

**“An Exhaustive Review on - A Comparative Swotting on Jute Fiber progress.”**

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**Abstract:** Jute fiber is a vital component of the agricultural industry. In Third World countries like India, China, and Bangladesh, it is one of the most common natural fibers. The jute sector is vital to Bangladesh's economy, and it continues to be a major source of foreign cash. Synthetic fibers, on the other hand, pose a serious threat. Jute fibers are used in high-end decorative and furnishing items like lampshades, wall coverings, curtains, and upholstery. Jute is presently the world's second most significant fiber, behind cotton, in terms of volume. Jute fibers have been partially displaced by synthetic fibers, which have some advantages over jute in conventional uses such as carpets, ropes, sacks, and so on. Nontraditional channels for the fiber must be investigated in order to give a reasonable return to producers. Fiber-reinforced composites are one such possibility. Jute's prospects stem from a worldwide awareness of environmental issues, as well as its environmentally benign qualities. Jute, a natural fiber that may be used to enhance or replace synthetics in a variety of applications, is gaining traction in the industry. Jute is used in a variety of goods, including pulp and paper, geo-textiles, composites, and household textiles, in addition to its traditional uses. Jute is a renewable energy source that produces a large amount of biomass per unit of land area every year. It is biodegradable, and its products can be disposed of safely without endangering the environment. The roots of jute plants are important for boosting the fertility of your soil. The carbon dioxide assimilation rate of jute plants is high, and it cleans the air by eating enormous amounts of carbon dioxide. As a result, the study's objectives are to assess and review the effects of jute in Bangladesh.

**Keywords:** Jute fiber, uses of jute fiber, further application of jute fiber, consumption of jute fiber, future of jute fiber.

**Introduction:**

Jute is an ancient agricultural crop with an excellent record. Argo-climatic environment made Bangladesh a natural home for producing the satisfactory pleasant jute inside the international. (1) It has played a massive function in the economic system and records of Bangladesh. Jute is a natural fiber, an environmentally sustainable material, that absorbs CO<sub>2</sub> during the primary material production as it is collected from plants, and is 100% biodegradable. Furthermore, it is an annual crop with a cultivation time ranging between 110 and 120 days; it contains 80–75% holo-cellulose and approximately 11–15% lignin. Significant research efforts over the past few decades have made considerable progress in jute fiber reinforced polymer composites. (2) Even today the decaying jute area accounts for the 0.33 highest foreign foreign money earner after readymade clothes and frozen ingredients in Bangladesh. Bangladesh controls 63% of the jute entire jute items marketplace of the sector and earn Taka 20.125 billion by means of exporting items. Bangladesh is the best exporter of raw jute. In current year the country exported 2.4 million bales of raw jute valued at Taka nine.77million. Bangladesh's jute zone began to face a critical time since 1990s, as jute started to face increasing competitive stress from artificial substitutes, failure to comply with modern-day advertising process and global alternate practices, lack of massive efforts and required funding closer to product development and diversification, lack of ability to undertake the technological transformation undermined jutes possibilities as fiber. (3) These types of had unfavorable effect on production & advertising. (4) Jute is the most environment-friendly fiber starting from the seed to expired fiber, as the expired fibers can be recycled more than once. (5)

Plastic industry has been dominating jute market by attractiveness, diversity, longevity, and user friendly well as cheap compared to jute made product. In Bangladesh, many jute factories have already been closed to overcome overhead cost but now by the invention of eco-friendly jute poly bag and by getting the opportunity to enter in highly demandable bio-plastic industry, the fame and glory of jute could be retained. The concern for the environment is increasing day by day that make the people more interested in environment-friendly and sustainable products. The natural fibers are scientifically considered as recyclable, bio-degradable and ultimately eco-friendly in nature. In this paper, the prospects of jute are highlighted as a natural fibre considering the study place Bangladesh. The economic and environmental benefits of jute and then attempts to link up with the social factor of Bangladesh. The paper also looks to find out the economic prospects of Bangladesh as the one of the major producers of jute in the world. (6) Jute ranks next to cotton as a natural fibre. The use of bast fibres, for example, jute, flax, hemp and kenaf, as a filler in different composite structures has challenged the monopoly of glass fibre reinforced composite (GFR) materials on sustainability ground in the application areas, where stiffness and low weight are more important than the mechanical strength. (7) Jute is a bast fibre crop along with a family of few other natural fibres together generally called as Jute & Allied Fibre Crops (JAF). They mainly occur in the equatorial, the tropical and the sub-tropical zones. Over the last three decades, natural fibers and their composites have gained immense popularity in the business and research communities due to increasing environmental awareness and the depletion of petroleum reserves. Such interest has resulted in an intensive search for renewable and sustainable engineering materials. (8)

The main species of jute and kenaf, which are the major components of JAF, under cultivation include *Corchorus olitorius* (white jute), *C. capsularis* (white jute), kenaf (*Hibiscus cannabinus*) and roselle/ mesta (*H. sabdariffa*). (9) The preference for cultivation of one species or the other varies from country to country. Jute is preferred by Bangladesh, India and Nepal; and kenaf is mainly grown in China and Indonesia, while roselle/ mesta is preferred in Thailand. The cultural and other aspects of JAF crops are more or less the same while the fibre characteristics differ. The fibres of jute are relatively finer than those of kenaf and roselle; together these are called 'raw jute' because of vast similarity in majority of the characteristics and their use. Of the two jute contributes the major share of production.

Competitive benefit in this changing gradually for corporations that mobilize understanding and technological advancements within the layout of recent products / services and how the produce and release. Product development is an important capability due to the continuously converting surroundings. (10) The innovation system is also relevant to the volume that an organization does something that no person else can do, or doing higher than others. For offering, offer them faster, cheaper and with better first-rate is a source of aggressive gain. (11) Organizations that are unable to learn and improve not have many chances of success, regardless of size, the improvement is something imperative for the twenty-first century with pressures in all directions. In a world where product life cycles are becoming shorter and the replacement occurs regularly through improved versions management technology enables a form of adaptation and survival, likewise, offer a faster, cheaper and higher quality has long been a factor of competitive advantage. For years it was adopted that product innovation was developed typically by manufacturers, however the sources of innovations are different in some fields users develop many innovations in other suppliers are sources of innovation. In other words, innovation can come from a number of relationships involving users, customers, suppliers. (12) Changes in the sources of innovations are caused by a degree of importance given by the variations in the expectations of potential innovators in profitability related innovation. Therefore, this paper analyzes the innovation procedure carried out by means of the Omega agency. (13) This work is dependent around three topics with their content material. The first segment offers assessment of the literature with a brief historical past of innovation and product improvement system and ends with the cultivation of jute fibres on Amazon. The second topic is working technique and studies techniques used inside the have a look at. (14)

