

# JUTE MILL UPGRADATION FOR HIGHER PRODUCTIVITY

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*A Study Jointly Carried Out by  
Centre for Policy Dialogue (CPD) and  
Department of Mechanical Engineering, BUET  
in Association with Katalyst*

**Presentation of the  
Centre for Policy Dialogue (CPD)**

by

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*31 December 2011*



CENTRE FOR POLICY DIALOGUE (CPD)  
B A N G L A D E S H

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*a c i v i l s o c i e t y t h i n k - t a n k*

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## *Acknowledgment*

The study team would like to register their deep appreciation to

***Professor Mustafizur Rahman***

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and

***Mr Goetz Ebbecke***

General Manager, Katalyst

for their valuable inputs and suggestions for this study.



## *Contents*

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- 1. Rationale of the study**
- 2. Objectives and methodology of the study**
- 3. Market potentials for jute goods at local and international levels**
- 4. Status of jute mills: machines, workers and production Processes**
- 5. Productivity and efficiency of sample jute mills**
- 6. Possible gain through technology upgradation**
- 7. Recommendations**

# 1. Rationale of the Study



## 1. Rationale of the Study

- Jute manufacturing sector has recently started to revitalize
  - ✓ Rise in global demand for jute goods
  - ✓ Environment-friendly nature
  - ✓ Price hike of petroleum products
- Recently, government has undertaken a number of policy measures
  - ✓ Special mention of jute sector in the *Industrial Policy 2010*
  - ✓ *New Jute Policy 2011 (which has been approved last week)*
  - ✓ Special act *Mandatory Use of Jute for Packaging Products Act 2010*
  - ✓ Decoding of the genetic sequence of jute fibers
- Jute manufacturing sector is facing a perennial problem, i.e. jute products are usually less competitive
  - ✓ Alternate products: Cheap synthetic packaging products
  - ✓ Alternate system: Inefficiency in bulk-handling and lack of diversity
- Strong policy support is required with a view to take out the sector from 'low level of competitiveness'
  - ✓ Major focus should be on 'improvement of productivity' of jute mills.

## 2. Objectives and Methodology of the Study

## 2. Objectives and Methodology of the Study

- The study (CPD part) has following objectives
  - ✓ Examine the market potentials of jute goods at local and international level;
  - ✓ Investigate the current status of jute mills in terms of use machines and workers, working environment and production process;
  - ✓ Analyse the productivity and efficiency of jute mills and estimating the possible gains through improvement of efficiency in these mills;
  - ✓ Put forward necessary policy suggestions with regard to improvement of productivity.
- The study is based on the data collected from ten sample jute mills
  - ✓ Both spinning and composite categories
  - ✓ Mills are under the authority or membership of BJMC, BJMA and BJSA.
- Findings of the study have limitations in terms of their robust interpretations.



