# A proposal of sustainable and integrated plant for jute fiber extraction in an eco-friendly manner

Mithun Kumar Biswas, Khan Mohammad Ridwan-Ul-Risty, Anupa Datta

**Abstract**— The modern manufacturing industry is facing a great number of challenges to establish green sustainability to lessen the threats formed by decadent civilization gradually for years, is the issue itself to solve with proposed solutions from all over the world can invite further unrecognized problems which may leave the situation unbearable. Jute is one of the bast fibers which has been proposed widely to accept and marketed as eco-friendly raw material for finished goods production, especially textiles. As jute made products are getting popular worldwide, steps are to be taken to comply with the demand of customers and conservationists. Mostly, raw materials are being sourced carefully in terms of its decomposition after use but its cultivation and processing stages should be controlled as a manner to ensure that environment is being taken care of. Traditional processes are outdated which should be modified according to the technological advancement. In this paper ,a plant is proposed to set up a sustainable and environment friendly jute extraction unit, integrated with updated technique and technology with a view to control raw jute fiber quality to support the fast moving industries and its benefits over the traditional method.

**Index Terms**— Sustainability, Jute, Retting, De-busting, Textile, Fashion, Environment-friendly, Industry, Plant

## 1 INTRODUCTION

CONSCIOUSNESS of consumers and their conservationist behavior are bending the manufacturing industries in pursuing adequate technologies for all the production related operations to secure less harm to environment [8]. People are showing great affinity towards products or commodities that are environment-friendly ,eco-safe, recycled, exposing less footprint to environment and labeled as green materials; this tendency is welcoming environmental sustainability. Comparing to a product that is yielded with less environmental concern, a product could be differentiated as eco-sustainable by ensuring that there is no potential threat towards environment in its production, uses and disposal [22]. Commercially sustainability could refer the long existence or durable service; but for environmental concern ,the possible safest use and replenishment of natural resources , disposal of the finished products followed by production are to be taken into account; because environment is to undergo every possible impact for every period of product's existence [22].The march to establish sustainability all around has brought forward promising natural raw materials which are recyclable and degradable with less effort as well [32]. From the concern of the higher degradability of finished products and innocuous cultivation, experts have already shown some alternatives that can be adopted to conserve environment. Regarding that, there are numerous qualitative and quantitative studies have been undertaken. Jute is one of the natural fibers that have been proposed widely to use for its eco-friendly features [38] .This is a shiny natural bast fiber of vegetable origin that contains cellulose fibrils and non-fibrous ground constituents like lignin, hemicelluloses. Jute exhibits many inherent advantages like luster, high tensile strength, moderate heat and fire resistance and long staple lengths [15]. This fiber can be spun into yarn to produce fabric or can be converted to non-woven textiles. As a feedstock for textile industry, jute was lagged behind due to lack in adequate hand feel, rigidity, less drapability, higher coarseness, poor wash ability and abrasion [2].

Nowadays many investigations are being carried out to develop jute blend quality as required at some extent using newly introduced treatments and blending processes [5].Successful researches are being conducted for yielding improved quality jute-ramie [6], jute-silk, jute-cotton, jute-viscose, jute-acrylic and jute-polyester blends [10].

Social and environmental consciousness is increasing day by day [22] resulting mandatory refurbishment of industries with sustainable approaches; and this may create high demand for producing fancy products in industrial scale to support fashion business and retail. Already Spain, Italy, France, Germany, UK, USA, Chili, Peru, Argentina, Belgium, Scandinavian Countries, Australia, South Africa, Japan, Singapore, etc. are already importing Jute made products as espadrilles, table coverings, cushion cover, curtain, fashion bag, mat and rug etc. [40]. Also for developing wearable garments, fashion designers and brands are working for many days; among them Prabha Mohanty, an Indian designer, has pioneered the use of jute into high fashion garments and working for around about 30 years and even introduced jute in Haute Couture arena [25]. Another award winning fashion designer based in Co. Clare in the west of Ireland, Regina Tierney can be mentioned as she has made so many dresses from jute even wedding dresses too [7]. Moreover, denim, shirting, suiting and home textiles are successfully manufactured from jute-blends so far [44]. That has been already reflected in BDT 568 crore (Around 68 million USD)project of establishing a composite jute textile plant by Bangladesh Jute Mills Corporation (BJMC) to make fabrics, particularly denim [30]. Researchers also started to study the acceptability of this kind of jute made garments to fashion world [19][4]. Apart from garment industry, there are other significant uses of jute which could con-

