Technology and Indian Jute industry

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Key Words : National Jute programme (NJP), National Centre for jute Diversification (NCJD), Jute Enterpreneurs Assistance Scheme (JEAS), Jute Service Center Scheme (JCSC), Development Design, Jute Technology Mission, Jute Geo Textile, Jute Agro Textile, Rice Barn Oil, Promotional Scheme.

ABSTRACT

Indian Jute industry is a very old industry which is passing through difficult days due to Various reasons. It urgentty requires adoption of new techkonologies for the manufacturing of jute-deversified produets and creating awareness about the uses of natural golden fiber in non conventional application. Thanks to the setup of NCJD which is now fully engaged in giving new discipline of jute diversification. Two significant break through in technology in recent times have been in the field of developing by drocarban free jute cloth for food-grade jute goods and enzymatic up gradation of TD-3 grade jute fiber. For diversification for Products various operational promotinal scheme have been embarkel upon to provide need- based support services at various locations. National Center for Jute Diversification (NCJD), and Jute Services Center Scheme (JCSC), Jute Enterpreneurs Assistance Schemes (JEAS),ISCS are action in their own way in adoption of technology and other measures so that the industry may come out of the woods and be competitive in the world market Jute techonology mission is a major improvement of the national Jute policy and is the vechicle for implementation of multifarious programmes in the jute sactor. Mini misson -I, Mini mission -II, Mini mission -III and Min mission -IV, are coordinated and implemented by the ministry of textiles. IJIRA has been engaged and assisted jute industry to solve their day-to-day problems adption of new technology, product design and development, product diversification along with process modification However, the efforts made so far are not enough. The industry requires more action on R&D and adoption of new technology Compled with adequate capital support to compete with the globale competition and have the bright future.

Introduction :

Jute the golden fibre, meets all the standards for, ‘safe’ packaging in view of being natural, renewable,biodegradable and eco-friendly product. The jute industry provides direct employment to about 0.37 million workersin organized mills and in diversifiedunits including tertiary sector and supports the livelihood of around 4.0 million farm families. There are 89 composite jute mills in india . The total number of looms installed in jute industry is about 49500 inculsive of Hessain looms, C B C looms and others. The maximum installed capacity in jute mills is estimated to be more than 2.64

million tonnes per annum.The jute Sector occupies an important place in the economy of the country in general, and astern India in particular.

With the launching of the National Jute Programme (NJP) a few years ago, aided by the Government and the United National Development Programme(UNDP) this fibre has received the fillip it derived to surge ahead. Set up as a body under the Ministry of textiles, the National Centre for Jute Diversification (NCJD) is now fully engaged to give shape to a new discipline of jute diversification. Several research outcomes have already been transferred from the lap to the land. Many of these have also started to bear fruits of profit. Many more are ready for take off and to flourish in the day to come.

The NCJD since it came into operation in late 1995 has played an important role in commercialization of technologies for the manufacture of jute-diversified products and creating awareness about the uses of this natural fibre in non-conventional application. The NJP envisaged commercialization of the technologies developed by the various research institutions on jute diversification. This was felt essential for providing a newer dimension to the application of jute.

It was further contemplated that spread of jute diversification activates through the decentralized sector would also assist in the socio-economic development of the country. Also, the growth of jute diversification would open newer markets for the growers who on due course, would be better placed to fetch remunerative price for the their yield.

The decade of the Nineties witnessed evolution of a wide ranges of technologies for diverse application of the golden fibre. Emergence of these technologies for diverse application in newer fields but has also made it available in different forms for use as replacement of conventional commodities. Ranging from pulp making as a non-wood component for manufacture of paper to substitute for glass and carbon fibre in certain composites, a wood substitute for construction industry to constituting a convenient ingredient of moulded products, a coarse packaging materials to fashion textile-jute has proved economical as well as purposeful. Characteristic changes brought about through research have contributed to reduce hairiness of the fabric, increased fibre strength, intensified its elasticity, woolenised the yarn as so on to make it acceptable to the textile sector as well .

Qualitative Improvement

Research in post harvest processing of jute fibre has proved enormously beneficial in so far as the improvement of the quality fibre itself is concerned. These qualitative improvements have contributed to superior finish and value enhancement of finished products. Methodologies developed for chemical processing of jute have contributed considerably towards adding value to the yarn and the fabric products out of it. This has led to its use in home textiles, fushion fabric and life style products meant for the niche market segment.

