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***THE RELEVANCE OF
JUTE AND COIR PRODUCTS
AS ENVIRONMENTAL GOODS***

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The Relevance Of Jute And Coir Products As Environmental Goods

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THE CONCEPTUAL ISSUES

Environmental Goods (EG) can logically be defined as products of Environment Industry. The Asia Pacific Economic Cooperation (APEC) as also the Organization for Economic Cooperation and Development (OECD) define the Environment Industry as consisting of activities which produce goods and services to measure, prevent, limit or correct environmental damage to water, air, and soil, as well as problems related to waste, noise and eco-systems. Clean technologies, processes, products and services, which reduce environmental risk and minimize pollution and material use are also considered part of the environment industry.

There is a scope for debate in this definition as apparently the production process of goods meant to limit environmental damage, for instance an electrostatic precipitator, might itself be found to be causing considerable environmental damage if a Life Cycle Analysis (LCA) of this product is carried out. Indeed the concept of Environmental Goods and Services (EGS) should be developed around boosting the Natural Capital, keeping in mind that the human, financial and manufactured capitals are continuously destroying this resource for creating products of our daily utility. It is no understatement that a sharp decline in economic prosperity of humanity as a whole in not too distant a future is foreseeable if this trend is not reversed. In this sense the Environment Industry should be primarily concerned with clean technologies, processes, products and services that reduce environmental risk and minimize pollution and material use. Tools such as Contingent Valuation Method (CVM) can be employed to estimate the economic values of the entire gamut of natural capital namely soil, air, water, minerals, oils, trees as also other living systems needed for any economic activity. Such information would be useful in designing products and production systems, which are ecofriendly and therefore sustainable.

Interestingly enough the categories of EG currently being advocated by the industrial world are limited to products for measuring, preventing, limiting and correcting environmental damages (see box below). The developed countries clearly dominate the market, with the US being the world's biggest producer and consumer of pollution

APC = Air Pollution Control, ORS = Other Recycling Systems, S/H = Solid/Hazardous Waste H/E = Heat/Energy Management, PWT = Potable Water Treatment, WWM = Waste Water Management, M/A= Monitoring/Analysis, R/C = Remediation/cleaning up, N/V = Noise/vibration abatement, REP = Renewable Energy Plant

PROPOSED COVERAGE OF ENVIRONMENTAL GOODS

control equipment and services. It is also the second largest net exporter after Germany and Japan. The EU, the US and Japan put together control 85 per cent of the global market in these goods and services. There is considerable reluctance on behalf of the International Agencies in admitting non-product related Process and Production Methods (PPM) as under GATT no discrimination between products based on production based criterion is allowed.

The ecofriendly and therefore sustainable concept of economic activity leads one to the regime of Environmentally Friendly Goods (EFG) that should at every stage – starting from selection of raw material, manufacture and use to distribution and disposal - be non-toxic and of low environmental impact. Products with low environmental impact should not create environmental problems when they are used and should not be the source of toxic byproducts when they are eventually disposed off. In this sense biodegradable products have a natural advantage over products, which need to be either incinerated or dumped in landfills at the end of their lifecycle. As an example one may consider the case of packaging materials made on one hand from a natural biodegradable material such as Jute as against a similar product made from a synthetic non-biodegradable material such as Polyethylene (PE). The former is made of renewable material, converted to the final product by a process with very low environmental impact, while the use and disposal poses absolutely no environmental concern. The packaging materials made of PE on the other hand owe their origin to a raw material even the extraction of which has considerable impact on the ecosystem. Similarly the conversion processes, the use as also the disposal of this non-biodegradable packaging material are all causes of considerable environmental concern. Clearly then the jute packaging material can be categorized as EFG. Economic activities involving EFGs should result in reduction of waste (jute packaging material can be recycled manifold and for many purposes till the degraded residues are returned to nature) and thus lead to a recycle-oriented society.