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tribute to develop sustainability. As example, it has already been proposed to use jute in concrete mixture for betterment of strength and other properties which could result in extended use of this material over other harmful polymer of same feature in concrete [48]. Other than, Jute Geo-textiles (JGT) are products of jute which have proved to be highly functional in soil erosion control, vegetation consolidation, agro-mulching, reinforcement, and protection of riverbanks & embankments, land reclamation and in road pavement construction, landslide control, shallow land recovery, railway slope protection etc. [21].

Furthermore, much awaited alternative to polythene has been invented from jute for daily uses. Recently, a Bangladeshi scientist has invented a biodegradable bag using jute cellulose that can be a substitute of conventional poly bag named as "Sonali Bag" [31].This kind of technological advancement would lead to reincarnation of jute in near future. Invasive population and their growing awareness to safeguard environment and tendency to avoid health risks are expected to franchise large markets for evolution of other natural cellulosic bast fibers to replace cotton which is now in extensive use [32] but with higher damage to environment [29]. Here among industrially used fiber crops, jute is already holding second position in terms of production and cultivating area worldwide [14]. Planned development and promotion of jute made products would be helpful to increase the possibilities of jute towards becoming one of the vital raw materials in industries. Propensity towards jute cultivation could observe the peak within a very short period of time to support the finished goods producing industries as well. Ultimately, this process will lead to rejuvenation of jute industry in jute producing regions of the world.

Here some data are collected from Food and Agriculture Organization of the United Nations statistics can be taken in concern that are showing the top 3 countries for last 15 years in terms of producer, exporter and importer.

| Top 3 Jute Producer countries | | | |
|---|---|---|---|
| **Years** | **Rank 1** | **Rank 2** | **Rank 3** |
| 2002 | India | Bangladesh | China,Mainland |
| 2003 | India | Pakistan | Thailand |
| 2004 | Pakistan | China,Mainland | India |
| 2005 | India | Bangladesh | China,Mainland |
| 2006 | India | Bangladesh | China,Mainland |
| 2007 | India | Bangladesh | China,Mainland |
| 2008 | India | Bangladesh | China,Mainland |
| 2009 | India | Bangladesh | China,Mainland |
| 2010 | India | Bangladesh | China,Mainland |
| 2011 | India | Bangladesh | China,Mainland |
| 2012 | India | Bangladesh | China,Mainland |
| 2013 | India | Bangladesh | China,Mainland |
| 2014 | India | Bangladesh | China,Mainland |
| 2015 | India | Bangladesh | China,Mainland |
| 2016 | India | Bangladesh | China,Mainland |

| Top 3 Jute Exporter countries | | | |
|---|---|---|---|
| **Years** | **Rank 1** | **Rank 2** | **Rank 3** |
| 2002 | Bangladesh | Mayanmar | Belgium |
| 2003 | Bangladesh | India | Belgium |
| 2004 | Bangladesh | India | Mayanmar |
| 2005 | Bangladesh | India | Mayanmar |
| 2006 | Bangladesh | India | Mayanmar |
| 2007 | Bangladesh | India | Kenya |
| 2008 | Bangladesh | India | Kenya |
| 2009 | Bangladesh | India | Kenya |
| 2010 | Bangladesh | India | Kenya |
| 2011 | Bangladesh | India | Tanzania |
| 2012 | Bangladesh | India | Tanzania |
| 2013 | Bangladesh | India | Tanzania |
| 2014 | Not found | Not found | Not found |
| 2015 | Bangladesh | Tanzania | India |
| 2016 | Bangladesh | India | Tanzania |

