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Jute and Sustainable Development- A Study of Its Socio-Economic and Environmental Prospects

Ruchita Chakraborty[1]

Abstract

Jute is a natural plant fibre that has been traditionally used as a packaging textile, but over the past decades, it has been rapidly replaced with synthetic substitutes. However, in the wake of the global consciousness regarding environmental crisis and sustainable development, the rejuvenation of the industry seems to answer a number of calls. On one hand, its usage in the packaging industry can reduce plastic wastes considerably. Again, in the backdrop of the environmental international instruments in recent years, jute can be a viable alternative to achieve the goals towards maintaining ecological balance. On the other hand, the industry being a source of income for more than 40 lakh families, its revival is expected to benefit the nation socio-economically as well. In this context this paper explores the usage of the fibre as an environmental friendly alternative to various widely used synthetic commodities. It also locates the different environmental standards set by the world community that can be achieved with its increased usage. Further, in the context of the two important recent instruments- the Sustainable Development Goals and the Paris Climate Pact, this paper examines the various dimensions that the golden fibre can effectively answer.

Keywords *– Jute, Sustainable Development, Environment, Socio-economic benefits*

I. Introduction

Jute is a natural fibre mostly cultivated in the South-Asian parts of the world. It is a naturally grown fibre crop which is environment friendly and bio-degradable. It is considered as the second most important vegetable fibre after cotton. The jute fibre is characterised with properties of high tensile strength, it has low extensibility, and is a breathable fabric. It is extensively used as packaging materials. Other applications of jute include its usage in the textiles, construction, and agricultural sectors. It is used in developing high quality industrial yarn, fabric, net, and sacks. Jute has also found its usage in the

[1]Research Scholar, Department of Law, University of North Bengal and Assistant Professor, Campus Law Centre, University of Delhi

automobile sector with increased research and innovation.[2] The fibre is often referred as the golden fibre, a name attributed to it due to the golden and silky shine of the fibre.

The cultivation of jute is extensively done in India and Bangladesh. More than 99 percent of the world jute cultivation is located in these two countries.[3] Other countries that produce jute are Myanmar, Thailand, Nepal and Uzbekistan. The crop is cultivated as a commercial crop which grows in hot and humid climate. India is a major cultivator of jute. Most of the jute cultivation in India is concentrated in the Ganga delta region. Jute being a rain fed crop, it needs adequate rainfall. States like West Bengal, Bihar, Orissa, Assam, Tripura, Meghalaya, Andhra Pradesh and certain parts of South India cultivates jute.

The jute fibre being a natural plant fibre, all jute products are bio-degradable and environment friendly. With the rising levels of pollution due to excessive emission of greenhouse gases, and intensive use of petrochemical fossil fuel product like ethylene and propylene (plastics), the world has been witnessing large-scale ecological imbalance during the past decades. In this context this article aims to study the prospects of the jute sector as a viable alternative to synthetic fibres and the importance of shifting the global focus towards natural fibres. In the backdrop of the various environmental concerns and international steps taken in the past decade to reduce plastic wastes, this paper aims place jute and jute goods as a commercial product that can be the recourse to mitigate these issues.

II. Sustainable Development

As a concept of general understanding, sustainable development refers to the idea that while the human societies strive to excel in economic activities and meet their needs by adopting means that do not compromise the ability of the future generations to meet their needs. In other words it refers to responsible consumption and production patterns that ensure to maintain the ecological balance. The concept of sustainable development was extensively deliberated in the United Nations Conference on Environment and Development (UNCED),

[2]C.Alves, et al., "Ecodesign of Automotive Components making use of Natural Jute Fibre Composites", 18(4) *Journal of Cleaner Production*313-327 (March 2010)

[3] Food and Agricultural Organisation of the United Nations, "Statistical Bulletin 2018-Jute, kenaf, sisal, abaca, coir and allied fibres", (2018)

also known as the Rio de Janeiro Earth Summit, held in Rio de Janeiro from 3 to 14 June in 1992[4]. The most popular understanding of the concept was introduced and defined by the Brundtland Commission[5] in 1987 is *development that meets the needs of the present without compromising the ability of future generations to meet their own needs*. In order to ensure sustainable development it is essential that economic, social and environmental development go hand in hand. Implementing sustainable development would essentially require us to trace the origins and integrate economic and ecological arrangements.