Considering the level of technologies currently available and the requirement of goods for sustaining the civilization, the regime of EFGs would have as on date a limited domain. Nonetheless keeping the overall concern of the ecosystem in focus it would be highly desirable to assign top priority to support and promote EFGs internationally. In fact the intersection of the two sets of EG and PPM forms a subset of the domain of EFGs as these embody some of the virtues of EG (limiting the environmental damage) and PPM (renewable raw material, simple conversion process of very low environmental impact) while exhibiting additional virtues (low environmental impact during use,

distribution and disposal) which the EFGs and PPMs do not possess. Hence the EFGs should enjoy all the trade and other benefits over and above those earmarked for the EGs.

It is also an additional responsibility of the international community to enlarge the domain of the EFGs and overcome the shortcomings of the ones currently being traded commercially through scientific, technical and requisite fiscal measures.

Interestingly enough some of the EFGs are already included in the list of EGs submitted by New Zealand (see box below). This in a way substantiates the argument forwarded in

Env. Act.	HTS No.		HS 6-Digit Description	Additional Product Specification
4.	WWM 4601.20	ex	Mats, matting, and screens of vegetable materials	Erosion control matting (biodegradable)
5.	WWM 4601.20	ex	Mats, matting, and screens of vegetable materials	Ecologically safe ground covers (biodegradable)

the foregoing. This also suggests a possible route for selectively identifying EFGs for including them in one category or the other such as WWM, S/H, ORS etc. Alternately a separate category termed as EFG may be added to the list thus broadening the scope of EGs and making it more representative of the products of the Environment Industry.

THE IMPORTANCE OF JUTE AND COCONUT PLANT CULTIVATION

Jute cultivation is primarily restricted to India and Bangladesh, accounting approximately for 66% and 25% respectively of the world production (ca. 3 million metric tons). Jute occupies the most important place among the bast fiber crops in India. It is grown on around 1 million-hectare land. About 4 million farmer families - mostly marginal - of eastern and northeastern regions generate principal income from jute cultivation, leading to paid employment to the tune of 10 million man-days per season, earning in the process on an average 32 Rs /day /head during the season of cultivation and fibre extraction. The land area under jute cultivation has grown two-fold since independence while the production has gone up by 3.5 times. Research and Development work carried out by the agricultural scientists during this period has not only resulted in increasing yield (kg/ha) of the fibre but also in improvement of the fibre quality and shortening of the cultivation period. Investigations reveal that the crop pattern jute-paddy-potato is more profitable for the farmers than say paddy-potato-sesame.

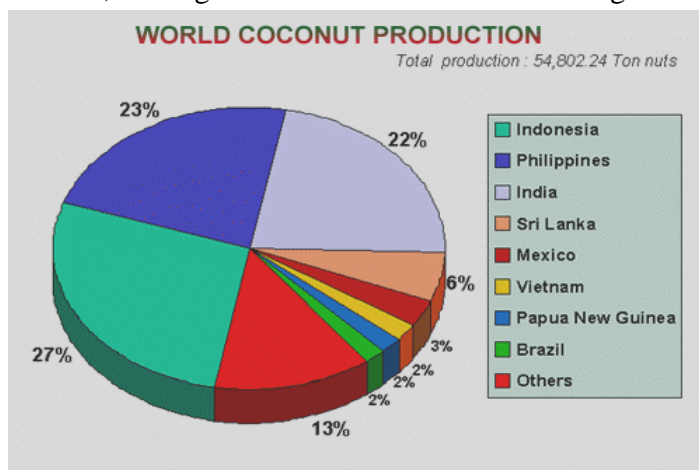
After being allowed to grow for four months (April onwards) the plant is harvested, leaving the root portion in the soil. The harvested jute plants are then allowed to dry up, shedding leaves in the process (defoliation). The roots left behind in the soil as also these dry leaves form important nutrition for the subsequent cultivation. Paddy cultivation with the assistance of fertilizers has been found to cause the soil to gradually lose cohesion requiring progressively higher inputs, thus pushing up the cost of the product. As a result, paddy cultivation is fast becoming non-profitable in many traditionally paddy-growing

areas. However the rotting roots and leaves of the jute plant not only add nutrient to the soil but also result in humus, which helps to enhance/maintain the soil cohesiveness.