| Top 3 Jute Importer countries | | | |
|---|---|---|---|
| **Years** | **Rank 1** | **Rank 2** | **Rank 3** |
| 2002 | India | Pakistan | China,Mainland |
| 2003 | India | Pakistan | Thailand |
| 2004 | Pakistan | China,Mainland | India |
| 2005 | Pakistan | China,Mainland | India |
| 2006 | Pakistan | China,Mainland | India |
| 2007 | India | Pakistan | China,Mainland |
| 2008 | Pakistan | China,Mainland | India |
| 2009 | Pakistan | China,Mainland | India |
| 2010 | China,Mainland | Pakistan | India |
| 2011 | India | China,Mainland | Pakistan |
| 2012 | India | China,Mainland | Pakistan |
| 2013 | Pakistan | India | China,Mainland |
| 2014 | Not found | Not found | Not found |
| 2015 | India | Pakistan | Nepal |
| 2016 | India | Pakistan | China,Mainland |

*** Countries of ASIA are highlighted in light green.

Table 1,2,3: Data collected from the statistics of rankings from FAOSTAT (Food and Agriculture Organization of the United Nations)

Data is showing that top three jute producer countries from last 15 years is ranked among India , Bangladesh, China. Top 3 importers are China, India, Pakistan and exporters also mostly from Asia, more precisely from southern part. For many years, from jute cultivation to finished products manufacturing, Asian region is directly involved with this business growth. Considering swift and quick transportation, the growth of jute diversified product (JDP) manufacturing industries in this region would be the most convenient and it would not be a very ambitious anticipation. There are some active industrial units in this region; and those are subjected to modify according to trend. In near future, it is expected that a potential finished jute products exporting zone will be flourished in Asia region. So, this is the right time to set up sustainable business model for jute as well as for raw material cultivation. There

are some significant drawbacks in old processes of jute cultivation which causes remarkable amount of water pollution and health hazards to handlers during jute retting and collecting fiber. When jute cultivation would be increased, contamination rate would be high as well and it would stand against the efforts of endorsing eco-friendly raw material to support sustainability. Studies have shown that high grade jute fiber manufacturing is being challenged by insufficient free flowing sweet water resources, traditional retting processes and under-developed post-harvesting process that lead to shorter fiber length, dull color and rough surface with increased defects [37].

Being cautious about competitive market of fiber, there are demands to improve retting and extraction processes, to decrease dependency on water source, to involve less manual labor, to minimize operating costs, especially to ensure quality fiber for end product manufacturing [16]. Additionally, Jute fiber grading is done by hand picking which is a time consuming process .Often this grading turns into ineffective and delayed process more as fiber is not sourced centrally from cultivators. Meeting the short period of lead time for competitive market is another challenge to overcome. India, Bangladesh, China are the top 3 jute producers in the world for almost 60 years [15]. In Asian jute producing regions, it would be almost an absurd thinking that marginal farmers would undertake any new process to develop situation [37]. Tendency of using updated technologies and inventions is not that much common among them [37]. A central infrastructure facility, dedicated to take over all the processes after green jute plant harvested from field to collection of final clean dried fiber, can be effective to solve all of those problems. Through this, industries would have even clear data of jute in terms of quality which they are using to produce end products. In this approach, for certain cultivating area, all the jute plants will be collected directly from fields. After grading centrally, those will be subjected to controlled modern technologies for best possible quality outcome in fiber form. Jute fiber extractor machine (decorticators) could be used to extract green fiber from stem; after that simple water tanks with water flow facility will be used for retting and washing that would protect natural water resources from pollution in every harvesting season. Improved retting technology for quality jute fiber production has been introduced where ribbon retting is done instead of stem retting and retting is done with a very small volume of water [16]. In the retting tank, use of pectinolytic microbial inoculums could be introduced to improve quality of fiber and reduce the time of retting [3]. Central Effluent Treatment Plant(ETP) could be installed to purify the water to reuse the water even for cleansing after retting. For quick and even drying UV dryer can be used to dry up the fiber before final collection.