### **Bangladesh Invented Bio-plastic Jute Poly Bag and International Market Potentials:**

Bangladesh Invented Bio-plastic Jute Poly Bag and International Market Potentials. In Generally Plastic Bags are very usable around the world. There is about one million plastic poly bags use over the world and Europe, plastic carrier bags are produced 3.4 million tons year. Jute poly bag using jute cellulose that is bio-degradable and bio-plastic in nature, which is substitute of conventional poly bag that invented Bangladeshi scientists. (15) In that case, we will analyze international marketing strategy, product positioning, and potentiality in international market, marketing mix & porter's five forces analysis. Our observation that newly invented jute biodegradable

poly bag will gain market share in international plastic & bio-plastic industry as well as the potential market for exporting all over the world and especially in Europe and North America. Bangladesh has both absolute and comparative advantages in producing jute poly bags. Jute is one of the Most affordable natural fibers and second only to cotton in the amount produced and varieties of uses. Jute fibers are composed primarily of the plant materials cellulose and lignin. Jute fiber falls into the bast fiber category along with kenaf, industrial hemp, flax, ramie. Jute is the most environment-friendly fiber starting from the seed to expired fiber, as the expired fibers can be recycled more than once. Plastic industry has been dominating jute market by attractiveness, diversity, longevity, and user-friendly well as cheap compared to jute made product. Plastic bags that are made from crude oil and natural gas. Both oil and gas are nonrenewable energy sources, meaning that they are in limited supply. On the contrary, jute is natural and renewable as much as needed ensuring fresh air and environment.(16)

**Invented Jute Poly Bags:** When the world is anxious about ecological impact of polythene and polypropylene bags right then people are going to get a solution for it from Bangladesh. Though yet no commercial name is set, it could be mentioned as `Jute Poly Bag`. Several times many biodegradable and eco-friendly bags have been inaugurated all over the world but not endured due to valorization. This time Bangladeshi scientist Dr. Mubarak Ahmad Khan, presently working as scientific advisor of Bangladesh Jute Mills Corporation (BJMC) and former Chief Scientific Officer of Bangladesh Atomic Energy Commission invented biodegradable and eco-friendly bag from jute cellulose. In Generally Dr. Mubarak Ahmad Khan the product could be used in garments packaging, food packaging, cover ice-cream, readymade garments, rice, sugar and even dairy milk. They have tested for a long time to test quality change and contamination but there was no contamination or quality problem. According to this things the Jute bags are useful to human health.

**World Potential Bio-plastic Market:** Global opportunity Analysis and industry Forecast, 2018-2024 the global bio-plastics market was valued at \$21,126.31 million in 2017, and is projected to reach \$68,577.25 million by 2024, resisting CAGR of 18.8% from 2018 to 2024. In 2017, the rigid packaging segment accounted for approximately one-third share in the global market in terms of value. Such as Energy and Gold Ltd. presented an interesting analysis on global growth of Bio-industry from the source of Grand view Research (2014), European Bio plastics (2013), BCC Research 2014, NEXAT Inc. (2012) that fore casted that in 2019 the total plastic industry value will be \$561 billion and the Bio-plastic industry will \$21 billion (4% market share) and in 2030, total plastic market value will \$1127 Billion and Bio-plastic market value \$ 324 Billion (40% market share). They also mentioned that bio-plastic market expected to grow at 30% CAGR 2013-2030 but the traditional plastic industry growth only 3% annually. World Bio-plastic Production Capacity and Forecasting. The world bio-degradable plastic production capacity is expected to be 1260 thousand tons in 2021. Bangladeshi jute poly bag also in the category of bio-degradable plastic and aiming that the production capacity will increase when Bangladesh will go for production. But the world production capacity is still insufficient to meet demand and supply equilibriums in international market of bio-plastic.(17)

**Jute Cellulose Poly Bag Positioning:** Bangladesh invented jute bio-degradable poly bag (Jute cellulose) are similarities bio-plastic and high & low density, that is bio-degradable as well as compostable. Bio-plastic could be two types such as bio-degradable-bio-plastic and no-bio-degradable. The Bio-degradable plastics are 15 made of conventional plastic but it could be degradable by sun-light and present of Oxygen that is called photo degradable, oxy-degradable or bio-degradable.(18) The bio-plastic industry will be the main competitor of the product and other industry conventional and durable bio-plastic industry will also be factor to entry in international market. The bio-plastic industry is growing industry in the world due to the by concern of environment and awareness of end used and decreasing uses of non-renewable resources pushing back conventional plastic industry. But still conventional plastic industry is the most active player in the world market which has the maximum market share.