The dried jute plant yields two important products namely the jute fibre and the jute stick. The jute fibre and the stick are extracted from the plant by a controlled rotting process, known as retting. The jute stick forms an important fuel for the farmers during the rainy season and it is claimed that even if jute cultivation becomes uneconomical for the farmers they would continue to grow some amount just for the sake of the fuel it yields. Incidentally it has been estimated that about 1.2 kg of CO₂ is absorbed from the atmosphere per every kg of fibre produced.

The coconut plant is grown around the world in lowland tropical and subtropical habitats and is one of the most economically important palms. From this species come many natural products, including foods, drinks, fibers, building materials, and chemicals. This species can be grown where annual precipitation is fairly low, and it does well growing near salt water, where salt spray would kill many other plants. The coconut is a tropical plant, and grows in temperatures between 20⁰ C and 25⁰ C, but the best temperature is 27⁰ C. It is usually found growing along the coastline. The plant is surprisingly drought tolerant, but adequate soil moisture is necessary for good fruit production. Coconuts tolerate salty, sandy soils and thrive in the lowland tropics, usually but not necessarily, on the seacoast. The plant is grown only from seeds and transplanted once (or more) before being set in a permanent place. The plant produces fruit from the 6th year onward until the tree is about 80 years old. A well maintained tree should grow to 80 feet tall and yield over 75 nuts a year.

All parts of coconut plant are useful. The white, fleshy part of the nut is edible and the cavity is filled with "coconut milk" containing sugars. Toddy is an English name for the fresh beverage obtained from the sap, which is derived from incising the flower clusters of coconut. Coir is the fiber from the husk of the nut and is used in making ropes, mats, brushes, calking boats and is also used as stuffing fiber. Copra is the edible dried meat or hard endosperm of the fruit.



Oil expressed from the dried endosperm can be used in soap production or as cooking oil. The trunks provide building timbers, the leaves provide materials for thatch and the husk and shells can be used for fuel.

The distribution of production of coconut over the entire globe is reflected in the pie chart. In this respect India occupies the second position (22%) after

Indonesia (27%). From one million coconut husks about 80 tons of coir fibre can be extracted. However only a small fraction of the coir fibres that can be obtained from the

nuts are actually utilized industrially. As a result India and Sri Lanka are the leading producers of coir fibre producing 75% and 22% respectively of the world production (ca. 0.5 million metric tons). This high Indian share is in spite of fibre extraction from only 25% of the nuts produced in the country. The rest of the potential fibre source either becomes garbage or is dried and used as fuel.

From the foregoing it is observed that the cultivation of jute plant is carried out primarily for production of the fibre and the stick as also in gainfully utilizing the soil during a 4-month period between two crops in a 3-crop rotation scheme. However, the cultivation of jute is by and large restricted to the eastern and northeastern part of India and neighboring Bangladesh, a relatively small patch on the globe. The cultivation of coconut plant has on the other hand a very different focus – coir fibre being one of the many useful byproducts - extending over a much larger time frame and is spread over a much wider area of the globe. Even then there are striking similarities between the two when one considers that

- In terms of jute fibre production India and Bangladesh are the two major global players while in terms of coir fibre production India and Sri Lanka are the two major nations.
- Both these plants have considerable economic importance for the major growing countries.
- The jute and coir fibres have similar chemical composition, i.e. both are lignocellulosic
- Products of both of these fibres are utilized globally and face a common challenge from the synthetic fibres
- There is considerable scope of broadening and improving the product base of these two fibres by injecting necessary inputs in the respective agriculture and industry sectors. This would not only bring more ecofriendly materials to the global consumer but also contribute to better utilization and hence in reduction of waste of the raw materials.
- The major shortcoming of the industrial exploitation of jute and coir fibres concerns the fibre extraction process, commonly known as retting.

The traditional retting of jute plant involves submerging the plants in water. As a result the bark of the stem swells resulting in cracks and crevices in the cortex.