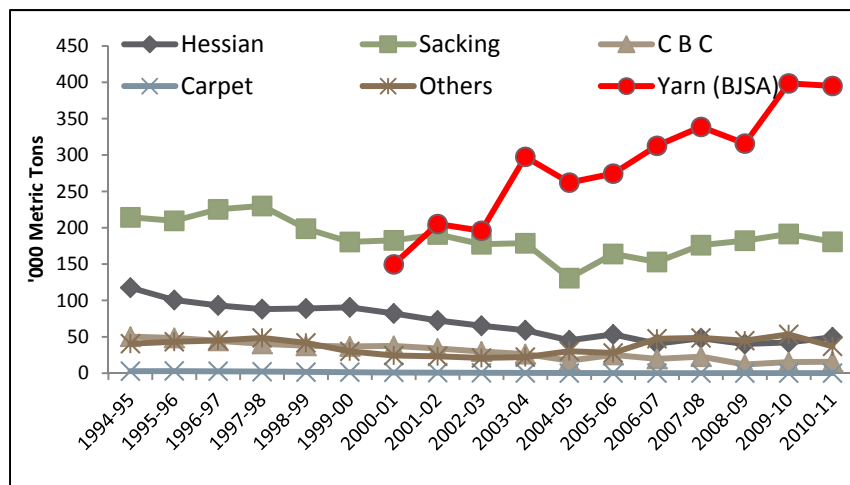


## **3. Market Potentials for Jute Goods**

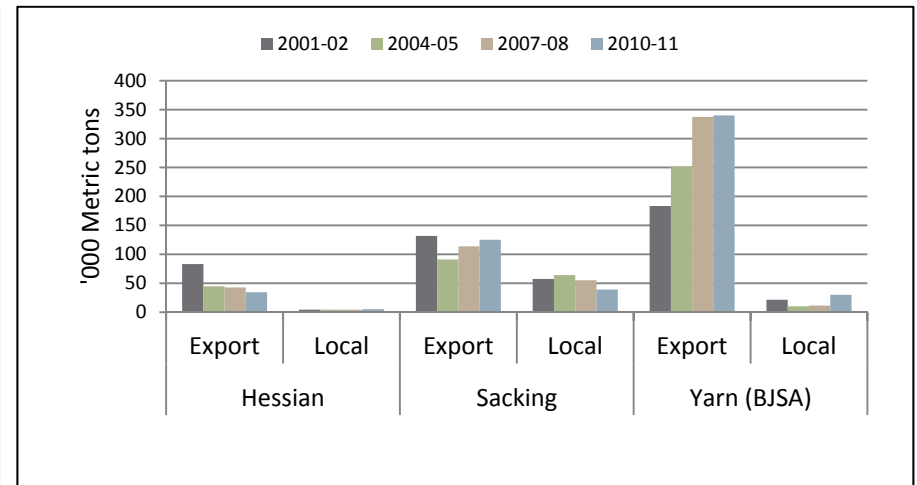
### 3. Market Potentials for Jute Goods

- Production of jute products has been remained invariant over the last decades
  - ✓ In FY2009-10 total production crossed the level of 700 thousand m. tons
- Product-composition has experienced a considerable change over the years
  - ✓ Rise of share of yarn (from 31.3% to 58.3%)
- Bangladesh's jute industry is overwhelmingly dependent on export market
  - ✓ More than 85% is exported; crossed US\$ 1 billion mark only in last fiscal
- Basic difference in the market structure with India
  - ✓ India is largely dependent on their domestic market
  - ✓ Significant contribution of India's domestic policy

Production of Jute Products: 1995-2011



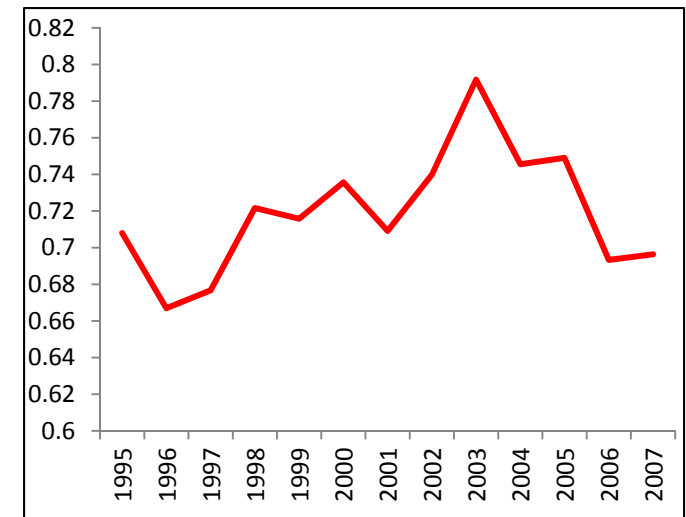
Bangladesh Export and Local Consumption



### 3. Market Potentials for Jute Goods

- The *Jute Substitutability Index* value hover around 0.7 mark
  - ✓ Indicates that major market share of packaging dominates by jute substitutes, i.e. polypropylene (PP) fabrics by 70%
- Since 2003 the index value has started to decline slowly indicating
  - ✓ Falling demand for PP fabrics; Rising demand for jute products
  - ✓ Recent export performance corroborates this change in the index value
- *Revealed Comparative Advantage* (RCA) indices for all major Bangladeshi jute products are substantially higher than 1
  - ✓ Indicate their strong competitiveness in the global market
- For a country like India, RCA analysis would not provide a good view on competitiveness.
  - ✓ RCA analysis does not take into account domestic production

Jute Substitutability Index



Source: Authors' calculation based on UNCOMTRADE's data

### 3. Market Potentials for Jute Goods

- Bangladesh has scope to increase the export by proper marketing strategy
- Bangladesh has the price advantage for jute made carpets
  - ✓ Per ton jute carpet costs US\$ 6,658 for India whereas it stands at US\$ 3,594 for Bangladesh (Rahman and Khaled, 2010)
- Turkish firms have taken interest to set up carpet factory in the EPZ.
  - ✓ Large amount of jute is likely to be used there.