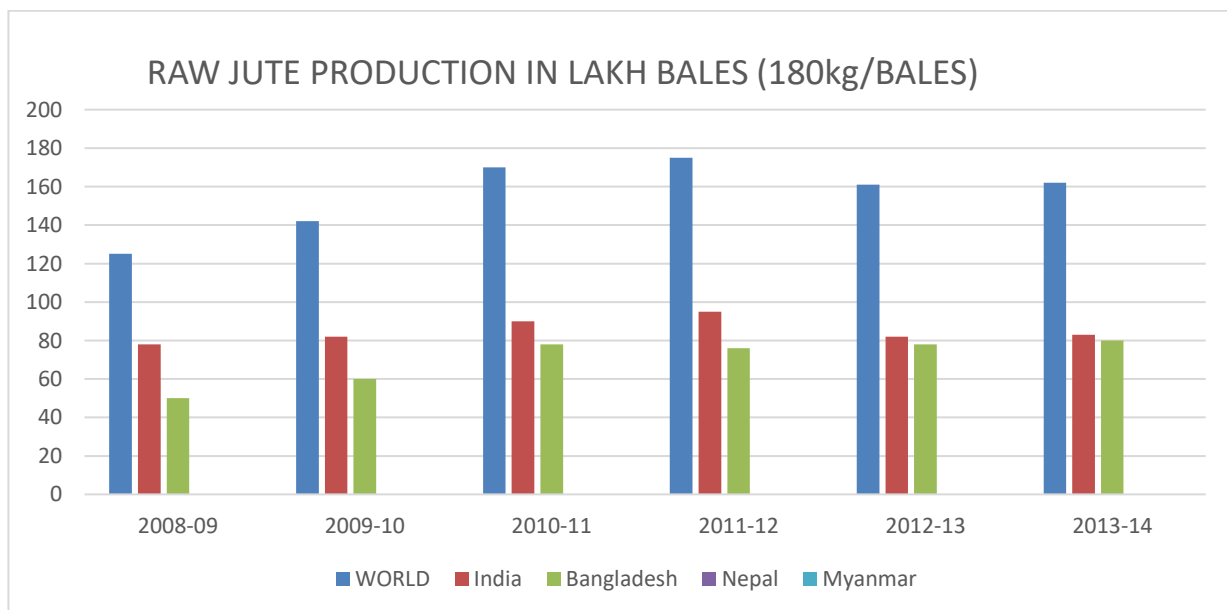
**Bio-plastic Industry Value Chain.**

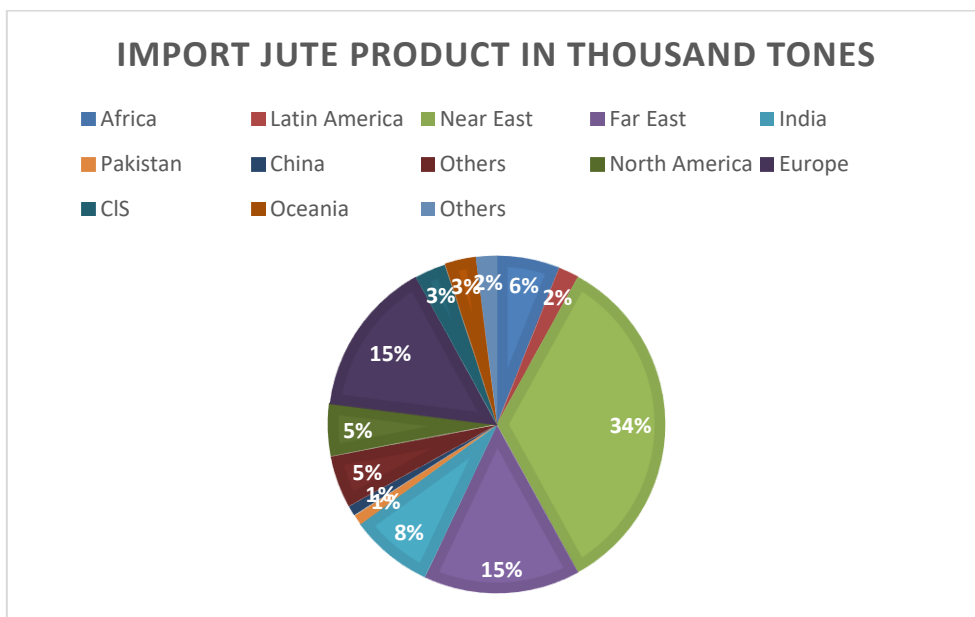
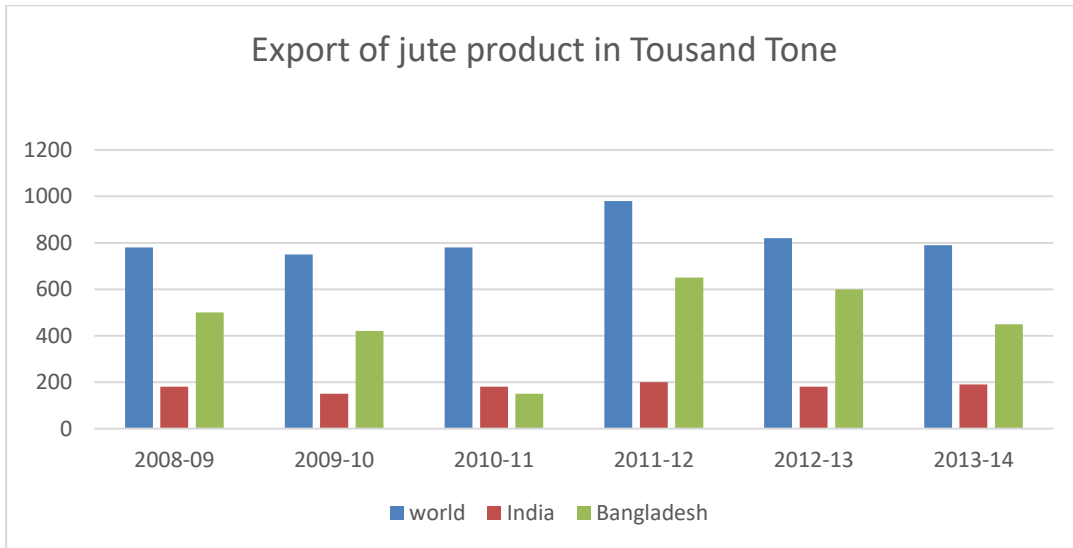
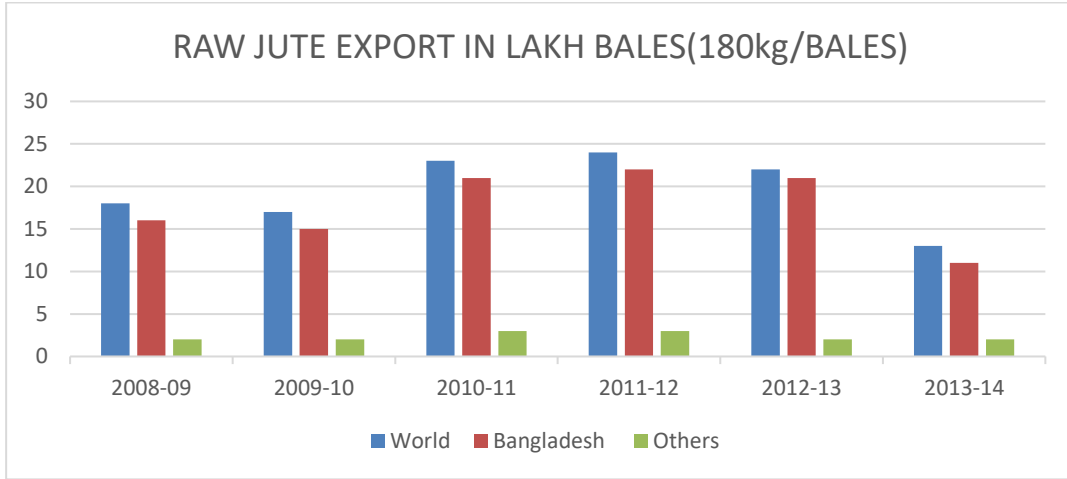
(16) We can see that the value chain compare between Bio-plastic and conventional plastic industry that in the bio-plastic industry the plastic wastage goes to manufacturer for reusing or it is goes to green field to decompose without any environmental hazardous. In Bangladesh Jute will be used to produce bio-plastic poly bag that is a natural plant which helps to environmental balance CO<sub>2</sub>. Jute cultivation is dependent on the climate, season, and soil. Almost 85% of the world's jute cultivation is concentrated in the Ganges Delta.(19) This fertile geographic region is shared by both Bangladesh and India.

World Wide Market Strategy: The Europe imports 15% of world jute goods. The EU is Bangladesh's most important trading partner, accounting for around 24% of Bangladesh's total trade in 2015. Bio-plastic beverage bottle consumption has grown dramatically since 2012, following the introduction of bio-derived PET for soft drinks bottles, and will account for almost 22% of bio-plastics for packaging consumption in 2017. (20) Bangladesh has a good trade relationship with Europe that could be also a potential market for Bangladeshi bio-plastic. Packing Strategies magazine (2017) noted that the largest regional market for bio-plastic packaging is [20] Europe with 31% share of the global bio-plastic packaging consumption. Bangladesh benefits from the most favourable administration available under the EU's Generalized Scheme of Preferences (GSP), duty free quota and free access to the European Union for exports of all products and EU imports 15% of world jute products that mostly export from Bangladesh. In Basically bio-plastic production in Bangladesh therefore very few chances to relocate the green field plant to other countries due to availability of raw jute, low labour cost, fertile land and government support. So, the best way to get access in international market through export marketing that could be direct and indirect exporting. The product that Bangladesh going to offer in international market that has the quality and opportunity to attain market leadership. (21) Specially, in packing and poly bag segment in both conventional and bio-plastic industry. The main ingredient of the product is jute cellulose and biodegradable synthetic polymer as binder that is very similar to Poly Bag but in actuality the bag is made by jute it has same potency of polythene bag that is 100% eco-friendly, recyclable. (22)

Limitation and Future Research: In that case one of the big challenges is insufficient data to measure and forecast future adaptability. In conventional plastic industry are involved in production and marketing but in bio-plastic industry, SME's involvement is still a big challenge. In that cases we could be conducted on customer acceptance and environmental effectiveness of newly invested poly bags and on how to get involvement of SME's in bio-plastic industry to strengthen absolute advantage whereas huge investment and research required compared to conventional plastic industry. As this Jute Poly Bags are newly invented they have some limitation such as customer acceptance, quality of the product and final production capacities to meet demand are still not tested.