Microorganisms, present on the plant as also in the surrounding water and soil system, then enter through these openings and start attacking the pectinous binding matter loosening in the process the long fibres located along an annular ring between the outer periderm and the inner cambium of the bark. In addition to the solubilised binding matters, other soluble matters such as Tannin etc. from the plants are also released in water during this process of retting. Objectionable gases such as methane, CO are also released into the atmosphere. As this process is carried out in batches over a period of a month or so, the water bodies surrounding the farmer's field as also the surrounding air gets fouled up during this activity. Moreover the quality of fibre too suffers considerably as a result of this uncontrolled batch process. Subsequently the recuperative process of nature brings the water bodies and air back to equilibrium over a period of time. However

the water left behind after retting contains many nutrients and has been found to be a supplemental nutritional source for the growth of the next crop i.e. rice.

Considerable amount of laboratory experiments and field trials have been and are being conducted for developing improved retting methods, which would have less environmental impact and also lead to improved fibre quality. Expectedly, superior and a wider range of products can be developed from superior fibres. In the forthcoming Jute Technology Mission, to be launched by the Govt. of India, a substantial amount of activity has been earmarked for this purpose. Clearly if the international community supports the cause of this fibre and makes room for more products for the consumer, this one objectionable feature of the jute sector can soon become part of the history.

A very similar scenario prevails in retting of coconut husk for extracting the fibre. The traditional retting is carried out by submerging the husks in pits created adjacent to the backwaters that prevail along the coastline. The regular flushing of such pits by the brackish seawater is instrumental in assisting the microorganisms to breakdown the gummy binding matter and loosen the coir fibres. As opposed to about 12 days needed for retting a batch of jute plants, a batch of coconut husks would need about nine months. In addition to the coir fibre, retting of coconut husk also yields the coir pith – a highly durable granular and micro porous substance of high moisture retentivity, which is also being converted to a number of useful products.

Besides this biological process, a mechanical fibre extraction process is also practiced, which however does not yield good quality fibre and is therefore meant for low value added products. An enzymatic retting process is also in vogue for improving the cleanliness of the mechanically extracted fibre. However for various reasons this process has not yet been widely accepted. Similar to the efforts of the concerned authority in the jute sector, a concerted action plan in the coir sector is also underway to improve the fibre extraction process and make the same environmentally friendlier.

THE NATURE OF JUTE AND COIR PRODUCTS

The commercially important products manufactured from these two fibres are listed in the following table

JUTE	COIR
Plied Yarn	Plied Yarn
Twine yarn	Ropes
Woven Sacking fabric	Mats
Woven Hessian fabric	Mattings
Woven Canvas fabric	Rugs
Woven Tarpaulin fabric	Carpets
Woven Carpet	Curled fibres
Woven Carpet Backing fabric	Rubberized Coir Mattresses
Decorative fabrics	Woven and Nonwoven Geotextiles
Woven and Nonwoven Geotextiles	
Composites	

The principal outlet of the jute products is in the packaging sector. Jute fabrics are widely used in India for packaging food grains, Sugar, Pulses and Seeds. Special food grade jute bags have been developed for satisfying stringent international norms of safety. Jute shopping bags of various shapes, sizes and designs are nowadays a common sight in many towns and cities. Jute-Geotextiles are being increasingly used in India to solve many geotechnical problems, which do not demand very high durability of the Geotextile material. In fact the biodegradability of the substance is viewed as a very welcome feature as after the useful lifespan, the material can decompose and merge with the surrounding soil. It is claimed that in this process the soil is also enriched. Jute composites are increasingly being used in the Railways and in the Building sector as wood substitute.

Majority of the coir products are meant for the floor-covering sector. The mats, mattings, rugs and carpets differ in construction, method of production, dimension, appearance and feel. These are very rugged, relatively heavy, stable and durable utility items meant for the household, offices, marketplaces etc. The Coir Geotextiles enjoys similar applications as Jute Geotextiles although there are significant differences in their properties and hence these two can play supplementary and complementary roles. Ropes and yarns of coir have and are being traditionally used in building, shipping and other sectors. Rubberized coir mats and mattresses are well-accepted household and office utility items.