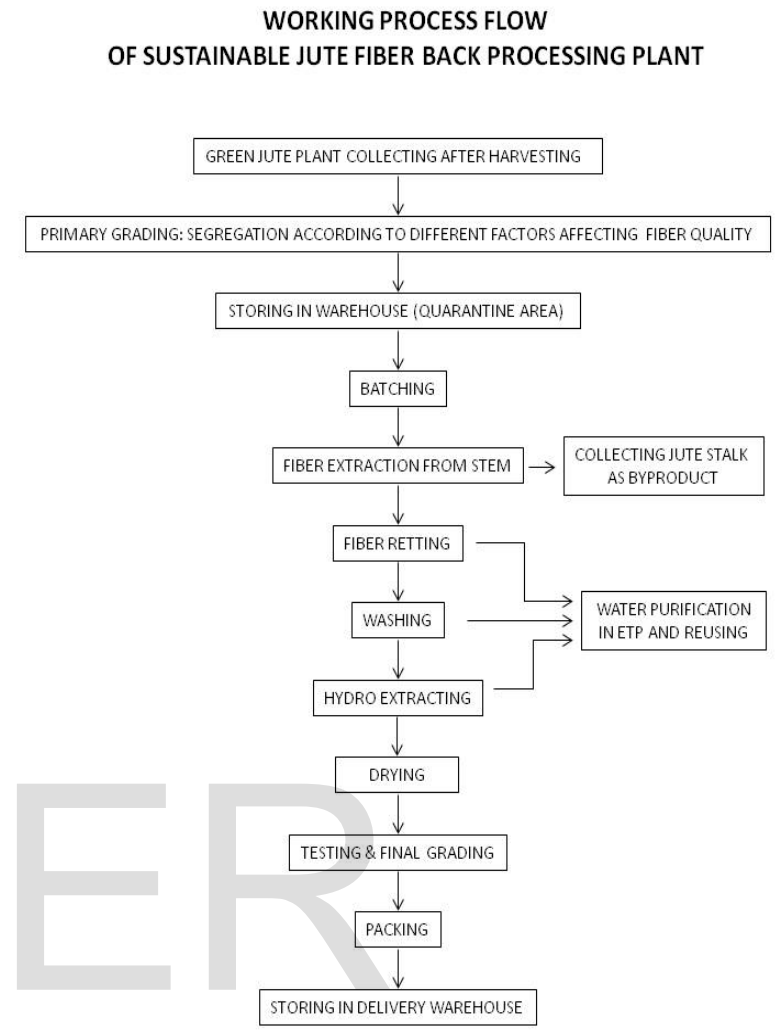
Hence, the main objectives of this paper were to propose an idea of integrated central jute fiber processing plant, that would be advised to set up in jute growing regions to meet the purpose of reserving environment from certain pollution and saving handlers and animals from health hazards, as well as to enable the small jute producers of the participating countries to obtain higher returns. This is expected that grading of jute fibers methodically in this plant would be helpful to control fiber properties more effectively.

