Dhaka 1209
Bangladesh
Phone : 88-02-8111994, 8113202
Fax : 88-02-8111650
Email : shams@dhaka.agni.com

Karim Jute Spinners Ltd.
Chandrahila Suvatu Tower
(4th Flr), 69/1 Pantha Path
Green Road, Dhaka, Bangladesh
Phone : 88-02-8629391-3
Fax : 88-02-8629395
Email : kjsl@bdmail.net

Keraniganj Jute Fibres Ltd.
49/1 Imamgonj (2nd Flr), Dhaka, Bangladesh
Phone : 88-02-7310065, 7314260
Fax : 88-02-7314406
Email : kjfl@bijoy.net

Lytton Jute Mills Limited
216 Outer Circular Road, Bara Moghbazar,
Dhaka 1217, Bangladesh
Phone : 88-02-9333851, 9144457
Fax : 88-02-9130201
Email : bengal@bd.drick.net

Metropolitan Exports Corporation
9-G Motijheel C/A, 2nd Flr, Room 3, Dhaka
1000, Bangladesh
Phone : 88-02-9550641, 9550615
Fax : 88-02-9568174
Email : metroexp@citechco.net

Mutual Jute Spinners Ltd.
Land Mark (3rd Floor) 12-14 North C/A,
Gulshan-2
Dhaka -1212 ,Bangladesh
Phone : 88-02-8822581
Fax : 88-02-88115100

Nawab Abdul Malek Jute Mills (BD) Ltd.
9-K, Motijheel C/A, EBCO Chamber (1st Flr),
Dhaka 1000, Bangladesh
Phone : 88-02-9551754, 7167525, 7126141
Fax : 88-02-9564757, 9564756
Email : namjute@citechco.net

New Dacca Industries Limited
17 Dhanmondi RA, Road # 2 Dhaka 1205,
Bangladesh
Phone : 88-02-8618220-7, 9669470 8611891-5
Fax : 88-02-861470, 8613297
Email : bexijute@bangla.net

Nissan Jute Mills Limited
Nahar Mansion (3rd Flr), 150 Motijheel C/A,
Dhaka,Bangladesh
Phone : 88-02-9552577, 9560912
Fax : 88-02-9561891
Email : nissanbd@citechco.net

Northern Jute Manufacturing Co. Ltd.
Jatiya Scout Bhaban (9th-12th Flr) 70/1, Purana
Paltan Line, Kakrail Dhaka 1000, Bangladesh
Phone : 88-02-9362065
Fax : 88-02- 8315335
Email : erba@bdmail.net

Nowapara Jute Mills Ltd.
Paribahan Bhaban, 21 Rajuk Avenue, Dhaka
1000, Bangladesh
Phone : 88-02-9558582, 9550707
Fax : 88-02-9563472
Email : sader@citechco.net

Patuakhali Jute Mills Ltd.
Rajuk Annex Building (4th Flr)
Dilkusha C/A, Dhaka 1000 Bangladesh
Phone : 88-02-9552222, 9552220
Fax : 88-02-9564208
Email : pjml@spaninn.com

Popular Jute Mills Ltd.
28 Dilkusha CA, 8th Flr, Dhaka Bangladesh
Phone : 88-02-9559454, 9551853
Fax : 88-02-9558906
Email : popular@bdonline.com

Sadat Jute Industries Limited
SMC Tower (3rd Flr) 33 Banani C/A, Dhaka
1213, Bangladesh
Phone : 88-02-9888419
Fax : 88-02-9881027
Email : jashuq@accesstel.net

Saddat Trading Co. Ltd.
94, Kakrail, Dhaka 1000 Bangladesh
Phone : 88-02-9346111 404103
011-855438
Fax : 88-02-8319776
Email : jutebiz@bijoy.net

Sagar Jute Spinning Mills Limited
392 New Eskaton Road,
Dhaka -1000, Bangladesh
Phone : 88-02-9358024
Fax : 88-02-8312933
Email : fdl_sjsm@bangla.net