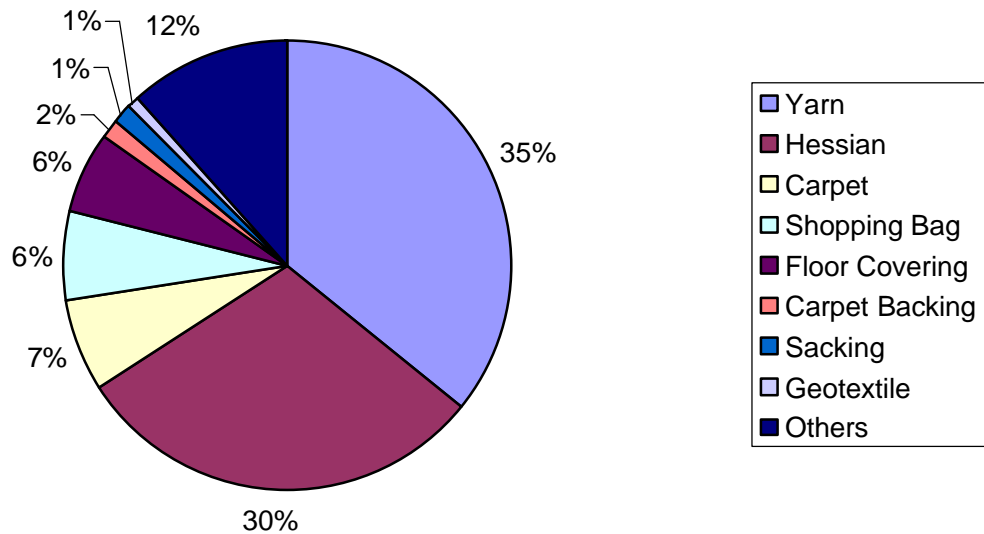
Relatively simple, labor intensive and sometimes very crude techniques are used to convert the fibres into the products listed here, although for some products – for instance jute based carpets - somewhat sophisticated technologies are employed. The level of sophistication obviously depends on the price that the product is going to fetch. It is a hard fact that jute and coir fibres and their products are traditionally low priced items. This has forced the respective agriculture and industrial sectors to be very wary about any costly inputs, which has resulted in a culture of stagnation. This scenario is further complicated by the high cost of transport, as the products are heavy and bulky, causing at times an addition of more than 100% to the landed cost. Any cost relief provided by the trading practices as also fiscal measures of the concerned authorities would help the jute and coir sectors to survive. Growth of these sectors would ultimately depend on innovation in processes and products, which can be strongly influenced by market pull. Thus if there is an international effort at protecting and promoting these EFGs, innovations in process (such as improved retting) and in products (such as lighter and denser packaging material) may follow. The resultant higher value added products could then start fetching a higher price and such a development could have a cascading beneficial effect on the overall health of these sectors.