## 2 Raw jute extraction process in conventional way and drawbacks

Depending on local cropping system, jute is harvested any time between 120 days to 150 days [47]. The plant from 8 to 12 feet high are cut at or close the ground level which is then subjected to retting process; retting is a favorable rotting process in which the bundles of jute stalks are submerged in water source by which fibers get loosened to separate from bast(worldjute.com). In this biological process, cortical and phloem tissues of the outermost layers of stems of jute plants containing fibers [37] are decomposed through the joint action of water and aquatic microbes at the appropriate temperature to separate fibers from woody stem [1]. There are several types of retting process invented all around the world for bast fiber such as water retting, dew retting, enzymatic retting, chemical retting, mechanical retting etc. [41]. The process, farmers are using in jute producing regions especially in Asia, can be classified as water retting as the use of water is significant in this process. Here the most common practice of retting is to immerse the jute bundles in lakes, rivers, canals, tanks ,ponds or ditches in 2-3 layers for about 15-20 days to be extracted manually. After that those are washed and dried for sale and this has been practiced since long to collect jute fibers [1]. Depending on time allowed for retting, there are quality related problems arisen such as under-retting which causes the fibers not soft enough to remove it from the bark and oppositely over-retting is harmful for fiber strength [37] as the bacteria may break down the plant tissues resulting in bad quality. Before selling to end product manufacturers the extracted fibers are washed in clean water and dried under sun. This time consuming natural degradation can be considered as the major problem in the production of long fiber and this conventional method was also reported to generate much water pollution [23]. As rotting of any substance in water eventually pollute the water source, this kind of vast practice is contributing a wide portion of polluted water in particular regions. So this is also threatening to freshwater ecosystems. For freshwater fish cultivation, the growth of microorganisms like bacteria and fungi at green jute in the water is not suitable and reasonably farmers are now facing restriction on jute retting in stagnant water [1] as it requires high treatment maintenance to free fetid water from pollution [41]. Here is another concern to think as unreliable and irregular monsoon in majority jute producing regions causing scarcity of water in the jute retting season [37] which leaving farmers helpless and leading them to use muddy water and small canal with insufficient water for traditional retting of green jute [1]. Observations have found that lacking of sufficient water results in piling green jute after harvesting until water availability as farmers cannot stack all of crops in a single shot and this way time consumption rate in traditional retting process is getting higher [1]. Yielding of low quality jute fiber is caused for no specific way of avoiding wa-

ter like: dark black colored water, muddy water, and lower level or insufficient water [1]. Reportedly, it is not possible to assure good quality fiber through traditional method [1]. However, in this manual labor-intensive process, depending upon productivity and the level of technology used, it takes 50-100 man for a day to complete one hectare harvesting [16]. But this highly monotonous hard work requires adequate skill or effort and people working for long hours immersed in polluted water are subjected to health risks [16]. In agricultural environment, basic causes of the frequent occurred skin conditions and diseases are plants, insects and pesticides, exposure to sunlight, heat, humidity and infectious agents [13]. Farmers involved in retting and extraction are in potential threat of skin diseases which can even lead to cancer if remains untreated for long time [46]. Additionally, polluted water containing chemicals as pesticides and fertilizers increases the risks.

Now-a-days a particular method is getting popular called ribbon retting which reduces time of traditional retting by around a week as well as requires less water where jute fibers are stripped out mechanically in ribbon form and then coiled and immersed in water [3]. But this method also involves open water retting process. Moreover, the difficulties of retting green jute during short harvesting period is getting more prominent as in some areas dryness of river and ponds/canals due to the climate change is almost shutting the process of traditional water retting of jute [1]. Ultimately, such extensive stench and pollution arising from fermentation occurred by bacteria of the plant, high cost and low grade fiber outcome are needed to be avoided [41] and to do so a model of sustainable jute fiber extraction plant is proposed in this article.