RCA Index of Selected Jute Items of Bangladesh and India

HS code	Description	Bangladesh			India		
		2002	2006	2010	2002	2006	2010
'530310	Jute and other textile bast fibres, raw or retted	616.9	945.2	574.7	1.5	0.8	19.0
'530390	Jute and other tex bast fib,not spun,nes;tow and waste of fibres	367.3	616.0	383.4	1.1	0.3	4.0
'530710	Yarn of jute or of other textile bast fibres, single	1191.6	1710.8	689.3	18.3	6.5	8.9
'530720	Yarn of jute or of oth textile bast fibres,multiple (folded) or cabled	244.0	122.9	539.4	32.5	29.0	23.9
'531010	Woven fabrics of jute or of other textile bast fibres, unbleached	534.0	372.5	185.8	48.6	45.8	54.7
'531090	Woven fabrics of jute or of other textile bast fibres, o/t unbleached	159.4	588.7	103.1	4.1	2.6	22.4
'560710	Twine, cordage, ropes and cables, of jute or other textile bast fibres	902.9	966.2	58.8	10.2	19.3	3.7
'570500	Carpets and other textile floor coverings, nes	0.6	2.9	0.1	31.6	33.5	9.1
'630510	Sacks & bags,for packg of goods,of jute or of other textile bast fibres	1079.0	402.6	206.4	29.4	33.0	24.1



### 3. Market Potentials for Jute Goods

- On October, 2010, the National Parliament has approved a new act titled “Mandatory Use of Jute for Packaging Products Act 2010”
  - ✓ In view of reducing the use of artificial packaging materials
- The most important commercial use as of now is in packaging of different kinds of agricultural products
  - ✓ Rice, wheat, pulses, oil seeds, potato and sugar; jute sacks for packaging of cement
- Packaging of different kinds of processed consumer goods may be the next step to target.
- A large domestic market could be opened up with the enactment of the act
  - ✓ The study has estimated that a total demand of 840 million jute bags in the initial year for packaging of selected agricultural and non-agricultural products.
    - If a jute bag reuses for three times, then average yearly requirement would be 280 million. This would require an additional production of raw jute of about 180, 000 m. ton

Projection of required jute bags and raw jute

	<i>Aus</i>	<i>Aman</i>	<i>Boro</i>	<i>Wheat</i>	<i>Pulses</i>	<i>Oil seeds</i>	<i>Potato</i>	<i>Sugar</i>	<i>Cement</i>	<i>Total ('000)</i>
<i>Production ('000 mt)</i>	1709	12207	18341	969	221	377	8168	62.2	2877.2	42,054
<i>Jute bags ('000)</i>	34180	244140	366820	19380	4420	7540	163360	1244	57544	841,084
<i>Raw jute ('000 mt)</i>	20.5	146.5	220.1	11.6	2.7	4.5	98.1	0.7	34.5	539



## **4. Status of Jute Mills: Machines, Workers and Production Processes**



#### 4. Status of Jute Mills: Machines, Workers and Production Processes

- Technology used in jute manufacturing sector did not change much
  - ✓ Most of the machines in jute mills are old and have passed the usual functional period.
  - ✓ By proper maintenance and replacement of parts, these machines can perform as close to a new one.
- Low level of capacity utilisation is a challenge.
  - ✓ Particularly in weaving section of composite mills
  - ✓ Responsible for low capacity utilisation at backward and forward parts of the production chain.

Section-wise capacity utilization of Machines

Mill Category	Softening	Carding	Drawing	Spinning	Winding	Beaming	Weaving	Calendaring
Spinning	1.00	1.00	1.00	1.00	1.00	-	-	-
	0.75	0.58	0.75	0.45	0.75	-	-	-
	1.00	1.00	0.97	1.00	0.86	-	-	-
	0.50	1.00	1.00	1.00	0.91	-	-	-
Composite	0.67	1.00	0.94	1.00	1.00	1.00	0.76	1.00
	1.00	1.00	1.00	0.94	1.00	1.00	0.92	-
	0.44	0.75	0.69	0.51	0.69	0.40	0.40	1.00
	0.75	0.88	0.76	0.76	0.80	0.38	0.42	0.33
Public	1.00	0.94	1.00	0.99	0.94	0.48	0.53	0.67
	0.80	0.98	1.00	0.98	0.88	0.89	0.84	1.00