CONSUMPTION PATTERN OF JUTE AND COIR PRODUCTS

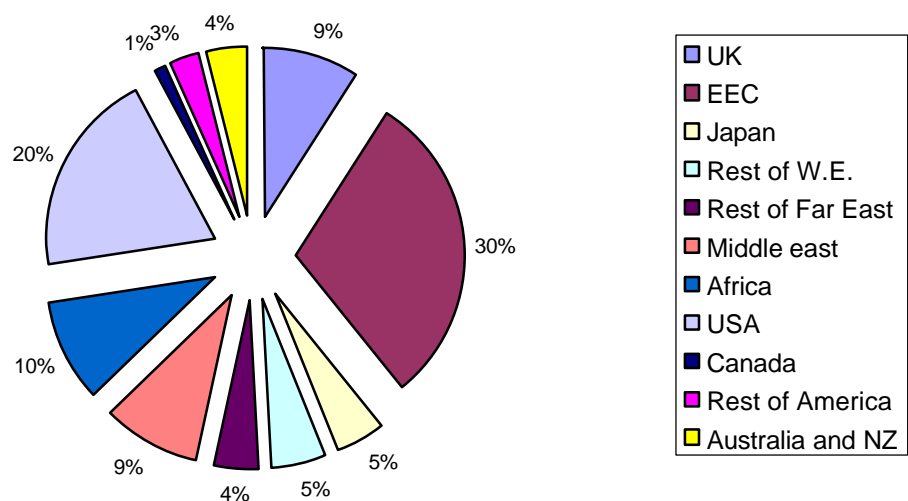
Most of jute and coir products manufactured in India are consumed in the domestic market. Thus during 2001-02 out of 1615 thousand tons of goods produced in the jute sector only 180 thousand tons (ca. 11%) were exported while out of 360 thousand tons of manufactured coir goods about 70 thousand tons (ca. 20%) were exported. The export earning from the jute sector accounted at the turn of the millennium for a meager 0.3%

and that from the coir sector even less than 0.2% of India's export earning. With the current surge in net export earnings powered by the IT and other manufacturing and service sectors, the share of export earning from jute and coir is bound to experience a downward trend. One of the major constraints to export is surely the high share of freight costs to the landed price. The nature of Indian goods exported and the countries importing them are displayed in the adjoining graphics.

JUTE PRODUCTS EXPORTED BY INDIA 2001-02



EXPORT OF JUTE PRODUCTS FROM INDIA - 2001-02

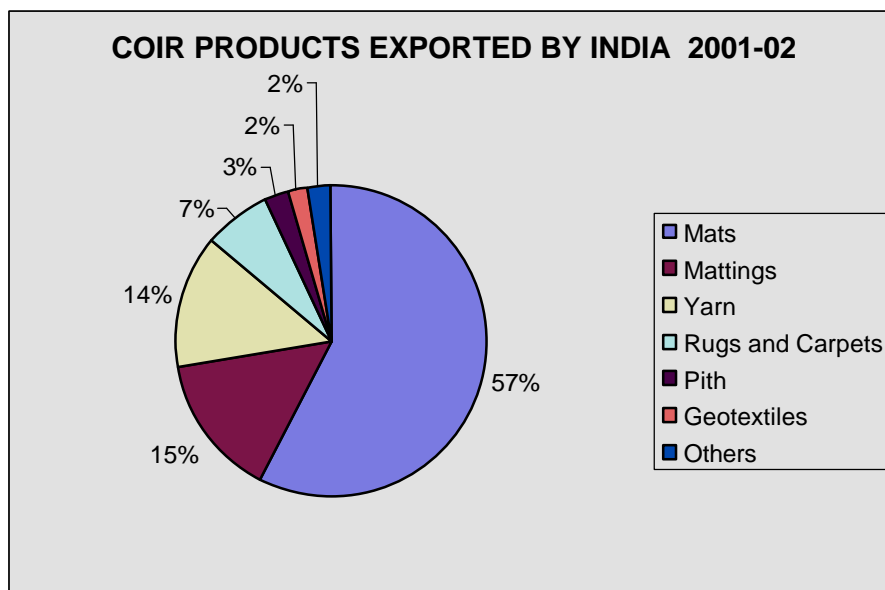


Out of all the exported Indian jute goods, only the sale yarn forms an intermediate product. The countries importing this product convert this material primarily into high value added floor covering. Since the turn of the millennium this scenario has started