Through these technological expirations, an array of innumerable jute diversified products have emerged. Jute-PP granules for injection moulding, resin transfer moulding, jute stick particle board, jute composite boards. Jute-cotton blended yarn. 100 per cent jute furnishing fabric in handloom, jute cotton carpet in handloom, upholstery fabric with jute mix in power loom, blankets. wool-jute blended durries, knitwear using dreg spun yarn, paper and paper boards from jute waste, celling board from jute stick and jute agro-waste, jute hand made paper, and jute woolenised blanket to name a few are projects which have already proved gainful for commercial application.

Technology break through :-

Two significant break through in technology in recent times have been in the fields of developing hydrocarbon free jute cloth for foods grade jute bags and enzymatic up gradation of TD-3 grade jute fibre. Both these technologies have been developed at the Indian jute industries Research Association, Kolkata, and have significantly contributed in serving the interest of the industry and the nation at large.

Whereas the former has helped restoring the market of the coka and coffee growing countries of Ghana, Nigeria, Cameroon, Brazil, Colombia and Zuganda apart from opening newer areas for export of food grade-nontoxic and hydrocarbon free jute bags, the latter has elevated the characteristics of the TD3 grade jute through biochemical treatment to match the properties of TDD2 variety crop which is less available in the country. This would mean spinning of fire yarn and at a higher speed from an indigenously available inferior variety of the fibre.

The suitable substitute for replacing conventional jute batching oil that actually carried the hydrocarbon was found in rice barn oil (RBO) which was also found to be conforming to the spinning parameters of the jute fibre. Being a large producer of rice, India has the potential to make available abundant RBO for jute mills.

Other areas of development, which deserve special mention, are jute geo-textiles and jute composites. Geo-textiles, though not a very new product, have been customized to cater to a new application area of protection from soil erosion. Experiments have revealed that jute geo-textile are ideal in river and canal bank protection work, for railway tracks and road construction on soft soil, roadside drainage and slide repair in hilly terrain and also in widespread plantation in arid zone. These experiments have proved worthwhile in controlling soil erosion caused by rain and river flow.

Moreover application of jute for such purpose has been founded to go extremely well with the soil as it decomposed in course of time. But considering the fact that the users of this application being large institutions, a through awareness exercise will be essential to apprise all such related organizations about the applicability and advert ages of jute geo-textiles.

Development of jute composites on the other hand has opened up new vistas in construction, partitions shuttering ply, false ceilings, moulded furniture, interior lining for automobiles, railway coach components, moulded utility products, and the like composites include resin-based composite board, jute-glass hybrid composite, jute stick particleboard, jute PP mould, medium density board from jute plant, jute thermoplastic and similar products. Although some of these technologies are in various stages of commercialization and experimentation the outcome has proved promising in finding suitable substitute for wood thereby saving the fast depleting forest resource.

Apart from serving this noble purpose jute composite is likely to contribute greatly to the packing industry. A pilot plant set up by the Indian Institute of Packaging, Mumbai, under the National Jute development Programme will be conducting trial and nesting of jute-reinforced plastic packing products. The areas targeted to cover are packaging of horticulture items, tea and engineering goods.

It has already been established that retain JRP packaging are advantageous in term of price compared to wood and wood derivatives and its lightweight which makes it convenient to transport, jute as is well known, has been traditionally a worthy materials for packaging.

Now, with the recently developed technology, several jute reinforced and jute-amalgamated materials have been made available to make packing convenient and versatile, jute reinforced ten chests and containers for packaging of apple and other fruits are at a developing stage. Factories such as higher cost and absence of enough manufactures of such packaging are the vital hindrance preventing its mass scale use. Though wood still continues to be the only materials fulfilling the purpose, time is perhaps not far when jute rein food packing will become the obvious choice.

Meanwhile extensive research and trials are on to overcome the constraints of replacing the wooded chests, Certain other products that are fast getting into commercial production are jute moulded sheets, bars and beams which could be nailed, sawed, screwed and clipped. These materials could find usage in packaging industrial products, engineering items, and machine parts such as cable reels, defence equipment, finished machines, encasing two-wheeler and the lie these materials may, at the initial stages, seem costly but is could certainly be said that a viable alternative to wood is now available, and certainly as a cost much lower that ruthlessly parting with the forest wood that to would that it would otherwise be eating up.

Production of Fine Jute Yarn:

The following technologies were identified by IJIRA and TRAs and the work got boost in the context of UNDP assisted national Jute Programme .

- Ring spinning technology in jute mills suited to produce jute yarn/blended yarn of 4 lb and below.
- Ring spinning technology utilizing cotton spinning system for production of jute-cotton blends.
- Open ended/rotors of jute cotton blends.