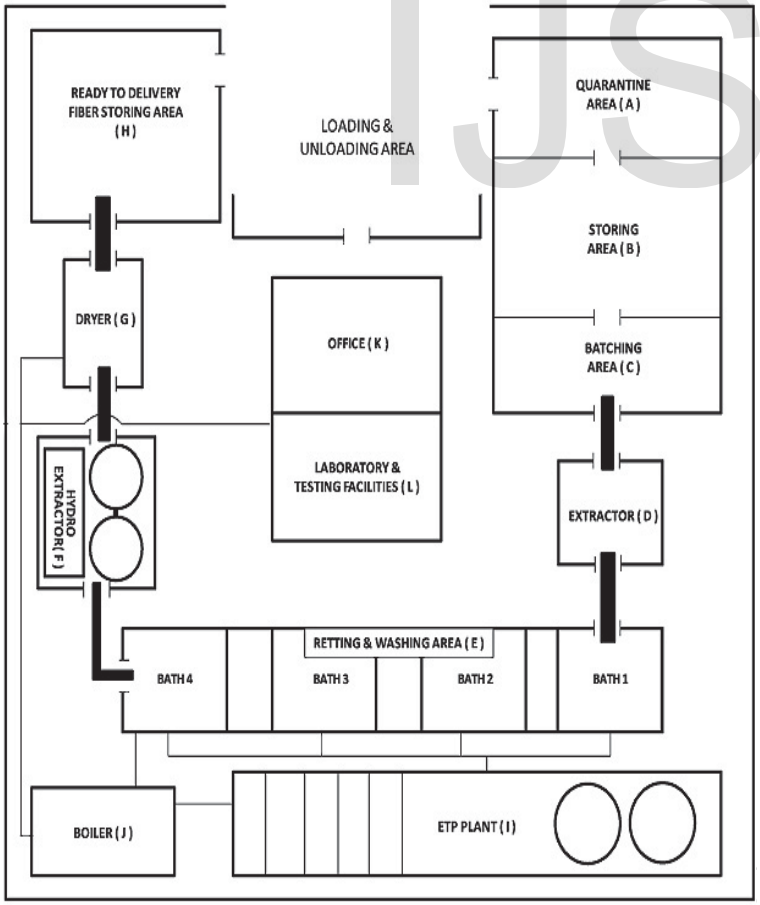



## 3 PROPOSED SUSTAINABLE PLANT FOR JUTE RETTING AND SUBSEQUENT PROCESSES

Regarding all the difficulties, here a jute processing plant is proposed to set up in the jute cultivating regions to process jute fiber centrally. In this plant, freshly cut green jute from field would be in input and well graded dried fiber would be in output for finished goods manufacturers. Below, there is a proposed work flow chart with brief description including a proposal of plant layout according to the flow chart are given. Further research and investigation should be carried out to make the plant layout more efficient and more productive.

It would be convenient if the plant is situated near the maximum jute growing area, in that case the transportation cost will be minimal. There would be designated agents to collect the green jute plants directly from the farmers by paying fair price. Also farmers can carry their harvested Green jute directly to the plant. A loading and unloading facility can be accommodated in the model. After bringing the green jutes in the Plant these will be primarily stored in the quarantine area (A). Here it will be segregated & graded according to their classes. Then these will be stored accordingly in the storing premises (B) with specific bin cards for easy identification. In-house store temperature and humidity should be controlled to keep the Jutes in the correct condition. Next, there will be a batching area (C) where batching team will batch immediately after getting an order. Volume per batch will be determined according to the fiber extraction machine and retting bath capacity. Wastage percentage and the weight reduction during the process should be considered as well. These weight reduction percentages, wastage percentage can be calculated from the trial runs of the plant. Then the marked batches will be brought to the fiber extraction area (D). Ashkol is one of the recent & efficient bast fiber extracting machines (Rahman, 2017) which can be fit in this model, just it is needed to be modified into industrial scale. The fiber extraction machine will extract green bast from the stems. Green bast will be carried to a reservoir by a conveyor belt. In the same time crushed jute stems will be transported to a separate reservoir by another conveyor belt. This byproduct Jute stalk crush can be used for other purposes. There will be multi storied retting baths (E) to utilize the area in efficient way. By this multi storied retting baths it will be possible to facilitate huge amount