Graphical Presentation of Jute Production and Product Demand All over the World: The Bar charts (Figure 1) shows the export of raw jute in over the world and it mentioned that Bangladesh is the key exporter of raw jute all over the world. The Bar charts (Figure 2) represents in raw jute production both Bangladesh and India play key role in the world. The Bar chart (Figure 3) denotes that Bangladesh has the highest market share in exporting of jute products and the pie chart (Figure 4) illustrates world's import of jute products and the near East (Egypt, Iran, Saudi Arabia, Sudan, Syria, Turkey) segment holds 34% of world jute products and Europe imports 15% as well as Nepal & Thailand jointly 15%.





Green Marketing Of Jute and Jute Products:

Governments and private sectors in jute growing countries only lately have started to undertake initiatives to address the attendant concerns. This renewed emphasis has been spurred due to the resurgence of global demand for jute as an environment-friendly product.(23) A number of technological breakthroughs favoring diversified uses of jute fiber have also helped. The present paper makes an attempt to analyze the challenges and opportunities in the world market for Bangladesh's export-oriented jute sector, in view of the recent developments some of which have been flagged above. As jute industry is economically an important industry of Bangladesh, any problem this industry should be studied carefully and should be removed as early as possible. As present, the industry faces some serious problem both in public and in private sector. Some of these problems are: ever-increasing need of subsidies and rise in cost of production, share increased in idle looms, managerial vacuum, lack of effective operating policies, alleged gross mismanagement in procurement of raw jute, shortage of varied nature of orders received from the buyer, imbalance, obsolete and worn out equipment's and some other problems like these(24). All these problems have converted this industry into a heavily loosing industry and hence needed generous subsidies from government. But it is being observed that recently different organizations organizing seminars, symposium etc. and publishing various articles in newspaper regarding present ailing situation on jute industries.(25) All are concerned how to overcome this situation and salvage the jute industry. Searching for ideal products to represent Bangladesh with uniqueness, we have suggested jute. Jute is environment friendly alternatives in synthetic world. Use of biodegradable jute from traditional sacks to composite in automobile industry or geo-textile or deforestation paves the way to be substitutes for many synthetic products.(26) Bangladesh has the natural advantage to produce best quality, which no other country can imitate.(27) The integrated policy along marketing and promotional campaign of jute can bring a positive Bangladesh worldwide .(28)

The broad objective of the article is to evaluate the marketing process of jute production in Bangladesh. To attain this basic objective, following specific objectives are set:

- To identify local sales and foreign sales for both BJMC and BJMA.
- To find out the production capacity and efficiency.
- To introduce the present scenario of jute and jute product's export in Bangladesh.
- To provide the recommendations of jute production and jute marketing as environment friendly in Bangladesh. (29)(30)
- To conduct the analysis of impacts of jute on export in Bangladesh.

### Methodology:

This newsletter is an analytical one facts had been gathered from secondary assets. Secondary information were gathered from annual reports of Bangladesh. Jutegenerators agency & Bangladesh Jute mills affiliation, Statistical year book, Bangladesh monetary review, have a look at on jute and cotton fabric (Vol. 1), diverse books and journals.

Limitations: This article has some limitations. Jute industry is a very large industrial sector, so it was not possible to discuss the all area of jute marketing. Others limitations are lack of current data, lack of testing the reliability of secondary data

Environment-Friendly Jute: Now, eco-friendly products and services and products are noticeably demandable inside the global. The extent of greenhouse gasoline emission, melting of ices in arctic and different zones, international warming is a problem for worldwide political economic policymakers international. As a result, use of natural fiber is selling thru activities like worldwide year of herbal Fiber 2009 which is prepared by means of UN. Now the sector is seeking to lessen the battle between the increasing international populace and the constrained natural assets available to it on the only hand and between the daily deterioration of the environment and the exploitation of herbal sources for industrialization. On the other, it is now realized that merchandising of a fiber other than natural cotton and artificial cellulose has turn out to be very critical. it is expected that the demand for fibers for apparel alone will upward push from the current 60 million tons up to one hundred thirty million ton in keeping with year within the year 2050, now not citing the fiber consumption numerous for other purposes. Though many problems of the use of artificial fibers has brought us uncountable blessings in our everyday existence, but among the problems of the use of synthetics have started to alternate our mindset closer to them. Jute and merchandise jute have delivered the ecological balance from the environmental pollutants as a result of synthetics. Following causes are to be noted that which bring ecological balance:

- Jute cultivation consumes large quantities of CO<sub>2</sub>.
- Modest amount of fertilizer and pesticides are required for jute cultivation.
- Jute improves the soil condition and erosion for its leaves & roots.
- Jute has high biological efficiency and also reduces deforestation.
- Wide ecological adaptability for growing jute is in the marginal lands like lands with unfavorable/ stress conditions such as drought, salt, flooding, low pH and low fertility.
- Diversified jute products are used in the alteration of petrochemical products.

Green Marketing of Jute and Jute Products: Environmentally-responsible or “inexperienced advertising and marketing” is a business practice that into consideration patron concerns approximately selling preservation and conservation of the herbal environment. Green marketing campaigns highlight the advanced environmental safety characteristics of an enterprise’s services and products. Bangladesh may be very rich in bio-variety. A huge range of vegetation is discovered right here. Even though Bangladesh is well-known for jute and allied fibers clothes industries swept in and feature developed because of relative advantage & cheap exertions price. As there's the multi-fiber idea of mixing jute with other natural and artificial fibers, jute had vivid destiny for the usage of them within the various fabric regions. Taking in view the prospects, the govt. of Bangladesh has began the diversification of jute makes use of with its limited assets. The objective of JDPC is to provide extension services to private sector for establishing industry for the production of high value added diversified jute products. The most basic and essential jute products fabricated in Bangladesh jute mills are:

- Canvas: This is the unique jute commodities, woven with highly premium grades of fiber. Jute canvas and screen lamination along with paper polythene is widely used in mines and for getting protection against weather.
  - Sacking Cloths: Sacking cloth is loosely woven heavy cloth used for packing sugar, food grains, cement etc. which is made up low quality jute fibers.
  - Bags: Bags are usually fabricated from sacking or hessian cloths which are mainly used for shopping. They are often decorated with varied artistic designs and with straps, chains and handles in several dimensions and shapes. Other categories of bags are promotional bags which are prepared for promote items for sale.
  - Hessian Cloth: This type of goods is a superior quality of plain woven jute fabric, weighing between 5 and 12, a yard.
  - Hydrocarbon free Jute Cloth: This cloth is fabricated by treating jute with vegetable oil. It is a hessian fabric, hydrocarbon free cloth, widely used for packing different food materials, cocoa, coffee, peanut beans etc.
  - Geo-Textile: It is a jute cloth laid along the river embankment sides and hill slopes to prevent soil erosion and landslides.
  - D.W. Tarpaulin: This product is majorly used for coverings on a very high multidimensional scale.
  - Serim Cloth: This is a light weight hessian cloth, used in felt industry for reinforcing the non-woven fabric and for strengthening paper with lamination.
  - Tobacco Sheets: This item is used for wrapping tobacco leaves, tobacco sheets are made up of hessian cloth.
  - Decorative Items: Diversified decorative products are made up of jute fabrics like wall hangings, toys, table lamps, paper, decorative bags, furniture and many more.
  - Hessian Tapes and Gaps: These are made up with hessian cloth, woven with gapes at regular intervals and the cloths cut between the gapes to make small width taps.
  - Raw Jute: The number of importers of raw jute is limited due to the limited number of jute spinning mills or jute felt manufacturing companies. Spinning companies in the UK use brokers for the import of their raw jute, whereas continental spinners buy directly from the origin countries. The import of raw jute for the UK is mainly used for the spinning companies in the Dundee area. The raw jute for the continent is to large extent cuttings for the cable industry and felt industry. Raw jute is used in the local industry of Bangladesh.
- Major jute items that were exported included-raw jute, jute yarn and twine jute carpet, jute ropes and other jute items. Share of jute export & growth performance scenario has shown in the below table-1 & 2:

**Table 1: Raw Jute year value share %**

Year	Value (Million USD)	Share %
FY 1972-73	313.1	89.9

FY 1980-81	487.3	68.6
FY 1990-91	394.6	23.0
FY 2000-01	297.5	4.6
FY 2004-05	334.9	4.0
FY 2007-08	483.4	3.4
FY 2008-09	417.0	2.7
FY 2009-10	736.4	4.5

Source: (Mohiuddin, 2015)

**Table 2: Raw Jute Item**

Item	FY1973-1981	FY1981-1991	FY1991-2001	FY2001-2010
Raw Jute	1.0	-1.2	-1.2	-0.4
Jute Goods	9.7	-1.5	-1.4	0.7
Total Raw Jute & Jute Goods	6.8	-1.4	-1.4	0.4
Total Export from Bangladesh	10.3	9.9	13.6	10.9

Source: (Mohiuddin, 2015)

**Marketing and Promotional Activity of Jute**

The maximum critical constraint that changed into identified from the qualitative survey is lack of advertising and promotional activities for jute, BJRC is specially pessimistic in this regard. They have repeatedly questioned the lack of government initiative to use their technology in commercial purpose and opine that if government makes a policy, for example, to use jute blanket in all the defense sectors and hospitals, it will create enormous market locally and thus would help to run the jute mills smoothly. JDPC is created from the government to improve the sociological condition those who are related directly and indirectly to this sector by diversification and increased used of jute products. JDPC is involved in implementing projects on small scale entrepreneurship development in diversified jute products. They also arrange training in skill development and design workshop, participate in International Trade Fair, organize seminar, createlink with local and international universities, research organizations and industries. International Jute Study Group (IJSJG) is making strong efforts for initiating various projects for developing required technologies and quality of products for the overall growth of jute sector. It has been also found that some of the small scale entrepreneurs can able to meet demand of the buyers due to capacity and inadequacy of fund.



## Jute Market Development and Promotion

- The environmental friendliness of jute can only be used when there are no doubts whatsoever about the validity of these arguments. Only then the „natural“ character of jute goods may be used for generic market promotion.
- A Marketing Intelligence System (MIS) has to be developed. A customer orientated MIS should be able to provide governments, international organizations as well as individual companies, both in the producer as well as in the consumer countries, with relevant information. The MIS should be preceded by a feasibility-study on the various possibilities for implementation.
- A jute bulletin should, in conjunction with the MIS, be used as a vehicle for extension of present relations and the establishment of new (semi commercial) relations.
- Political lobby is desirable regarding the position of jute goods in light on new regulations on reduction of packaging waste materials and the allowable environmental impact of durable consumer goods.

### Challenges of Jute Marketing

- The cultivable land is decreasing due to increase of population day by day.
- To meet the demand farmers motivate to take up high earning agricultural activities resulting in decreased jute production.
- Water is necessary for jute retting. Scarcity of water will threaten jute retting in future resulting in motivate farmers to take up other agricultural activities.
- Other countries have successfully established a favorable image of their jute diversified products in the international market.
- Indian, Chinese and Vietnamese jute diversified goods are more popular because of their product range and depth, colors, designs and quality.
- Extensive governmental support in the jute sector by neighboring countries made their jute products more competitive in international markets.(31)

### Eco-efficient innovation in jute fiber:

In step with the Oslo manual (OECD, 2005, p 55). Innovation "is the implementation of a product (or carrier) new or substantially improved, or a technique, or a brand new advertising technique, or a brand new organizational approach in practice business, business enterprise, place of job or outside members of the family."The manual considers R&D "constructing and checking out a prototype in case your predominant aim is to make in addition improvements. A prototype is an unique model (or a test case) that consists of all the technical capabilities and capabilities the new product or system "(OECD, 2005, p. 106). Innovation isn't always limited to hi-tech sectors, it's miles equitably allotted among unique sectors do no longer prevent conventional industries to be revolutionary (Reddy, January 2017).

The culture of jute fibres in the Amazonas: The Amazon has, throughout its history, economic cycles that motivated the activities to be carried out by its inhabitants on their land, as well as a decisive influence on the development of the urban area, which would later be the principal cities of the region.(32) The importance of improving the economy of the region is taken as needed from the Amazon Provincial, when the authorities tried to diversify agricultural production, with projects that predicted plantations of cocoa, coffee, tobacco, guarana, gathering nuts and rubber tree latex. (33)

Many of these crops have had their expansion by wetlands (wet land, being close to the banks of the Amazon River), leading to the settlement in these areas considered very fertile. The floodplain lands are limited by land and by the Amazon River and rises to undergo cyclical River, contains large amounts of calcium and phosphate rich nutrients utilized in plantations.

As Bentes&Rolim (2005) on the history of Amazon, extractive activities were intensified so that the picture of the economy in a situation of low due to the decline of rubber, were reversed. However, such activities, considered extremely violent and predatory against the environment have not been able to sustainably boost the region's economy. Therefore, searching for alternatives to diversify agricultural production, the government gives Amazon a portion of land equivalent to one million hectares for the Japanese settlers, immigrants since mid-1929 in the Brazilian lands.

For some time, the production of jute was devalued by the low price of the product and the precarious and unsanitary conditions during some phases of processing the fibres, but this situation was gradually being reversed

through the support and investment in this type of activity, with increases in production, credit, technical assistance, support for processing and marketing of production. This initiative encourages juticultores (producers of jute), valuing the activity that stands out among the rural and considering the economic, social as a crucial factor for the environmental balance of the Amazon.(16)

### Methodology:

This study, in terms of approach to your problem, characterized as a qualitative research by considering the existence of a dynamic relationship between the real world and the subject, ie an inseparable link between the objective world and the subjectivity of the subject than can be translated into numbers (Silva & Menzes, 2005). Qualitative research in interpretative analysis of the data, statements and speeches to get search data nonlinear, as these have a greater assurance of real and these catch the intensity of the phenomenon (Demo 2009). Regarding goals, this work is characterized as a descriptive, since aims to describe the characteristics of a given population or phenomenon or establishing relationships between variables, where the company Omega.