#### 4. Status of Jute Mills: Machines, Workers and Production Processes

- There is no standard practice for the use of workers in different sections of jute mills
  - ✓ Standard deviation in the use of workers is estimated to be 22.6 in calendaring sections to as high as 376.3 in weaving sections
- Man-machine ratio is not homogenous in all sections
  - ✓ Widely varies in softening, winding and calendaring sections
- Manufacturing of jute goods is mostly skill-oriented job.
  - ✓ There is a scarcity of skilled workers
- Entrepreneurs should offer competitive wage to retain skill workers
  - ✓ Average wage of an skilled jute worker is less than that of an agricultural worker (Tk.153/day vis-à-vis Tk.163/day)
- Female workers in skill-oriented and labourious activities is not rare
  - ✓ Manufacturers should target appointing more female workers in all sections.

Per Ton Labour Cost in Different Sections (Tk.)

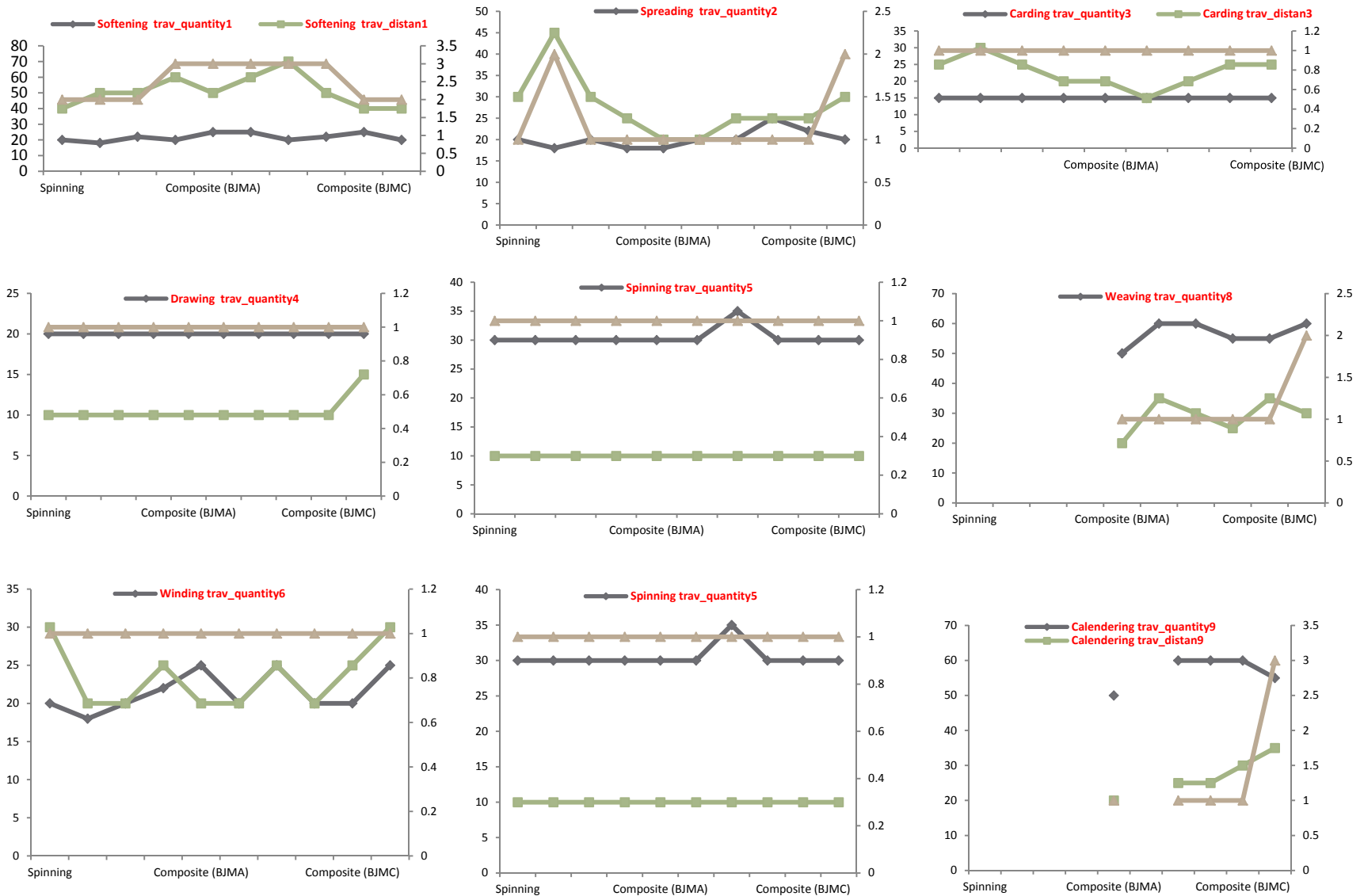
	<i>Softening</i>	<i>Carding</i>	<i>Drawing</i>	<i>Spinning</i>	<i>Winding</i>	<i>Beaming</i>	<i>Weaving</i>	<i>Calendaring</i>
<i>BJSA</i>	200	347	531	798	691			
<i>BJMA</i>	205	416	466	1153	574	323	3387	105
<i>BJMC</i>	472	695	717	3165	1097	499	8384	378