of jute fiber in a small area. In this model, ribbon retting process will be used. Green jute basts will be put into the bath according to the bath capacity. Baths will be filled with water and other ingredients like Pre-cultured microbial, chemicals etc. to get perfect retting. As slow moving water is convenient for the good quality retting so there will be a artificial mechanism to create mild tide inside the retting bath [34]. The temperature, pH and other variable factors can be controlled here to keep the comfortable condition for retting. Washing is the next subsequent process and it will be possible to do inside the bath. There will be a padding mechanism will be installed to wash the fibers with fresh water. The washed jute fibers will be transferred to the hydro extracting machines. All the used water in those wet processes will be transferred to central Effluent Treatment Plant (ETP) (I) to purify as much as possible for reuse. There will be a Boiler (J) to produce heat for the retting bath, Effluent Treatment Plant (ETP), dryer and laboratory. Fibers will be dried up in the Drying area (G). It can be done in 2 ways. Tumble drying or Line drying. Now a comparative study should be placed to determine the convenient




same process and recipe and the quality of each fiber supposed to be same; even though it would be necessary to grade the fibers to secure the required quality [18]. A research needs to be placed to determine the method of grading.

Finally jute fibers will be packed and stored in the finished fiber storing area (H) for the final delivery. Here also the humidity and the temperature will be controlled to keep the fibers in good condition. To test & control the quality of the fiber and determine the recipe there will be a central laboratory (L). It would have a great importance in this plant. The office area (K) will be adjacent to the laboratory area. Officers, engineers and other personnel will use this place as their work station, in a word it will be the control room for the whole plant. As this office is near to the laboratory so it will be easier and faster to take any decision for the managers.

Here is a lay out proposal of the plant which has to be subjected to proper modification to enrich the efficiency.

## 4 EXPECTED BENEFITS

Through this plant, jute sector can be benefited in terms of quality, environmental sustainability, economy, health and hygiene etc. In below, some of the benefits are being portrayed concisely.

### 4.1 Grading and Classification

From observations, it is found that several factors can affect the fiber quality [11] and in most of the cases it can't be possible to segregate the different jute fibers having different quality and properties contributing end product's quality significantly. Though further research is needed to determine this deficiency, it is possible to sort out fibers according to their genotype, origins etc. before and after the retting process which would be adopted in this model. As there would be better control over each operation with the help of laboratory facility, end products quality can be controlled easily even from the beginning of the process. In the proposed plant, adequate storage capacity would be installed to store the raw jutes according to their grades.

### 4.2 Controlled Fiber Extraction

Generally de-basting process is done manually which is very time consuming. But several automatic mechanical process are been introduced to minimize the time and the labor [33]. In conventional method estimated cost per kilogram is 21 TK (0.27 USD), but with this machine it will be 7 TK (0.09 USD); in the same time, this process will enhance the quality & color of the fibers in comparison with traditional process [43]. The use of decorticators individually is too much costly for the farmers [9] while this proposed plant will free them from the effort of extracting fiber. This integrated form of using de-basting machine will be time, cost and energy efficient which is being planned to use in a regular and controlled manner after modifying them for industrial use. Hopefully, it will be possible to extract maximum amount of jute fiber from the Jute stalk.

### 4.3 Efficient Retting

Generally Retting is the most important step of the bast fiber extraction. But in conventional retting there are lots of problems and drawbacks which are mentioned already. Timing is the most

important factor in retting. In research it is proved that ribbon retting takes 4-5 days less than the conventional retting [3]. Also it will be possible to make the process faster by adding pre-cultured microbial agents [16]. In laboratory it was possible to do retting in 3 days [20]. And also it will increase the strength of the Jute fibers up to 15% than the typical process [27]. There are several advantages like less water requirement, less time consumption and the improvement of fiber quality at least by 2 grades [24]. Most importantly, it will be possible to consume as less water as possible to do the perfect retting and even water consumption will be almost half of the conventional retting [3] .To get better retting non-polluted & slow moving water sources are needed which can be possible to create artificially in the model [34]. Finally there is a significant difference in the Jute fiber quality between Conventional and the ribbon retting. Several researches are been carried out on this topic. Below picture shows the outlook [1] .


**Figure 3: Fiber outlook collected from conventional process(a) and ribbon retting(b)**

Here multistoried retting and washing bath is proposed to set up for space saving and enlarge capacity.