The approach used was the case study, because it seeks to examine contemporary events where one cannot manipulate the behavior of the subjects having character generalizable theoretical prepositions. The method used is the generalization "analytical generalization" using a theory developed as a model and comparing it to the results of the case study. The case study allows (Gil, 2002):

- i. Explore real life situations whose boundaries are not clearly defined;
- ii. Preserve the unitary character of the studied object;
- iii. Describe the situation of the context in which specific research is being done;
- iv. Develop hypotheses or theories, and
- v. Causal variables explain a certain phenomenon in very complex situations that do not allow the use of surveys and experiments.

Innovation process in Omega enterprise: This section will be analyzed each of the criteria that were evaluated in the study, showing the main activities in the organization. For a better understanding of the innovation process in the company studied the criteria will be presented as follows:

- (1) The context of eco-efficient innovation,
- (2) Innovation, and (3) sources of innovations and future prospects.

Context of innovation eco-efficient: The Omega is a small industrial enterprise specializing in paper recycling and manufacturing of screens vegetable fibres, including jute, discovered and developed from scientific research and innovation carried out with the support and partnership with recognized entities in the State of Amazonas among them: Amazonas Sustainable Foundation (FAS); Association of Collectors of Recyclable Amazon (Eco - Recycle); Foundation Benefit New Hope (FUBENE); group of Glory; Sustainable Development Agency Amazon (ADS); Development Secretary sustainable Government of the State of Amazonas (SDS), Institute of Environmental Research of the Amazon

(IPAAM); Incubation Center and Business Development (CIDE), among others.

The company, based in Manaus has an infrastructure that is located in the following areas:

- i. CIDE - for research, development and prototyping;
- ii. Micro and Small Enterprises District (DIMPE) - for recycling, making your entire product line and expansion of new product lines. The enterprise exists since 2007 by personnel with experience of more than fifteen years in the recycling of paper, cardboard and fibre. With little time in entering the market already has a strong and broad participation in growth businesses that have activities like recycling and already has a great demand in the area of research. The company Omega seeks innovation through processing of jute fibres in products that are environmentally friendly and eco-efficient. The Omega enterprise was encouraged by customers to innovate with the use of jute fibres, which today is its flagship product. Actually, Omega uses the fibres of jute and malva as basic raw material, which offer the possibility of making a variety of products, where they stand out among the green bags (figure )

Innovations: The manufacture of jute fibre passes through a easy technique in which the reduce is made while the jute is blooming and fruiting earlier than, after passing the "debranching" and cleaning rods, shredding and removal

of bark, fibres drying on clotheslines and then certain and despatched to local baling. Consequently, the process for obtaining the jute fibre consists of:

- i. Shredding: After harvesting the beams with the rods remain immersed in water for 15 to 20 days on the same river or stream;
- ii. After being washed desfibrarem and drying occurs, jute drying is extended into shafts for two or three days;
- iii. Then there is storage where the fibres are stored, and later sold in bales;
- iv. Wiring originates in the spinning process that smoothes the fibre softener;
- v. In that carding "combs" and untangles jute the result is thinner wires. Organizing the wires rolls by a machine called dowel.
- vi. Finally, the rollers to follow the fiadeiras where the fibres are twisted and twisted giving rise to yarns, ropes and cables of various thicknesses.

The cultivation of jute is renewable on annual cycles and self-sustaining, since there is no need for the use of fertilizers, deforestation and burning of new land for planting. The wetlands are lands suitable for growing jute, since they are rich in humus from the river itself in the rainy season.(34)

Innovation sources and future prospect: Sources for the modern and destiny innovations of the business enterprise based totally on information derived from development interest with the supplier of jute fibres, the expert recommendation and cooperation with the Technological Centre (FUCAPI); studies in specialised courses which includes magazines on micro and small corporations, survey with the customer, further to partnering with entities identified and energetic in the country of Amazonas, already noted earlier in this chapter complement the facts assets. The Omega own investment objectives for the coming years as improve product quality by performing increments as: embroidery, paints and other attractions for the bags of jute, planning and research innovation of other products using the same material and continue with the hand labor of the inmates of Company. The company has encountered bureaucratic difficulties in obtaining financing from banks because it is a regional company, but managed by the funding PAPPE (Program to support research on small business). Despite these difficulties with funding, the company has growth expectations for the Amazon region since the start of this disclosure of your innovative product is gaining market acceptance. In summary, Omega excels in quality and the factors that sustains the competitiveness of their products as quality of raw material, labor, labor, constant innovations in its products, marketing strategies, financing costs and ability quick service requests. The commercialization of its products is carried by custom and own marketing.

Final consideration: The objective of this study was to make an analysis of the innovation process conducted by the company OMEGA, to identify: the economic and market factors that influenced the decision and the search for innovation, use of technology based experiences accumulated knowledge sources and procedures for acquiring them; defining the characteristics of the innovator product; difficulties encountered by the company to innovate, and the impact of innovation on the market, the partnerships established, and the results achieved with innovation.

### **Jute, Kenaf & Allied fibers industry:**

The growing ecological, economical, and environmental awareness has driven efforts for the development of new advance materials for various applications. The natural fiber-reinforced polymer composites are used for various applications including automotive components, consumer goods, sporting goods, and in the marine and oil industries. (35) Jute is the common name given to the fiber extracted from the stems of plants belonging to the genus *Corchorus*, family Tiliaceae. Where kenaf is the name given to a similar fiber obtained from the stems of plants belonging to the genus *Hibiscus*, family malvaceae, especially the species *H. cannabinus* L. Only two species of *Corchorus*, namely *C. capsularis* L. and *C. olitorius* L., are grown commercially, although around 40 wild species are known, Whereas others species of *Hibiscus*, particularly *H. Sabdariffa* L. are sometimes also marketed as kenaf. In Jute and Allied Fibers are produced in many countries. India, Bangladesh, China, Thailand, Myanmar & Nepal are the major producing countries.(36) Together they produce about 95% of the global production of JAF. India and Bangladesh produce mostly jute, China produces mostly kenaf while Thailand produces kenaf and roselle. In Nepal, Jute is grown in about 11000 ha in Tarai belt of Eastern part of Nepal. In Thailand JAF are cultivated in about 20,000 ha. In India Jute and Kenaf are grown in about 1,000,000 hectares. Jute is a bast fibre crop along with a family of few other natural fibres together generally called as Jute & Allied Fibre Crops (JAF). They mainly occur in the equatorial, the tropical and the sub-tropical zones.(37)

Global Competitiveness.

Indonesia: We can see that there is 70.37 % decrease in the production, and the market share has decreased by 99.72 %.

Myanmar: Production of raw jute in 2010: 3,800 T by volume and USD 1,076,000 by value.