III. Jute and Sustainable Development

The fact that environmental degradation has turned to be a glaring issue for the word does not need to be exaggerated. The requirement to protect and reinstate the lost ecological balance is the need of the world currently. In this new awake, there have been a number of important international instruments that were adopted by the world in the past decade to minimise the harm caused to the environment due to the various economic activities that the different nations undertake. Sustainable Development Goals, 2015 and the Paris Agreement on Climate, 2015 are the major developments in this aspect during the past few years. In this context, an attempt has been made to locate the usage of jute and jute products in alignment with the objectives of these international commitments. Products that are made of jute and other natural fibres can be intrinsically interlinked with sustainable development. If such products are promoted and are used through planning and innovation, they can effectively act as instruments in reviving the misplaced ecological balance.

In the following paragraphs, this contention has been analysed and examined in the perspective of the Sustainable Development Goals and the Paris Climate Agreement.

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[4] It was attended by more than loo heads of state, 170 governments, 2,400 representatives from NGOS, and nearly io,ooo journalist. It is also considered as a building block of environmental actions in the world

[5] The Brundtland Commission, also referred as the World Commission on Environment and Development (WCED), operated from 1984 to 1987 under the auspices of the UNO. In the United Nations, it is also called the UN Special Commission on the Environment. It presented the report- Our Common Future where the principle of sustainable development was defined and is a milestone in diverting the world's attention towards the concept.

IV. Sustainable Development Goals, 2015 and Jute

The Sustainable Development Goals (SDGs) were adopted by the United Nations in 2015 which succeeded the Millennium Development Goals. Under the SDGs, 17 goals have been iterated that the world community aims to achieve within 2030. These goals promulgate certain economic, social and environmental standards that are targeted to be established across the world through state level actions and mutual cooperation among states. One of the important considerations for reducing the harm caused to the environment has been recognised to be the extensive usage of synthetics in various spheres of our daily lives. While the dangers of synthetics and the potential hazards it poses to the environment are all well known, reducing its usage has been grossly unsuccessful. The main reasons for failing to replace synthetics has been it's abundance, easy availability and most essentially its affordable pricing which greatly appeals to price sensitive consumers. The commonly used synthetic variants which flood the markets with a variety of products are Polypropylene (also referred as pp) and Polyethylene.

In fact, one of the major reasons behind the downfall of the jute industry since the mid-sixties has been the advent of polypropylene. As these light weight, low-priced, abundantly available goods began to adorn the markets, the demand of jute products began to fall sharply both in the domestic and international domains.

Jute has primarily been used as a packing material, as such, among all synthetic products, the most important competitor that emerged for jute in the packaging market was polypropylene. Although jute and pp are not perfect substitutes, it's low cost and abundance rapidly chewed up the share of the jute market. While The jute fabric is a more breathable fibre with higher resistance to solar degradation and less chances of slipping and tearing, on the other hand, pp is light weight and water resistant. But the major basis of competition between the two has been the price factor.[6] However, despite its abundance and affordability, the dangers of increased usage of synthetics are well known. In fact, the world is witnessing its adverse consequences in terms of increased, unrecyclable, and

[6]Food and Agricultural Organisation, *Jute, kenaf and allied fibres*, available at: fao.org/3/y5143e/y5143e1g.htm, (last visited on: July 1, 2020)

polluting heaps of plastics which is threatening the bio-diversity on land, water, and effecting human life, in fact the entire ecology.

In this context, redirecting the world view back to the golden fibre can ensure the minimisation of pollutants and carbon footprints. If strategically promoted and marketed, jute and jute products can prove to be instrumental in achieving some of the SDGs to a great extent. These are discussed in the following paragraphs.

i. Goal 1 – Poverty Alienation

Goal 1 of the SDGs talks about *poverty alienation*. Poverty and hunger has been a persisting and critical challenge before the world. In this regard, it is crucial to note that the natural fibre industries like jute, provide employments and is a source of income for numerous people all across the world. This fact is more apt in the context of developing nations. On one hand there are considerable number of families which are involved in jute cultivation (In India it is estimated to provide livelihood to about 40 lakh families) and again, it provides employment to huge number of people in this production units and trading activities (estimated to be about 2.5 lakh employees in jute mills 5 lakh traders in India).[7] Promoting jute products thus can create an eco-system which is sustainable both for the environment as well as for a large number of people. Hence, promoting jute products and other natural fibres, will ensure sustainable development and considerably help in poverty alienation.