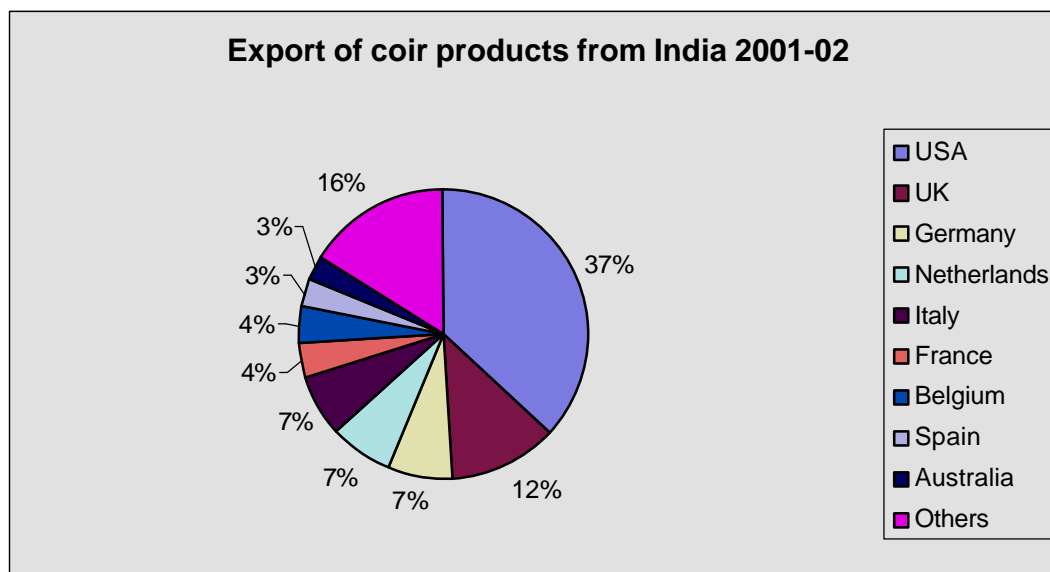
changing as Indian manufacturers have themselves started producing the finished goods and exporting the same to the consuming countries. Accordingly the value addition in exported jute goods has been growing. Even then the average unit value of jute goods exported works out to be 35 Rs/kg. Industrially developed countries procure bulk of these products. Incidentally Sacking, the major jute product on which the industry is thriving and which is consumed in bulk in the domestic market as a packaging article, has hardly any taker in the international market. On the other hand the Hessian, a slightly superior material seems to have more appeal and in all probability is used as packaging material by the importers. Thus the export scenario of jute products presents a paradox as jute the ideal packaging material is exported from India mostly for non-packaging end uses. Clearly the solution lies in converting Indian jute to superior packaging materials.

The export of jute goods from Bangladesh, accounting for 45 to 50% of the total fibre grown there, makes a more dismal reading as raw fibre and yarn account for 50% and 20% by weight of exported jute goods. The unit value realization quite expectedly does not differ from that of the Indian exported goods.

Similar to the export scenario pertaining to jute products, a share of export of Indian coir products is taken up by the intermediate item namely the yarn. Moreover, some amount of coir fibre as also coir pith is also exported. However the unit value realization



of exported coir goods works out to be ca. 42 Rs/kg. Here again one is confronted with a paradox: jute fibre is almost twice as expensive as the coir fibre but fetches a lower price per kg of product exported compared to the products of coir. Clearly the coir floor covering- accounting for 79% share in the export baggage - has a niche of its own in the



International market and represents a much higher value addition to the cheaper coir fibre than yarn and Hessian – representing 65% share in the export baggage – of the much costlier jute fibre. However coir fibres, depending on their type, fetch very widely differing prices in the International market, the bristle fibre being twice as expensive as good jute fibres.

A close look at the International trading scenario of coir reveals the following interesting information:

- Developed countries import 40% of the total world production of coir fibre and coir products. The share of raw fibre in this import is a staggering 60%.
- Sri Lanka exports 85% of its total production of about 70 thousand tons of coir fibre
- In the internationally traded yarn and floor covering goods, India's share is 70 and 80% respectively.

One would conclude from the above that the Indian coir industry, although relying on very simple and overwhelmingly manual techniques, is adding substantial value to the raw material and dominates the international market although growing only 22% of coconuts Internationally and utilizing only a fraction of coconut husks available in the country. India is also the major consumer of the produce of its coir industry.