#### *4. Status of Jute Mills: Machines, Workers and Production Processes*

- Production environment in jute mills is found to be in diverse states
  - ✓ Lack of proper maintenance of temperature, humidity and widespread dust available in the factory premise
  - ✓ 50% of sample factories maintain humidity level lower than as it is required.
  - ✓ Particularly in the amount of time required, amount of output transferred and the distance passed for transferring outputs
  - ✓ Differences in ergonomic structure is appeared to be a major factor
  - ✓ Diverse state also found in maintaining required space, machines and workers at backward and forward linkage activities.
- Lack of standardised use of machines and workers in different sections among jute mills are another reasons for variation in the level of production

# 4. Status of Jute Mills: Machines, Workers and Production Processes



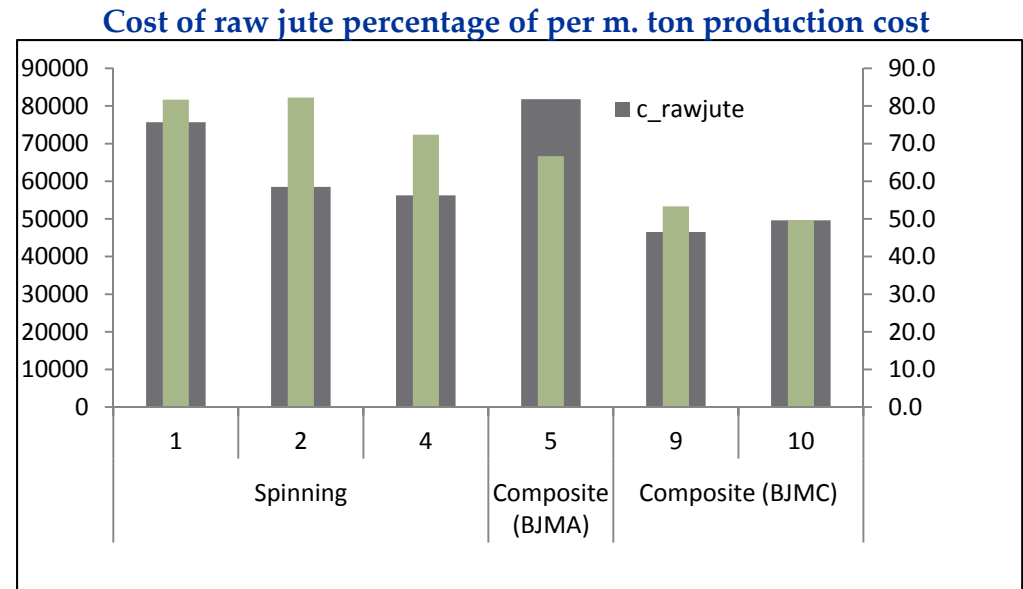
Source: Based on CPD survey, 2011





#### 4. Status of Jute Mills: Machines, Workers and Production Processes

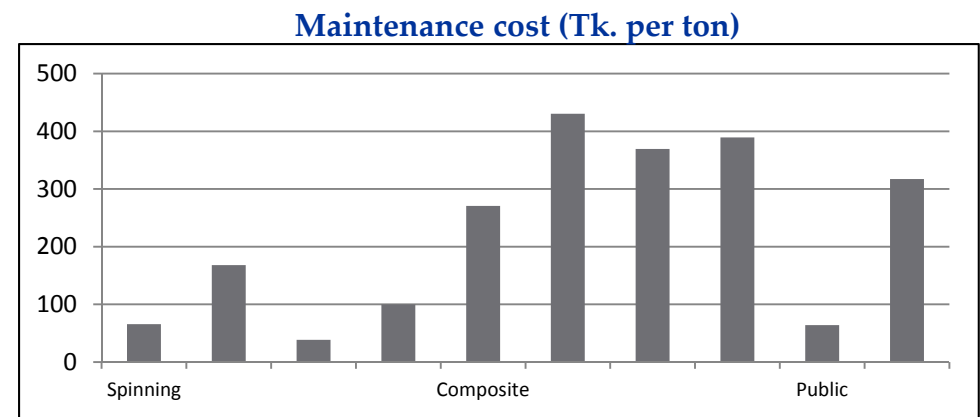
- 75% jute mills have godown facility which could stack only 1/3rd of total yearly requirement of raw jute.
  - ✓ Most of the mills procure a major share of raw jute during the post-harvest seasons taking the burden of higher price of raw jute (*about 30% higher during 2010*).
- Cost of raw jute is the most important component in overall cost structure
  - ✓ Accounted for 50-80 per cent of the total cost of production in sample jute mills
  - ✓ Rise of raw jute price in recent years have significantly increased its proportionate share in total cost of production
- Availability of raw jute at a manageable price is essential for maintaining cost competitiveness





#### 4. Status of Jute Mills: Machines, Workers and Production Processes

- Although machineries are regularly maintained according to the mill managements