ii. Goal 3 – Good Health and Well-Being

Goal 3 of the SDGs aims towards *Good Health and Well-being*. Good health and well-being are premised on sustaining life in an eco-system where pollution is minimum and people live in harmony with the nature. Life in the present times is subjected to numerous aggravations in terms of pollution of water, soil, air, noise, etc. In this context again, natural fibres like jute are viable options in

[7]D. K. Kundu, "Potentials of Jute in Sustainable Family Farming for Livelihood Security in India and Recent Developments in Jute Production Technologies" in B. Mandal et al. (eds.), *Family Farming: Challenges and Opportunities*209-217(Renu Publishers, New Delhi, 2016)

minimising the existing pollution levels, not only in terms of manufacturing goods the product life cycle of which are bio-degradable (cradle to grave), but the crops as well benefit in restoring the lost ecological balance. (It has been seen that jute plants absorb huge amounts of carbon dioxide from the air. In approximately 100- 120 days of jute cultivation, per hectare plantation can absorb almost 15 MT of CO_2 from the air and release about 11 MT of Oxygen.[8])

iii. Goal 9- Industry, Innovation and Infrastructure

Again *Goal 9* which enumerates *Industry, Innovation and Infrastructure* targets inter alia to reduce the emission of greenhouse gases during manufacturing process. It aims to bring forth innovation in developing goods, production process, raw materials, transportations etc., that would be more environment friendly. In order to objectively transition towards such methods the usage of bio-based products need to be increased and industrial wastes must be treated before discharging. In this context, in consonance of the Kyoto Protocol[9], it is crucial to minimise the emission of harmful greenhouse gasses and imbibe carbon dioxide neutral methods. Such implementations can alter the focus towards the natural fibre markets. Various industries use fossil fuels or mineral resources as raw materials, which are essentially non-renewable resources. Natural fibres on the other hand, are renewable and leave almost no carbon footprint in the entire life cycle of its products. One such natural fibre is jute which can be used for multiple purposes thus reducing the plastic usage. It is however important to note that shifting the trajectories entirely would demand a fundamental transformation of the world's attitude. It is only possible to create a sustainable global economy when the natural renewable resources are exploited commercially. Crops like jute and other natural fibres, are renewable resources since the crops can be planted regularly and they also promote the natural bio-diversity. In this backdrop, research and development for innovative and

[8]Omar Faruk and Mohini Sain (eds.), *Biofibre Reinforcement in Composite Materials*, 4 (Woodhead Publishing, UK, 2015)

[9]The Kyoto Protocol was an agreement that signatory nations would cut emissions of greenhouse cases, including carbon dioxide, by an average of five percent below 1990 levels by 2012. Each country was assigned an individual target for cuts based on its share of global pollution. It was signed in Kyoto, Japan in 1997 and officially entered into force in 2005.

diversified application of natural fibres could prove to be an efficient way to achieve the goals. Increased consumption of natural fibres in the commercial sphere can be viable green options for achieving a greener planet.

iv. GOAL 12 – Responsible Consumption and Production

On similar lines, the implementation of *Goal 12* which lays down *Responsible Consumption and Production* may also be accelerated with the increased usage of natural fibres like jute. Goal 12 essentially aims to minimise over extraction of natural resources and instead divert consumptions in sustainable manner. When natural resources are randomly and irresponsibly mined, it results in rapid degradation that causes serious threats to the future generations. However, with increased usage of natural fibres and plant based resources, this threat may be considerably mitigated and mainstreaming sustainability practices can be easier. Usage of jute products could reduce the burden of fossil fuels and at the same time would also palliate the long term adversities of the synthetic goods disposal. The achievement of this goal essentially diverts the trajectory of policy approach towards a more sustainable consumption and production pattern. This in turn would demand a commitment from the industries to not just adopt sustainable practices in business and procurement processes but also downsize subsidies for fossil fuels, which predominantly reflect a mode of economy that is based on r take-make-dispose methods.[10] The process needs to integrate recycling in it's apparatus.

v. Goal 13- Climate Actions

This is a veryimportant goal which draws the world attention towards the rampant greenhouse emissions causing havoc in the environment. From global warming to rapid melting of Arctic Ice to depletion of the ozone layer, it creates numerous threats towards sustaining life on earth. Given this scenario, it is the