Two very different scenarios thus emerge in so far as consumption of Indian jute and coir products is concerned. The Indian domestic market absorbs most of its jute while export is a more developed activity in the coir sector. As a result more value added items in coir are exported by India. The large import of coir fibre and products by the developed countries indicate presence of a captive market, which awaits exploitation and further exploration. The jute sector, enjoying incidentally more advanced technological backup and other supports as compared to the coir sector, has indeed a lot of ground to cover for boosting up its export front although even now it enjoys a qualitatively more dominant position in this respect vis-à-vis Bangladesh. A growth of these two sectors in India

would bring more value added EFGs to the global consumer and therefore have an overall beneficial effect. However the routes for growth of these two sectors are different; for jute a more aggressive export marketing and for coir adaptation of more advanced technology.

BARRIERS AFFECTING INTERNATIONAL TRADE IN JUTE AND COIR

From the discussions in the foregoing it is evident that impediments to growth in International trade in Indian jute and coir result primarily out of the very limited palette of useful products being offered by these industries. Moreover products of both of these fibres are very voluminous, attracting a disproportionately high freight cost for the value of goods being traded. Nevertheless freeing these products from whatever trade barriers they encounter would surely be a boost to these sectors.

The tariff barriers being faced by jute products vary widely from country to country and are also product dependant. The average duty imposed on jute goods in USA, UK, Japan and Australia is 5.6, 5.27, 5.45 and 4.17% respectively while Argentina and Egypt for instance impose the very average high rates of 31.22 and 28.45% respectively. The seventeen different types of jute products entering USA attract very different rates of duty ranging between 0 (for three products) and 17%, with four products of not very great export volume attracting duties above 10%. However the major products contributing to the export basket to USA account for duties varying between 0 and 8%.

Some of the sources of Non Tariff Barriers (NTB) for Indian jute are listed below.

USA: Jute blend products may require special certification depending on the % of jute in fabric
EGYPT: Import of Hessian bags must conform to new Egyptian Standard, which is different from BIS standard in certain respects
BRAZIL: Imposed very high anti dumping duty of jute bags from India. Case being pursued by JMDC
SYRIA: Legalization of export documents at 2% of invoice value is mandatory for Indian but not for Bangladeshi goods
TANZANIA: Import of jute bags attracts a suspended duty (in addition of normal duty) at Tanzanian Shillings 400 per bag. Import duty = 15%, Suspended duty = 40%, VAT = 20%
IRAN: Import of jute-diversified products is restricted
KENYA: Protection given to Non-hydrocarbon free Sisal bags for packing Coffee beans, violating IOCCA decision

Examples of NTBs affecting trade in Indian Jute

Similar to jute, coir products attract duty in the range of 4 to 35%. The major item of export from India, namely the handloom mats and mattings attract duty up to 8.6 Cents/m² for import to USA. The import duty for Austria comes to 8.4% while for Portugal, Ireland, UK and Finland it is 8%. In the case of coir yarn the East European

Region and East Asian Region impose duty at a flat rate ranging up to 20% while for the Latin American countries it comes to 9 to 12%. The EU countries levy a duty of 10.8% on coir cordages and ropes and 5.8% on coir Geotextiles. The NTBs for coir goods are mostly technical in nature. The coir Geotextiles does not conform to any specific international standards because of which its acceptance poses problem. Similar is the case for the Sanitary and Phytosanitary standards of some products on which clarity is absent.

CONCLUSION

The cultivation of jute and coconut plants and industrial exploitation of the relevant fibres has considerable economic importance for India. The products can be categorized as EFGs considering the nature of economic activities involved in their manufacturing process as also in their subsequent use and disposal. In spite of consuming most of its produce in the domestic market, India has the capacity to increase export of these goods and bring more value added products to the global consumers. This would benefit not only the Indian economy but also the global ecosystem. It is therefore a responsibility of the International community to enlarge the domain of these EFGs and overcome the shortcomings of the ones currently being traded commercially through scientific, technical and requisite fiscal measures. In the ongoing international negotiations on trading in Environmental Goods (EGs) a special attention should therefore be paid to these EFGs and measures taken to accord them a special status.

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