- Jute/Wool in the dref-2 machine for production of jute-woolen blends.
- Jute woolen blends in the traditional jute ring spinning system.
- Jute colon in the dref-3 system for production of jute-cotton blends for denim items.
- REDCO spinning system, for jute, cotton/synthetic/blends.

For the production of jute fine or jute viscose yarn in the jute ring spinning system collaboration was sought for technology and machinery from Maclli International (U.K.) and N. Stumberger (France).

Promotional Schemes

In its effort to spread the activities and awareness of jute diversification. This National centre embarked on operating promotional schemes to provide need-based support services at various locations. Its Governors' Council under the chairmanship of the Union Textiles Secretary provides the course of action and guidelines based on the mandate for the sector.

The schemes are of the nature of physical support service and financial assistance. Under the former category, four main stream schemes are operational, namely. Jute service centre Scheme, jute yarn (and Raw Material) Bank Scheme, Market support Scheme and the Design Development Scheme. The other part comprise Jute Entrepreneurs Assistance Scheme (JEAS) which provides venture into manufacture of JDP the prospects of which are as gainful and as worthwhile as any other.

Through the Jute Service Centre Scheme (JCSC) local agencies are set up at distant locations through collaboration with bona fide bodies to carry our various activities, with and/or on behalf of NCJD, for the promotion of jute and its diverse application in various fields. These agencies also act as facilitator for rendering the backward and forward linkages to existing and potential entrepreneurs. The ISCS acts as a source of information and counseling on the possibilities with jute. Creating awareness, organization exhibitions, maintaining display centers and extending escort service through local bodies are the other functions of the ISCS.

Design Development :

Based on survey reports of NCJD's service center and response of respective regions, design development is carried out either through design workers or by way of holding hand-on design training programmes. These activities are organized by engaging specialist designers for training entrepreneurs. These are held at location convenient to the beneficiaries. This enables generation of newer ideas for creativity and value addition. Design development is also organized by engaging freelance designers and attaching each to one production unit for a specified period when the designer is assigned to evolve a given number of desired designs. Major thrust is laid on holding design workshops at locations convenient to the4 beneficiaries. In order in exert an additional trust to product development and design innovation a design bank is being established at the HO of the center. This Scheme envisages dissemination of designs, cataloguing them and also organizing design workshops.

In this effort, NSJD collaborates with organizations like DCHC, NIFT, IIP and NID for training and information of the small entrepreneurs and the NGOs sector. Also included are prototype development and design catalogue for all time reference. This scheme has not only made available at various place.

Jute Entrepreneurs Assistance (JEAS) is a scheme formulated to provide technological and financial assistance to enthusiastic entrepreneurs keen to set up commercial units to produce value added, marketable jute diversified commodities. NCJD contemplates to articulate the accomplishments of the several R & D and test marketing efforts of various institutions over the years in the field of jutes, to entrepreneurs around the country, so as to commercialise such findings. It is expected that involvement of a large number of entrepreneurs will enhance the demand for jute fibre. This, in turn will ensure remunerative price of jute growing farmers.

***Technology Mission* :-**

The Jute Technology Mission is major component of the National Jute Policy and is the vehicle for implementation of multifarious programmes in the jute sector, both present and future. Pursuant to the National Jute Policy, 2005, the CCEA approved the Jute Technology Mission (2006-07 to 2010-11) in its meeting held on 02.06.2006 with a total outlay of Rs.355.55 crore. The Jute Technology Mission comprised four Mini Missions, to be completed during 2006-07 to 2010-11. However, the Mission could not be completed within the scheduled time on account of multiple reasons.

Subsequently, the Cabinet Committee on Economic Affairs (CCEA) approved the following in its meeting held on 26th April, 2012.

(i) extension of the implementation period of the "Jute Technology Mission (2006-07 to 2010-11) " by two years beyond 2010-11(i.e. 2006-07 to 2012-13)

(ii) reallocation of funds among the Missions while maintaining the overall grants at the same level as was approved by the CCEA vide its meeting held on 02.06.2006.

The objectives of Jute Technology Mission are :

- To Improve the yield and quality of jute fibre by

  (a) developing new varieties : (b) developing improved retting procedures; and,(c) promoting scientific agronomic practices;

- To Strengthen the existing infrastructure to develop and supply quality seeds through the public private partnership framework.
- To Implement quality improvement programmes with a thrust on retting and the adoption of other innovative extraction technologies.