### 4.4 Quality Control

Several automated and updated instruments are been developed which could be used in this plant. In this model there would a well-equipped lab facility for different tests [35]. So it will be possible to check and control the required parameter during sequential processes to secure the good quality of Jute fiber.

### 4.5 Quality Modification

It will be possible to modify the fiber quality according to the requirement. Different chemical and enzymatic process can be imposed to get the required quality. Already lots of researches have been carried out [45] [12] [28] [36].

### 4.6 Effluent Treatment Plant

Dedicated Effluent Treatment Plant (ETP) plant is proposed to do the necessary treatments to turn the used water reusable. Also this can be released to open water sources. It will be a great help for the environment because in traditional method huge normal water sources are being polluted which harms the water bodies and the water echo system [1]. Through this effort, we can avoid dependency on natural water throughout the year and by this way difficulties arisen for late monsoon would be tackled.

### 4.7 Byproduct Utilization

Jute sticks can be collected during de-basting as the byproduct which will be easier to dry and use for other purposes like burning as fuel, making charcoal ashes for photocopier ink, carbon paper, cosmetics, dry cell batteries etc. Already several Bangladeshi organizations are exporting these charcoal ashes and earning handsome amount of foreign currency [42]. These by products can be used to heat the internal boiler also.

### 4.8 Cost Efficient

Already individual cost effectiveness has been discussed of fiber extraction and retting process [43]. Finally, it will be cost effective for those who will buy Jute fibers from here. Least amount of people will be needed which will decrease the labor cost. Cost increases along with the process time which affect the efficiency, here it will be possible to get the final fiber within least possible time, so surely the efficiency will be much higher than the traditional method. As the world is crazy for the cheap prices so these may help to reduce the end products as well.

### 4.9 Easy Supply Chain

Through this plant, adhered data and analytics could be used swiftly; inventory can be performed effectively. A balanced plan with predictability of outcome can help to build the most resilient processing unit and this would be easy to do so for the integrated plan. At a glance, it will be possible to maintain a good supply chain.

### 4.10 Research and Development Opportunities

Jute is a very much potential fiber. But still adequate research and development has not been done on Jute [39]. It is possible to make the jute fiber usable for lots of purposes. Already it is used in many ways but still the opportunities remain hidden. So this plant can be a good place for the higher research and development. Also this plant will have the connection with several national and international government or non-government organization and research institutes to comply with the latest developments.

### 4.11 Information Database

Most of the time farmers don't get the fair price for their jute as the present marketing system is not well established, quite inefficient and not been updated with the technological transformation [26]. Also buyers don't have the clear information of the present dataof prices as like as other fibers: cotton, linen, silk etc. Here it will be easy for both buyers and famers to access the central database to get the required information any time. Also it will be possible to restrict any types of illogical price hikes or drops.

### 4.12 Multi Purposes and Durable

This can be longtime project. The plant can be modified to extract any type of bast fibers according to their fiber extraction method if needed. Also this plant will be built to be active for a long time.

## 5 Limitations

**a**. As Jute is a seasonal crop so there will be a big pressure during the harvesting season. Rest of the time plant may sit idle. But further research and development can be done to avoid this issue.

**b**. Primary investment will be high to establish the plant because it requires big land area and infrastructure.

**c**. This plant will require efficient and technically keen people which can be difficult to find initially.

## 6 Conclusion

The increasing demand of the sustainable fibers and plant for producing fibers for various purposes leads to the responsibility and obligation of researchers and entrepreneurs to develop a process with better productivity and efficiency compared with those of existing traditional processes and methods. In this proposal, we have portrayed the present problems in traditional jute fiber extraction process as well as how a sustainable plant can be looked like, dedicated to minimize these problems, its work flow and what are the differences it may bring. Lots of national and international individual researchers and organization have already addressed the major problems of this trade, so this is the time to bring the revolution in Jute production and development, and this plant can be a milestone toward that success.

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