[10]Marisa Gabriel and María Lourdes Delgado Luque, "Sustainable Development Goal 12 and Its Relationship
with the Textile Industry" in Miguel Angel Gardetti and Subramanian Senthilkannan Muthu (eds.), *The UN Sustainable Development Goals for the Textile and Fashion Industry* 21-46(Springer Nature Singapore Pte Ltd., 2020)

call of the hour to evolve sustainable plans to address the accelerated impairment to the ecology. In this context again, minimising the usage of synthetic goods and instead diverting towards natural goods like jute can be an operational relief to the break the depleting trend of the environment.

vi. Goal 14 – Life in Water

Life in water happens to be one of the grossly effected areas due to excessive usage of synthetic goods. The need to protect marine bio-diversity need not be reiterated. The synthetic wastes, primarily single use plastics have proved to be a catastrophe for marine life.

The way it has engulfed the water bodies, it causes detrimental effects on all forms of marine life. It is a fact that till the 1950s most of the fishing gears and other fishing equipment were made of bio-degradable products such as jute or hemp ropes or paper bags. Even if they were disposed in the water bodies, they decomposed eventually which never caused any harm to the natural environment under the water. But with the proliferating use of plastic and synthetics, the newer equipment made from these materials when lost or abandoned into water bodies, they do not decompose and instead continue to be accumulated. They are often consumed by sea animals, cause blockage, and threatens the safety of different marine species, including marine mammals, sea birds, sea turtles, fish, crustaceans, and even corals[11]. Recently, in March 2019, a young whale was found dead in the shores of Philippines and scientists found that there were 88 pounds of plastic wastes in its stomach. It was starved to death since it was unable to eat anything due to the massive plastic wastes it had consumed that accumulated in its stomach. [12]

vii. Goal 15- Life on Land

Synthetic goods have been detrimental for the natural habitat on land as well. Under this Goal the SDG aims to protect the terrestrial ecosystem and

[11] National Oceanic and Atmospheric Administration Marine Debris Program,"Report on the Entanglement of Marine Species in Marine Debris with an Emphasis on Species in the United States" 2 (2014)

[12] Alejandra Borunda, This young whale died with 88 pounds of plastic in its stomach, The National Geography, (March 18, 2019)

biodiversity. Here again, using jute in various industries instead of synthetic alternatives can effectively minimise land degradation and restore vital ecosystems. For example, it has been scientifically proved that jute can be very good alternatives to synthetic geo textiles in the construction industry. Since they are bio degradable, they do not harm the flora and fauna of the region. Additionally with increased innovation in this aspect, the jute geo textile materials has also been extremely cost effective compared to synthetic materials[13].

Again, the polyethylene bags which are mainly singe use plastics have recently been a matter of significant concern in the context of their disposal. Often huge heaps of such polyethylene bags are seen on landfills which act as major impediments in the flourishing of the flora and fauna of the region[14]. In this context again, jute bags, in addition of being durable and useful for people, can significantly reduce unwarranted plastic wastes.

Further, jute pulp can also be used as raw material in the paper manufacturing industry which can reduce the usage of wood pulp which is extracted after cutting trees. While wood pulp is collected from trees which need years to grow and in case of replantation too, the immediate effect on the environment is heavy, jute being a crop annually grown, it is indeed a renewable resource that can save the environment[15].

Additionally, jute crops also safeguards photosynthetic CO_2 fixation in the air.[16] Further, it is also instrumental in preserving and restoring the ecological balance since its residues and by-products can be applied for multi-purpose utilities.

Realising the effectiveness of natural fibres like jute can help the world to redirect their track towards a balanced ecology. It would not be wrong to deduct

[13] Manoj P. Samuel, S. Senthilvel and Abraham C. Mathew, "Performance Evaluation of a Dual-Flow Recharge Filter for Improving Groundwater Quality" 86(7) *Water Environment Research* 615-625 (July 2014)

[14]Barnes, David K A et al.,"Accumulation and fragmentation of plastic debris in global environments." 36(1526) *Philosophical transactions of the Royal Society of London. Series B, Biological Sciences* 1985-1998 (2009)

[15]JorgMussig (ed.), *Industrial Application of Natural Fibres – Structure, Properties and Technical Applications*, 159 (Wiley Publications, United Kingdom, 2010)