- To increase the supply of quality raw materials to the jute industry at reasonable prices so that they can meet the growing demand for better quality yarn, twine and fabric for Diversified Jute Products (JDPs).
- To Explore the prospect of Commercial utilization of sun hemp, ramie, jute and mesta in the pulp and paper industry.
- To Establish strong market linkages by improving the available markets, and put in place a rural network of
- To market facilities for the benefit of jute growers.
- To Modernize plant and machinery in the jute industry, adopt international standards, and upgrade skills.
- To Take up market promotional activities and explore new areas to increase the consumption of raw jute, Jute Diversified Products (JDPs) and increase earnings through export.

MINI MISSION – I (MM-I)

This Mini-Mission is coordinated and implemented by the Department of Agricultural Research and Education (DARE)/ Indian Council of Agricultural Research (ICAR) under the Ministry of agriculture. The mandate of Mini Mission I will be to strengthen technologic for jute and allied fibre crops. the potential productivity of the newly developed technology, including new varieties will be raised at lease by 25 percent. Research efforts will be directed towards the development of varieties for different agro-climatic zones. New varieties will be developed to include desirable quantitative and qualitative characteristic to meet various agro industrial needs. Research efforts will also cover the process of retting, which is an integral process contribution to the improvement of the quality of the fibre. Mini Mission-I comprises six schemes with total proposed outlay of Rs.7.05 crore during the entire Mission period.

MINI MISSION (MM-II)

The Mini-Mission is coordinated and implemented by the Department of agriculture and Co-operation. The mandate of Mini Mission–II will be to transfer improved technology through extension to the farmers MM –II will harness post production and management technologics and concentrate on post-harvest technology to augment yield and quality improvement of jute and allied crops.

Separate development programmes for associated fibres will also be lunched under this Mission, and it will consider the prospects of commercial utilization of jute and allied fibres in the pulp and paper industry. Mini Mission-II comprises eighteen schemes with total proposed outlay of Rs.49.90 crore during the entire Mission period.

MINI MISSION – III(MM-II)

This Mini-Mission is coordinated and implemented by the Ministry of textiles. The mandate of this Mini Mission will be to develop and ensure efficient market linkages and value addition for raw jute. This will include upgradation of the existing market infrastureand facilities to be provided to frame the aim will be to provide market support to framers to enable them to get a fair market price by providing reliable and accessible market information. The focus on the technology transfer programmes to improve fibre quality through the adoption of improved retting techniques will be an integral part of the MM-III. Mini Mission-III comprised five schemes with total proposed outlay of Rs.64.58 crore during the entire Mission period. The physical and financial progress of the mini Mission-III as on 31.03.2013 is as under.

Name of Scheme	**Physical**	**Financial**	**Physical**	**Financial**
	Allocation		**Completion**	
		Rs. in crore		Rs. in crore
I. Development of Market Yard	12	11.98	11	8.96
II. Construction of DPC	40	44.00	26	31.06
III. Construction ofRetting Tank	50	5.00	40	2,04
IV. Deconstruction RettingTechnology	200	2.00	200	2.00
V. Development of HighSpeed Jute Ribboner.	3Projects (with JU CRIJA, NIRJAFT)	1.60	1st Phase Completed 2nd phase under trial run	1.00
Total		**64.58**		**45.65**

MINI MISSION – IV(MM-IV)

This Mini Mission is coordinated and implemented by the Ministry of Textiles. This Mini Mission focuses on modernization of jute industry either through replacement of old machinery with new ones and establishing green field modernized mills. It is proposed to introduce a scheme titled " Acquisition of Modern and efficient Machinery & Plants' " with a proposed allocation of Rs.100 crore. This scheme will replace the existing scheme of the Jute Manufactures development Council of Modernization of Jute Industry. the subsidy component will be 20% of identified machinery and plants subject to the pecuniary limit of Rs. 75 lakh in case of existing mills, which may be enhanced to Rs.1 crore for the North East States and Rs. 1 crore for altogether new mills. Mini Mission – IV will also include training and upgradation of skills of the workers engaged in the jute sector. It will lay emphasis on the need to transform the traditional product portfolia of the Jute Industry to include jute diversified products as these incorporate not only value addition, but are also intended to boost exports and emphasize the multiple uses for which jute can be employed. This will include the promotion of technical textiles made from jute for agriculture, road building etc, and the use of jute composites in industry. Altogether, Mini Mission-IV comprises nine schemes with total proposed outlay of Rs.234.02 crore during the entire Mission period. Since inception of the scheme (upto 31.03.2013), 9 market yards developed and 25 Departmental Purchase Centre (DPC) & 39 Retting Tank were constructed. A total investment of Rs.373.70 crore for Modernization and Upgradation of Technology in Jute Mills was made under the Capital Subsidy Scheme in 102 units all over India. Productivity improvement & TOM facilitation exercises were undertaken and implemented in 12 mills as processes for good governance. 21 markets driven R&D Studies for development of new processes and new diversified products were conducted by reputed institutions of