Nepal: Production of raw jute in 2010: Intl. \$5,937,000 by value and 20,965 MT in volume, Yield (fibre): 1.6 MT/ha

Bangladesh: Production of raw jute: 1.5 million MT by volume in 10-11 and USD261 million by value in 09-10. Share of raw jute production in agriculture in 2010: 1.401% by value. The production has increased by 41.03 % and market share increased by 42.35%.

India: Share of jute production in total agriculture in 09-10: 0.183% by value and 1.6% by volume. The production value has increased from 1991 to 2011 13.88%, with an increase in the market share of 14.5 %. (37)

Comodia: The data availability of this region is out of the scope of this paper, but is assured that the region is not meant to produce JAF.(38)

China: Production of raw jute in 2010: 40 thousand MT (volume) and USD 11 million (value).

The production index has decreased by a massive 84.79 % and market share by 86.8 %.

Sudan: Production of raw jute in 2010: Intl \$906,000 by value and 3,200 MT by volume. The far east production data has decreased by 0.8%.

Thailand: Production of raw jute in 2010: 2,300 MT by volume and Intl. \$651,000 by value, Yield (fibre): 1.6 MT/ha.

Vietnam: Production of raw jute in 2010: 12,448 MT by volume and Int. \$3,525,000 by value. The global trend of competition over the years for detecting any change in the degree of competition in global JAF production, we would like to plot the values of  $(1-\sqrt{\sum Mi^2})$  over the years. In that case, we propose to go for linear regression analysis. We shall consider the hypothesis  $H_0$  as null hypothesis that there is no change in the degree of global competition in JAF production over the years against  $H_a$  as alternative hypothesis that there is an increase or decrease in the same over the years.

Let the linear trend equation of Global Competitiveness of JAF producing countries be represented by,

$$G_t = a + b t + e_t,$$

Where  $G_t$  is the global competitiveness during the period  $t$ ,  $a$  and  $b$  are the regression parameters,  $t$  is the time variable, and  $e_t$  is the error term. Using the least square math done can estimate  $a$  and  $b$  using timeseries data using IBM SPSS.

The corresponding analysis is presented below:

GCI

Linear

**Table 3: Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.879	.772	.760	.021

**Table 4: ANOVA**

	Sum of square	df	Mean square	F	sig
Regression	.029	1	.029	64.497	.000
Residual	.009	19	.000		
Total	.037	20			

By this things we express that the production of JAF in over the world is decreasing over the years, this indicates the treats for plantations. Among the top ten producing countries of global JAF production the market shares of only Bangladeshis favorable compared to other nine countries. India is one of those countries whose market share is steadily increasing or fluctuating. The performance of India is also is highest in 2002 and not up to the mark in the years 2005. The Government is committed to providing a conducive environment to enable the jute and jute textile sector to realize its full potential, to achieve global excellence, and to fulfill its obligations to the different sections of society. It is now the responsibility of government and private players to join hands and establish institutions to help JAF industry grow. Long gestation period, high labour costs and, climatic changes critically affecting demand-supply imbalances, have led to these causes. The problem just does not end here, surging competition from countries like Bangladesh, Sudan, Thailand & Uzbekistan is also on alltime high, which has further weakened Indian exports. The steps government is taking are tremendously essential for the production of JAF like establishing Research facilities, deploying modern technology for the industry, empowering public sector enterprises, marketing the value and profitability of the product. (37)

### The Environmental and Economic Prospects of Jute:

Jute is the second most natural and biodegradable fiber. Jute fiber is an excellent alternative when strength, thermal conductivity, and cost are major concerns. In addition, jute fibers are eco-friendly. Nowadays, jute fiber-reinforced polymer composites have become an important area of research. Typically, jute fiber is used for basic and low-end textile products.(39) Apart from energy, environmental protection is one of the top problems facing the current generation. Novel strategies are required now more than ever to either protect the environment or generate products, which are not harmful to the environment. Natural fibers have received a lot of attention as possible alternative replacement for synthetic fibers.(40) If the properties of jute could be modified in favor of high value and technical textiles, not only the cost but also the environment would benefit a great deal. Jute is composed of cellulose (45–71.5%), hemicelluloses (13.6–21%), and lignin (12–26%). Lignin, due to the many aromatic rings inside of it, is responsible for mechanical support. Any material besides cellulose that hampers the smoothness, pliability, and fineness of jute is denoted as gum.(41) Air purification: Jute plants inhale carbon dioxide and exhale oxygen that results air purification. On average, 7302 thousand tonnes CO<sub>2</sub> are absorbed and in return 5309 thousand tonnes O<sub>2</sub> are omitted by jute plants (Islam and Ahmed, 2012, p.26). Jute composite is applied in the automobile sector and vehicles. Using these composites can prevent lots of CO<sub>2</sub> emissions in the environment due to saving average 21% fuel consumption. Fig. 1 shows the effect of jute cultivation in the environment:

Geo-fabric is a popular time period in the engineering discipline that is used to save panorama erosion making sure low value.(42) But, it's far degradable while final the artificial inside the soil for long term. It is used in the river embankment, dam and also in the road construction (Islam and Ahmed, 2012, p. 27). Jute geotextile (JGT) is considered as environment friendly which prevent soil loss though this allows seepage. JGT in the form of filter cloth is used behind the structural blockage made of concrete, stone or gabions. The reinforcement fabrics help to protect vegetation being used to strengthen soil and blocks. Therefore, JGT contributes a lot in protecting slopes of the embankment and hills and erosion of river banks, canals and other waterways.(43)

Historically nursery bags are product of polyethylene because of its water leaking evidence firstclass and rate reasonability. But, when planting the sapling, the polyethylene luggage are eliminated as these are not biodegradable. Alternatively, jute made nursery luggage are biodegradable, needs not be eliminated on the time of plantation and now not harmful for the soil (Islam, 2009).

The researcher visualizes the monetary prospect of jute. Jute plant derives from a relative of hemp plant. However, jute is loose from narcotic elements and odour.(44) Jute is capable of blend with other artificial and herbal fibres. Jute can grab special kinds of dyes together with herbal, vat, sulfur, pigment, reactive, which belong to cellulosic dye classes. With the expanded call for of natural comfort fibres, the call for for blended jute and cotton fibre will increase daily. With the increased demand of natural comfort fibres, the demand for blended jute and cotton fibre will increase day by day. Fabrics are produced from jute and cotton yarns that can reduce the cost of wet processing treatments.(45) It is possible to blend jute with wool. For blending with wool, caustic soda is used to improve the pliability, softness and appearance. To add the characteristics of flame resistance in jute, liquid ammonia is used to treat with flame proofing agents. Along blending with wool, new concept, technology and techniques are attempted to blend jute with polyester and acrylic for manufacturing diversified yarns. These diversified jute blended yarns are used to produce value added products such as home textiles, decorative fabrics, geo-textiles, carpet backing cloth and so on. These end fabrics from diversified jute blended yarns poses different