[16] Omar Faruk and Mohini Sain (eds.), *Biofibre Reinforcement in Composite Materials*, 4 (Woodhead Publishing, UK, 2015)

that jute can be placed as an economically viable, socially beneficial and environmentally sustainable agricultural product. This fact has been recognized by the United Nations as well when the UN General Assembly adopted the resolution titled 'Natural Plant Fibres and Sustainable Development'[17] on 19th December 2019. The resolution was suggested by Bangladesh. It happens to be the first resolution that has surfaced the important consideration before the world forum that natural fibres like jute, abaca, coir, kenaf, sisal, hemp and ramie could act as prospective substitutes to the perilous products like plastics made from fossil fuels. The paradox lies in the fact, that the world is not well aware about the utility and benefits of these products. If research and development activities are introduced amply in respect of these sectors their commercial efficacies can be further explored. In this direction the said Resolution may be an eye opener for the world community which aims to stimulate the use of natural plant fibres in all relevant areas and in turn propagates for sustainable development. The Resolution also calls for relevant support in terms of political motives and economic considerations to organise these valuable resources for integrated development which can act as an impetus to catalyse measures of sustainable production processes.

V. Paris Climate Agreement

Another important milestone in the international screen of environmental awareness in recent times has been the Paris Climate Agreement adopted in December 2015. It was eventually enforced on November 4, 2016. The Agreement has been carved out of the 21st Conference of Parties (COP21) of the United Nations Framework Convention on Climate Change (UNFCCC). These Conferences began since 1995 which is an annual meeting of the world forum for discussing climate change issues. It began its journey initially with negotiating the Kyoto Protocols. The significance of the Paris Agreement lies in the fact that it is the first effort of the world to mitigate the problem of global warming by adopting unique measures of adherence. Under this agreement the world community has attempted to undertake region based action plans for individual nations regarding the steps that they can take to reduce the greenhouse gas emissions. Unlike the previous efforts that framed straight jacket

[17] UN General Assembly, Seventy Fourth Session, Agenda Item 24, Agricultural Development Food Security and Nutrition, Resolution on the Report of the Second Committee - A/74/386, (September 2019)

formulas which in most cases were never implemented by the states, under this Agreement, the nations are required to formulate their own individual plans. There have been arguments in the academic and industrial spheres over decades that setting universal goals for environmental plans cannot succeed since local needs and interests differ greatly. Hence the target of saving ecological balance must be generated at local levels. Further, sustainable development is also required to be redefined recurrently at local levels for these are essentially to be executed and practiced at regional levels.[18]

In most cases the nations based their targets on their economic and other situations at the domestic levels and sketch out their contribution in fighting the escalating problem of global warming. Instead of propagating for specific targets regarding emission reduction, Under Article 4 of the Agreement, it incorporates flexibility in asking the states to chalk out their contributions. The primary objective of the Agreement is to achieve the target of controlling the rising global warming within 2 Degrees Celsius above pre-industrial levels, and striving to limit it within 1.5 Degrees. The Agreement also promulgates for 'peaking of emissions'[19] and balance emissions by forming sinks of greenhouse gases. Another factor that marks the crucial role of the Agreement is the review mechanism incorporated. It is to be conducted every 5 years referred as Global Stocktake, which will analyse and evaluate the progress of each country separately against the commitments that they have set for themselves.

In this context, it is interesting to note that most of the sectors that emit greenhouse gasses use fossil fuels. Therefore, jute can be placed in this context as a viable raw material and input in the production chain that can contribute immensely in reducing carbon foot-print. Huge amount of plastic wastes that are generated in the packaging of mercantile items like food stuffs, appeals, foot ware, consumer durables, construction, etc., can be mitigated by using jute packaging materials instead. Further in industries like construction, paper, transportation sectors, replacing the existing synthetic inputs with jute may

[18] David G. Victor, "Recovering Sustainable Development", 85(1)*Foreign Affairs - Council on Foreign Relations* 91-103 (Jan- Feb2006)

[19]When a city or country have reduced its greenhouse gas emissions over a five-year period or longer and attain at least a 10 per cent reduction compared to its peak emissions, it is referred as peaking of emissions.

assist in bringing a momentum to the actions that are to be taken under the Agreement.

VI. Sustainable Development During Covid-19 and Jute

The outbreak of the pandemic COVID 19 has identified a number of reasons to reflect upon the course of actions that have been adopted over the time in treating the nature and the resources available. It has not only casted its grim shadow over physical and mental health of people across the world, but has also effected the social and economic life of the world. It is indeed a wake-up call for entire humanity to rectify on the irresponsible behaviour that has been persistently displayed in dealing with the bounties of nature. The lack of accountability that were created in the pretext of economic activities also need to be redirected . With the lockdown declared and the economic standstill, the country witnessed an instant variation in the weather conditions for the better, cleaning of the rivers, dwindling pollution levels in all cities, etc. This brings forth the crucial question about the status and seriousness with which the Sustainable Development Goals and the Paris Agreement are being adhered to.