India. Training was imparted to 24131 workers in 39 jute mills for sustainable human resource development. Under schemes for assisting NGOs and Women Self Help Groups (WSHGs) in developing jute diversified products, 57 NGOs in 428 clusters involving 2106 Women Self Help Groups in 121 districts of 19 States benefited 28,170 artisans. Moreover, 1971 training programmes benefiting 37750 artisans were organized and 828 JDP-SHG units were setup. The setting up of 4 Jute Parks are also in progress.

The financial progress of the Mini Mission– III as on 31.03.20-13 is as under :-

Sl. No.	**SCHEMES JTM MMIV**	Total MM IV allotment(Revised 10th EC18.01.2013)	Achievement till 31.03.2013
		Rs. Crores	**Rs. Crores**
6.	**SCHEMES FOR MODERNISATION OF ORGANISED JUTE MILLS**		
6.1	Training of Workers & Supervisors	5.50	4.50
6.2	Machinery Development	28.00	21.68
6.3	Productivity Improvement & TQM Facilitation	8.00	4.97
6.4	Acquisition of Machinery and Plant (Subsidy)	90.00	76.54
7.	**SCHEMES FOR PROMOTION OF JUTE DIVERSIFICATION**		
7.1	Scheme for Design and Development of JDP	14.00	10.61
7.2	Scheme for helping the NGOs and WSHGs for developing JDPs	14.00	13.14
7.3	Scheme for Promotion of Jute Diversification.	28.52	23.59
7.4	Scheme for Commercialisation of Technology	1.00	0.03
7.5	Scheme for setting up jute Parks for the Diversified sector	35.54	21.81
	Monitoring &Admn. Exp.	9.46	8.05
	Total (Mini Mission IV).	**234.02**	**184.92**

(Data Source : Jute Section, Website updated on 17-12-2013)

Technology Transfer :

Since its inception, IJIRA has been working in close proximity with jute industry to fulfil its mandate of industrial development for the jute and its ancillary industries. IJIRA worked with almost all

the jute mills (58 nos working) in different aspects at different time. Study groups formed in different time to overcome the industrial problems.

IJIRA has been engaged and assisted jute industry to solve their day to day problem, adaptation of newer technologies, product design & development, product diversification along with process modifications. For that purposes IJIRA carried out a while lot of research & development in terms of mechanical and chemical processing modifications, instrumentation designing and product development.

IJIRA has bagged quite a large number of accomplishments in its crown and made its foot bold strong regarding the R&D of jute and allied fibres.

Jute Geotextile (JGT) and Jute Agrotextile (JAT)

Extensive research work and field studies on application of JGT & JAT in civil engineering and agriculture areas have been conducted by IJIRa with efficacy of the products have been established and documented.

With a sponsorship and guidance of NJB and in association with different research organizations of India via. B. E. College (BESUS), Central Road Research Institute (CRRI), Centre Soil and Water Conservation Research and Training Institute (CSWCRTI), Tea Research Association and Jadavpur University, IJIRA has conducted several exercises and field applications in different parts of India of JGT and JAT in the areas of civil engineering applications like –

- Soil conservation
- Road construction.
- Slope management
- Mine spoil stabilization
- River bank protection

IJIRA has also worked in various agricultural applications like –

- Weed management
- Agro-mulching for vegetation growth
- A forestation in semi-arid zone
- Sleeves for nursery etc, especially in North-East Region of India.

Instrument Development

List of some Instruments developed by IJIRA

- Electronic Moisture Meter
- IJIRA jute lustre and brightness meter
- Tensile tester for jute yarn/fabrics –Tensojute
- Electronic twist tester

- ♣ IJIRA impact strength tester
- ♣ Fibre parallelization tester
- ♣ IJIRA impact strength tester
- ♣ Raw jute bundle strength tester
- ♣ IJIRA silver irregularity recorder
- ♣ IJIRA fabric stiffness tester
- ♣ IJIRA fabric cover factor tester
- ♣ Auto leveler in Finisher card
- ♣ Microprocessor based yarn evenness tester and slub counter
- ♣ Multi-now seed Drill
- ♣ Attachment for card board tube strength measurement.

To Conclude break through in technology has brought signification changes in diversification of jute products and packaing industry.

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