  - ✓ However their overall performance level contradicts it.
- Workshops observed in sample jute mills are not found to be adequate with facilities
  - ✓ Technicians, machines, tools, availability of raw materials etc.
- Expenditure on maintenance is usually considered as an additional burden to the mills.
  - ✓ Even though only about 4-5 per cent of total cost is attributed for that purpose
  - ✓ Maintenance cost is about 10-15 per cent in developed countries.
- Instead of following the '*prevention method*' for maintenance, most mills practice '*breakdown method*'.
- Lack of availability of spare parts is also a major reason for low capacity utilisation.
  - ✓ Local manufacturing base of machineries and spare parts is inadequate.



Source: Estimates based on CPD survey, 2011

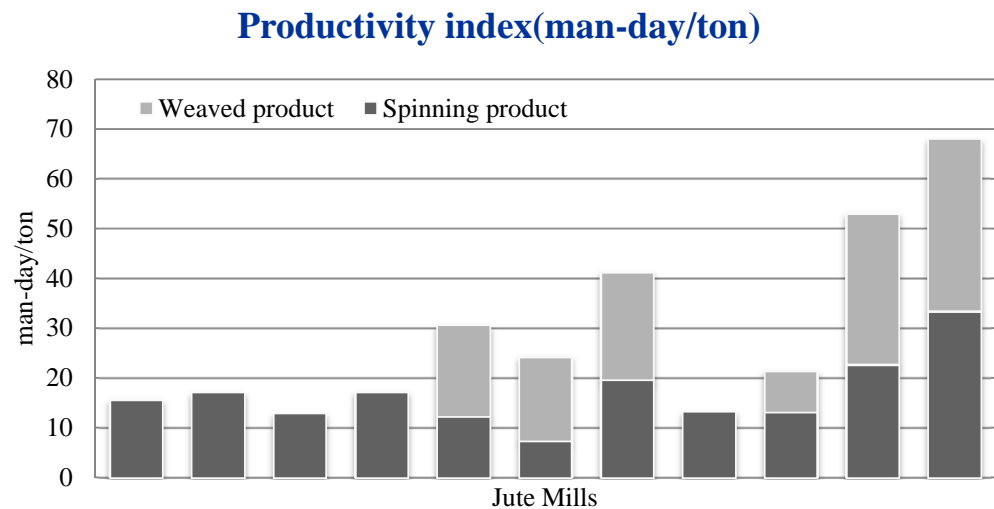


## **5. Productivity and Efficiency of Sample Jute Mills**



## 5. Productivity and Efficiency of Sample Jute Mills

- There are variations in productivity in different sections of different mills.
  - ✓ One possible reason is the machines in all the mills are not run at full capacity.
- Productivity measurement in terms of *man-day/ton* is lower for mills having a larger number of skilled worked force and use of suitable production processes.
  - ✓ Proper allocation of labour and machines can reduce *man-day/ton* productivity
  - ✓ It is essential to retain skilled workforce for better productivity



Source: Estimates based on CPD survey, 2011

## 5. Productivity and Efficiency of Sample Jute Mills

- Using *Data Envelopment Analysis Programme* (DEAP)
  - ✓ *Technical efficiency* (TE), *allocative efficiency* (AE) and *cost efficiency* (CE) of the sample mills have been estimated
- Both spinning and composite jute mills should improve their *allocative* and most importantly *cost efficiency*.