It is high time that the trajectories of inclusive economic, social, and political policies based on a sustainable ecosystem are explored and take a back-foot from the continuous irresponsible consumption and economic patterns thereby developing more resilient societies. Sound environmental responses are the critical need of the hour. Amidst the rising COVID 19 concerns, the United Nations Environment Programme (UNEP) has iterated 4 sustainable goals out of the 17 that could stimulate a brisk global recovery. These are - Goal 13 - Climate Action; Goal 15 – Life on Earth; Goal 14- Life below Water; Goal 12 – Responsible consumption and production.[20]

At the onset the most essential prerequisite is to thwart the distressing rates of global warming. It is important to realise that the issue of global warming is beyond the reach of any science and technology, nor can it be fixed with any amount of funds. Hence, a reasonable orientation for decarbonising the planet is the best that humanity can strive for. The current statistics reveal that the world is proceeding towards a 3.2 degree global temperature rise and beyond, which is

[20] Green economy & COVID-19 recovery, United Nations Environment Programme, *available at*: unenvironment.org/news-and-stories/story/green-economy-covid-19-recovery (last visited on July 16, 2020)

both precarious and detrimental.[21] While the Paris Climate Agreement targeted to check the rising temperature at 1.5 degree, and maximum to 2 degrees, the actual scenario is sombre and afar from the target set. The environmental experts analyse that such conditions may provoke the occurrence of further pandemics, undeniably result in extreme weather events, floods, and droughts; surge the dearth of food availability, and cynically effect that economic and security systems. None of these are desirable or worthwhile. Climate actions indeed form the fundamental aspects of the SDGs since it has the potential to prejudice the situations to such overwhelming levels that it can detriment all other SDGs. Therefore, all viable options must be explored that can control the carbon foot-print thus embracing greener technologies and renewable resources. In this respect again the natural fibres like jute can prove to be beneficial and a welcome step. Especially since jute is an imperative alternate to different arrangements of plastics, propagating it could be a positive step to towards mitigating the concern.

Secondly, regarding life on earth, human activities need to be more conscious and sensible so that they do not amplify the destruction of natural habitat. Amidst the brazen shape of the pandemic, it is essential that the world analyses the zoonotic diseases – their causes and effects so that comprehensive policy frameworks can be developed towards maintaining and promoting world health. Further with the scrutinisation of these factors, the hazards of unchecked environmental annihilations will also surface that can govern the directions of future actions. Again in this context, promoting natural products like jute, which are bio-safe and ensure biosecurity can prove to be a pragmatic approach. This will aid in restoring the lost ecological balance and will also serve human kind in the long run.

Thirdly, as far as life in water is concerned, human activities have grossly effected them as well to their detriment. There is no denial that human beings depend greatly on the marine ecosystem in a number of ways in the form of

[21] COVID-19: Four Sustainable Development Goals that help future-proof global recovery, UNEP, *available at*: https://www.unenvironment.org/news-and-stories/story/covid-19-four-sustainable-development-goals-help-future-proof-global, (last visited: July 10, 2020)

coastal protection, life-saving medicines and drugs, various industrial uses and most importantly for food. However, unfortunately these factors have not been successful in urging humans to cease their unmindful behaviour in treating the marine ecosystem. The world population has continued to exploit the marine life with rampant domestic and industrial waste disposal into water bodies and heightened use of non-biodegradable products which are eventually discarded into the water bodies. Various forms of marine species are endangered and struggling for existence due to these factors. This situation has taken up a further ghastly shape with the outbreak of the pandemic. There has been a substantial rise in creation of toxic medical wastes which also includes huge amount of single-use plastic wastes. The disposal of these wastes therefore poses greater challenge and if not treated properly, will ultimately jeopardise land and marine environment. The need of the hour is thus to focus towards intervention of technology to ensure that the damage caused is minimised. In the post -COVID recovery phase, it is also crucial to think of bio-friendly packaging options that does not harm the environment and goes ahead to endorse a sustaining blue ecosystem.