qualities, comfort and cost benefits. Currently, Bangladesh earns around \$600 from exporting one ton raw jute. This export value can be increased by 10 times with exporting these value-added diversified jute products. It is estimated that subject to quality and types, by exporting one ton of these diversified products Bangladesh can earn \$3,000-\$10,000. Being optimistic about increased usage of jute, he mentioned that with the implementation of the mandatory packaging act for using jute bags contribute in increasing production of more than 1 billion jute sacks. Export base jute goods have been expanded by local entrepreneurs from 135 in year 2016-17 to 240 in year 2017-18. It is estimated that the market of jute bag will increase to \$2.6 billion and the market of home textiles combining clothes and fabrics will reach to \$130 billion by 2021. With value addition and new application of jute has the potential and prospect to play the role of next key driver in economy, while in Bangladesh, garments are the main key driver now. The country needs a new growth driver and it can be fulfilled by jute and jute goods. However, he reiterated about the coordination between jute industry and textile industry. In Bangladesh, almost 0.5 million people are directly engaged in the jute sector Bangladesh. However, there is shortage of skilled labourforce. Bangladesh is now working for the fourth Industrial Revolution. Therefore, the technology of fourth Industrial Revolution should be used to develop jute sector. Like the mandatory packaging act, he thinks formulating a Jute Pulp and Paper Act can encourage the paper industry to make paper from jute pulp which will save wood. Therefore, market analysis, branding of jute products internationally, implementation of investment friendly policy, skill development of the workers, setting specialized jute mills are some important factors to explore economic opportunities of jute.

From the findings of literature review and interview, an analysis has been developed in this section on the basis of research questions. Also, the theoretical framework chosen for the research has been considered to relate with the findings of the research. If we divide the findings according to the research questions, there would be four parts. One is the environmental benefits of jute, second one is prospect of new application and value-added jute products, third one is economic prospects of jute in the perspective of Bangladesh and last one is social impact to fulfil the holistic approach of sustainable development. The findings of the benefits of jute are quite adequate to prove jute is environment friendly which is evident from the literatures and the interviews. There are several environmental benefits of jute and also it was attempted to collect the diversified environmental benefits from the sources and not to repeat the same information. Table shows some environmental benefits of jute from different sources:

**Table 5: environmental benefits of jute from different sources**

Environmental Benefits	Sources
Completely biodegradable, mixes with soil within two-three months	(Islam and Ahmed, 2012)
Purify air, absorb CO2 and emit O2	(46)
Preserve forest as an alternative for wood for providing fuel, food, paper pulp, furniture. Used as popular vegetables.	(46)
Increase fertility of land	(Islam and Ahmed, 2012), (Abdullah, 2014), (FAO, 2012)
Biologically efficient, grows very fast, grow in crop rotation so does not occupy land for long time and provide fertilizers for next crops	(Islam and Ahmed, 2012), (Islam, 2013) Provides bio fuel (Islam and Ahmed, 2012), (Abdullah, 2014)
Provides bio fuel	(Islam and Ahmed, 2012), (Abdullah, 2014)

Environmental benefits of jute (47)

Therefore, the first research question is justified with lots of data from literatures and answers from the interviewees. Regarding second research question, we have seen different new application of jute with enhanced value. In Bangladesh, along with the traditional usage, the nontraditional diversified products of jute are getting popular. From the interview of the Juteborg it was found how high tech is used in the automotive sector, textile sector and especially in the infrastructure sector to add value in jute.(48)

The invention of ‘jutin’ also has great impact in the infrastructure while geo jute has already been used for a long time and benefitting environment and economy.

**Table 6: Some new applications of jute are summarized in**

New application with added value outside traditional usage	Source
Geo Jute used in the engineering field to prevent landscape erosion. Used in river embankment, dam road construction	(Islam and Ahmed, 2012), (Ghosh et al., 2014)
Jutin in building housing infra structure	(Ferdous and Hossain, 2017), Interview-Dr. Mubarak
Composites in the automotive sector, both in indoor panel and body of the vehicle	(Ferdous and Hossain, 2017), Interview Juteborg
Jute plastic blended boat as a great substitute of wooden boat	(Islam, 2009)
Biodegradable plastic bag from jute cellulose	(Pavel and Supinit, 2017)

Source: (47)

**Conclusion:**

Jute manufacturing sector of Bangladesh is passing through a critical juncture in the course of its long track record of development. The sector faced both opportunities and challenges. The sector has inherent weaknesses but it has also demonstrated strengths. Bangladesh can claim as a country of jute as everywhere in this country jute and allied fibers can be grown. These diversified products are biodegradable, photo biodegradable, non-toxic, non-plastic, acidic, hydrophilic, high absorption of UV capacity & moisture, eco-friendly and easy disposability. These products not only preserve environment but also help to protect environment from degradation. Typically jute marketing involves multiple intermediary levels. In Bangladesh, jute marketing process remains a traditional trend that is why it needs to develop jute product marketing process. Global marketing of jute is increasing day by day, so it should also develop jute marketing in accordance with global marketing process. A huge potential market of these products is created in the developed countries. To convert this potential market into real market, comprehensive market promotional activity is highly needed. Long gestation period, high labour costs and, climatic changes critically affecting demand-supply imbalances, have led to these causes. The problem just does not end here, surging competition from countries like Bangladesh, Sudan, Thailand & Uzbekistan is also on all time high, which has further weakened Indian exports. The steps government is taking are tremendously essential for the production of JAF like establishing Research facilities, deploying modern technology for the industry, empowering public sector enterprises, marketing the value and profitability of the product. So, on the whole it is a great threat to Indian JAF industry as Bangladesh is doing well and degree of competition is decreasing over the years. The Government is committed to providing a conducive environment to enable the Indian jute and jute textile sector to realize its full potential, to achieve global excellence, and to fulfill its obligations to the different sections of society. Important factors controlling the production of quality fiber are: (a) proper cultivation practices in good quality soil, (b) controlled retting process, and (c) genetic make-up of jute cultivars. Soil quality is intimately connected to the quality and quantity of crop produced. (49) It is now the responsibility of government and private players to join hands and establish institutions to help JAF industry grow. From the report findings, the social factors are attempted to find out and the relations between the economic, environmental and social benefits are analysed in the discussion with the light of ecological economic approach framework. From the findings of literature review and interview findings, it is found that: a) jute has a great contribution in the environment, b) jute poses good prospects in economy of Bangladesh with the traditional products and also with the new applications and c) jute connects both environmental and economic factors with the social part of sustainability in Bangladesh. Therefore, in this paper it was depicted how jute can be linked up in the sustainability factors and contribute in the sustainable development. Bangladesh has sufficient knowledge in exporting jute & readymade garments all over the world for a long time especially in European Union where she gets duty free export opportunity mostly in all products and we suggest focusing EU to get cost leadership in known market at first phase. We also suggest concentrating on Asian market especially in India and China though this market will be competitive in near future due to availability of

resources in corn starch production where forecasted that China will be a leader in Asian as well as world market in producing corn starch. Most of the currently planned volume production facilities are being implemented in Thailand, India and China, and over 1/3 quarters of bio-plastics will be produced in Asia by 2022. Branding and marketing through international media and more participation in international trade fair demonstrate the benefits and usefulness. Concrete with jute fiber is an aspiring step towards the sustainable development mainly in Bangladesh where the jute is abundantly cultivated.(50)

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