TE, AE and CE of Sample Spinning Mills

Technical Efficiency	Allocative Efficiency	Cost Efficiency
1.00	0.89	0.89
0.41	0.34	0.14
1.00	1.00	1.00
0.52	0.83	0.44

TE, AE and CE of Sample Composite Mills

Mill Category	Technical Efficiency	Allocative Efficiency	Cost Efficiency
Composite	1.00	0.75	0.75
	1.00	1.00	1.00
	0.57	0.75	0.43
	1.00	0.84	0.84
Public	0.99	0.64	0.64
	0.53	0.71	0.37

Section-wise Technical Efficiency of Sample Mills

Mill Category	Softening	Carding	Drawing	Spinning	Winding	Beaming	Weaving	Calendaring
Spinning	0.615	0.646	0.752	1.000	0.821			
	0.338	0.395	0.399	0.660	0.051			
	1.000	1.000	1.000	0.975	1.000			
	0.462	0.485	0.508	0.429	0.277			
Composite	0.656	0.470	0.560	0.447	0.537	0.889	0.754	0.457
	0.615	0.538	0.635	0.353	0.462	0.370	0.895	
	0.328	0.323	0.451	0.417	0.328	0.593	0.573	0.229
	0.538	0.665	0.935	0.750	0.538	0.972	1.000	1.000
Public	0.462	0.469	0.586	0.310	0.489	1.000	0.636	0.321
	0.320	0.195	0.259	0.179	0.320	0.361	0.317	0.786

## 6. Possible Gain through Technology Upgradation



## 6. Possible Gain through Technology Upgradation

- By improving machine capacity the possible gain in terms of improvement in productivity are as follows:
  - ✓ Softening section: 38 kg per machine per hour to 184 kg;
  - ✓ Carding section: 5-49 kg;
  - ✓ Drawing section: 2-30 kg;
  - ✓ Spinning section: 10-28 kg;
  - ✓ Weaving section: 0.9-3.0 kg
- Possible saving of labour cost (Tk. per minute) in different sections are:
  - ✓ Softening section: Tk.1.0-Tk.2.9 per minute per machine;
  - ✓ Drawing section: Tk.0.2-Tk.0.7 for carding; Tk.0.2-Tk.0.8;
  - ✓ Spinning section: Tk.0.2-Tk.1.3 ;
  - ✓ Winding section: Tk.0.1-Tk.2.1;
  - ✓ Beaming section: Tk.0.9-Tk.3.1;
  - ✓ Weaving section: Tk.0.2-Tk.0.5 ; and
  - ✓ Calendaring section: Tk.0.8-Tk.2.8.
- Proper balance of machines and workforce would result in significant cost cuts
  - ✓ In nominal terms, it could be as high as Tk.537,000 in a year for a mill.

## 7. Recommendations



## 7. Recommendations

- A medium and long term work plan needs to be developed based on the following recommendations.
- Penetrate the market potentials at domestic and international levels
  - ✓ Bangladesh and India as the two major jute-exporting countries can undertake joint initiative to promote jute products at global level.
  - ✓ This initiative should include campaigning, policy influencing, collaborative research on product development and marketing.
  - ✓ *International Jute Study Group (IJSG)* should take a lead role in this case.
  - ✓ *Ministry of Jute and Textiles (MoJT)* should immediately finalise the action plan for the implementation of the “*Mandatory Use of Jute for Packaging Products Act 2010*”.



## *7. Recommendations*

- Adoption of the Jute Policy 2011 is a welcome initiative.
- It is important to finalise the action plan based on the Policy
  - ✓ With appropriate timeframe, deliverables and appropriate authorities for implementing different targets
  - ✓ The Textile and Jute Ministry will monitor its implementation on a regular basis.



## 7. Recommendations

- Balancing the machinery-use to attain higher level of productivity
  - ✓ A review of the existing production process, techniques and operational management of different sections of jute mills is urgently needed.
  - ✓ Section-wise monitoring of capacity utilization is highly important.
- It is also important to set up a team of experts under the auspices of BJMA BJSa and BJMC
  - ✓ In order to provide technical support to the jute mills with regard to machines, working environment, size of workforce, machine replacement and production process etc.