Finally, regarding responsible production and consumption patterns as well, the pandemic has proved to be an eye opener. The imprudent lifestyle choices and incautious business patterns have hammered the natural resources into fragile and delicate states. The ecosystem has been randomly disrupted, most economic frameworks have been carbon-intensive, and mechanisms to control the unfettered emissions have been limited. It is thus time to divert our production and consumption designs prioritising green practices and rather turn *atmanirbhar,* as propagated by our honourable Prime Minister. A huge learning from the pandemic has been that it is always possible to device new methods and explore unwonted avenues during the time of adversity. From conducting online classes, to online research modes, to online connectivity throughout the world, to online working, online court hearings, there has been a fundamental change in the work-life space intensified with the infusion of technology. Interestingly, the change has not stopped here, during the pandemic, a lot of economic activities were based on locally sourced raw materials and local production processes.

In this context, up surging the use of natural and renewable resources is imperative. It definitely calls for incorporation of innovation and technology.

However, the important matter is, when usual policies and social norms are metamorphosing according to the changing demands of time, this situation can be well leveraged to take robust initiatives and vocalise the locally produced jute and use it for industrial purposes. This can further lead to the fabrication of an environmental setup and industrial ecosystem that are complimentary to each other and are not conflicting at fundamental levels. A sustainable economy can thus be established with proper planning and strategizing. Fossil fuels which act as raw materials in manufacturing plastic and synthetic goods are not resourced in India, but on the other hand, she is the largest producer of jute in the world. It is rather worthwhile to switch our priorities to green alternatives as soon as possible.

In this context jute as an alternative can be a vital option. It is a plant fibre and is bio friendly. It also helps in balancing the lost ecological interface. The most effective utility of the jute fibre in this context would be its extensive usage as a packaging material and a viable alternative to single use polyethylene bags. This would also ensure protection of the natural habitat on land and as well as under the water.

It is pertinent to mention here that with recent research in Bangladesh, they have developed a variety of bio-degradable cellulose sheets using the jute fibres. These are also referred as jute plastics which have been found to have similar properties like the single-use plastics as far as their utility and usage is concerned. Bangladesh has named this material Sonali[22] that can be used extensively for food and garment packaging, as wrapping materials, and also as carry bags. Bangladesh has not yet begun the commercial production of Sonali but it is expected to mould the market dynamics as soon as it hits the commercial space. It is also a ray of hope against the harmful consequences of petrochemical resins.

VII. Conclusion

In respect of socio-economic and specially environmental perspective, the golden fibre has massive utility that can be explored with proper research and development and infusion of technology in the sector. But despite its immense

[22] Shaharia Pavel and VijitSupinit, "Bangladesh Invented Bioplastic Jute Poly Bag and International Market Potentials", 5(4) *Open Journal of Business and Management* 624-640 (2017)

potentials it is thwart with multiple challenges. The primary concern in this context is the lack of awareness among general people and more importantly among the policy framers and decision makers across the world. Unless it is promoted highlighting its commercial and industrial usages, manoeuvring its prospects will not be possible. Secondly, there are huge gaps in the strategies of its promotion both in the national as well as in international markets. The steps taken by the government in this regard are rather maladroit. The marketing strategy needs to be more aggressive and product placement needs to be focused on its utilities and versatility.

Given the pandemic situation, jute can be very well marketed with its environmental benefits and multiple usage in different areas – packaging being the primary among them. Unfortunately, even in the packaging sector, it's usage is limited especially in the commercial packaging sector where the market is flooded with plastic packaging materials. Although they are cost effective, abundantly available and easy to use, plastics throw huge challenges through its usage. The main reason to opt back jute fibres are the rising environmental concerns. Hence, this aspect needs to be clubbed in the promotional activities of the products which are grossly inadequate. Promoting jute and jute products as an alternative to the synthetics in world markets with the backdrop of the climate change issues and motive of decarbonisation is essential. For bringing about positive changes in the sector which is today considered as a sunset industry, it is crucial to focus on two factors – firstly, strategic promotion of the fibre with its environmental benefits; and secondly, infuse research and development so that the potentials and the uses of the fibre can be further explored. Although both these aspects are taken up by India and Bangladesh who are the major jute producing nations in the world, but the efforts need to be coupled with greater zeal and rigour. The positive ray of hope in this regard is that the UN has recently recognised the importance of natural fibres in achieving SDGs. However its promotion can be further explored in the world which has just suffered the pandemic and probably would better understand the importance of natural fibres. If properly strategized, jute can be re-introduced to the world with all its prospects and utilities.