Sarwar Jute Mills Ltd.
Akusha Bhaban 53, Gulshan Avenue, Dhaka 1212, Bangladesh
Phone : 88-02-9881867-8
Fax : 88-02-8823727
Email : jute@citechco.net

Sayeed Jute Spinning Ltd.
50 DIT Extension Road, Eastern View, 13th Flr, Room-10/12 Fakirapol, Dhaka, Bangladesh
Phone : 88-02-8321914
Fax : 88-02-9343546

Shamsher Jute Mills Ltd.
9-G Motijheel C/A, 3rd Flr, Dhaka Bangladesh
Phone : 88-02-9552024, 9560939
Fax : 88-02-9553428.
Email : sjml@bol-online.com

Sharif Jute Mills Ltd.
86 Nawabpur Road, Dhaka 1100 Bangladesh
Phone : 88-02-7110985
Fax : 88-02-7117548

Shihab Jute Spinners Ltd.
Elite House (3rd Flr), 54, Motijheel C/A, Dhaka, Bangladesh
Phone : 88-02-9551413, 9550632
Fax : 88-02-9560398
Email : sjrl@sparkbd.net

Shyamol Bangla Jutex Ltd.
Al-Helal Bld (3rd Flr), 186 Inner Circular Road, Agrambagh,
Dhaka 1000, Bangladesh
Phone : 88-02-7100089, 7100547
Fax : 88-02-7100675
Email : sbjutex@bttb.net.bd

Sidlaw Textile (Bangladesh) Ltd.
392 New Eskaton Road, Dhaka 1000, Bangladesh
Phone : 88-02-9340284, 8315490
Fax : 88-02-8312943
Email : mma-atoz@bangla.net

Sonali Aansh Industries Ltd.
Lal Bhaban, 18 Rajuk Ave, 1st Flr, Dhaka 1000, Bangladesh
Phone : 88-02-9556251
Fax : 88-02-9562076
Email : sonali@bol-online.com

Specialised Jute Yarn & Twine Mfg. Co. Ltd.
333/1 Segunbagicha (1st Floor)
Dhaka 1000, Bangladesh
Phone : 88-02-9334038, 9330836
Fax : 88-02-9330836
Email : aline@e-fsbd.net

Supreme Jute and Knitex Limited
House # 98, Road # 9A (New) Dhanmondi RA, Dhaka 1209, Bangladesh
Phone : 88-02-8111994, 8113202, 8116337
Fax : 88-02-8111650
Email : shams@agni.com

Transocean Fibres Processors (BD) Ltd.
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Farmer gathering Jute from the harvest.

This is a story of a golden fiber. The people twined gold fibers through hard labor and lived off the salt earned through sweat on the soil. The fiber was the gold flowing in the veins of Bengal, sustaining the farmers through the wealth that flowed into the land from exporting Jute. Jute, that lost its dominance to negligence, misappropriation and mismanagement. It looked destined to become another 'muslin' of the east story - a mere nostalgic remembrance and faint sense of pride in what is our golden heritage. A drop of tear in a pool that has dried husk in the sun.

The worth on the environment that plastic has brought had escaped the eye of the world for so long - but no more. The earth has a mission to turn green and is looking to escape the grasp of in-disposable incurable substance. The return to Jute, as a natural substance for the need has reinvigorated the land. The tears of loss of the heritage has been wiped with a joyous return to the foray. This is the high time, that we have to ensure the best technology, information and linkage for Bangladesh is in place to dominate the world market.

1. Jute Basics – International jute Study Group
2. Jute Yarn Manufacturing in Bangladesh
3. www.jute.org
4. www.bjmc.gov.bd
5. www.worldjute.com
6. http://www.infokosh.bangladesh.gov.bd
7. http://informedfarmers.com/jute-history-and-uses/
8. http://www.bjri.gov.bd/

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URL: www.asiajute.com Email: asiajute@gmail.com

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reduce the use of Plastic

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help us to achieve this &

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AGAIN & AGAIN

& again..

ASIA JUTE