## 7. Recommendations

- Balancing worker-use, mobilization of new workers and improvement of labour productivity
  - ✓ An assessment should be undertaken in different sections based on the standard practices of machine-worker ratio for operations.
  - ✓ Mill management should provide regular in-house training and better salary to skilled workers including non-wage benefits.
- Mill management may consider employing female workers in all sections of jute mills.
  - ✓ In this connection, the workplace should be more gender-sensitive through appropriate sanitary, medical and housing facilities.



## 7. Recommendations

- Jute mills should target for further mechanization of production technologies and processes whenever possible
  - ✓ Examples include use of forklift or jib crane for stacking
  - ✓ Conveyer belts in the softening section
  - ✓ Roll-feed breaker carding machine in the carding section
  - ✓ Baxter flyer in the spinning frame and improved weaving looms
- Improvement of knowledge-base regarding fibre quality
  - ✓ A proper training is required for the technicians and workers
  - ✓ Mainly at the stages of jute procurement, batching and selection activities



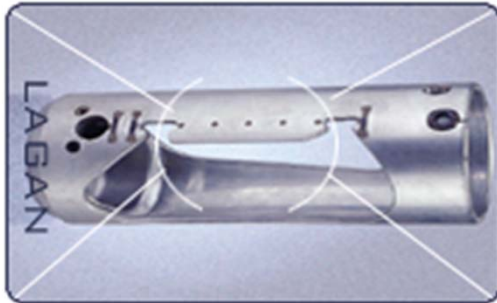
## 7. Recommendations



Jib Crane



Forklift



Baxter flyer



Ring spinning



Flexible rapier loom



## 7. Recommendations

- Improvement of maintenance practices
  - ✓ Jute mills should assess their existing maintenance practices particularly avoiding of *'breakdown'* based maintenance practices.
  - ✓ This requires extra training to make the staffs and technicians convinced to understand the changes required in the maintenance practices.
  - ✓ Mill management should be ready to invest more in maintenance such as having a fully equipped and operational workshop with skilled technicians.
- Recent MoU signed between *Gulfra Habib* (BJMC) and *Lagan (India)* has created much attention.
  - ✓ It is important to know the terms and conditions of the MoU particularly with regard to technology transfer, profit sharing, marketing of machineries and other priorities etc.
  - ✓ The target should be to supply all kinds of machineries required for the jute mill.
  - ✓ Improvement of management practices with recruitment of skilled professionals should be a priority.



## 7. Recommendations

- Develop factory level work-environment and social compliances
  - ✓ Mill management should particularly put attention to maintain the proper level of humidity, light, air, sound and dust.
  - ✓ Necessary training on the standard practice of these aspects will help to improve the production environment.
  - ✓ In collaboration with private sector organisations such as NGOs necessary facilities should be developed for the workers including dormitories, schools, clinics and entertainment facilities.
- Targeting dynamic leadership for the jute sector
  - ✓ Jute manufacturing sector needs dynamic entrepreneurs who can take the sector forward.
  - ✓ For this an energetic and dynamic management, dedicated mid-level professionals, particularly engineers and junior management trainees are required.



## 7. Recommendations

- Developing institutional capacity for better human resource
  - ✓ Upgradation of a textile institute located in Jamalpur for jute manufacturing sector is a good initiative.
  - ✓ Jute mill associations should develop collaborative arrangement with the institute to develop human resources and undertake necessary R&D.
  
- Building a strong base for research and development (R&D)
  - ✓ Recent invention of genome sequencing of jute could be expedited further.
  - ✓ *Public-private partnership* of research (between university/institute and private sector) for the development of commercial jute goods needs to be prioritised.
  - ✓ R&D undertaken by *Bangladesh Jute Research Institute* (BJRI) should be expanded with more focus on development of commercial products.



## 7. Recommendations

- GoB should introduce a *Technology Upgradation Fund (TUF)*, like that of in India
  - ✓ In order to provide financial support to the jute manufacturing sector for necessary development and upgradation of machineries, production process and further mechanization etc.
  
- GoB as well as the commercial banks should take necessary measures to provide financial support
  - ✓ In the form of low interest credit to the jute manufacturing sector especially for procurement of new machineries, upgradation/replacement of existing machineries, development of factory premises and go-down facilities etc.



# THANK YOU!

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