

# THE **FUTURE** OF JUTE PROCESSING

A Concept Presentation by **Lagan Engineering Company  
Limited**

**Technology Workshop by IJSG**

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# PRESENTATION AGENDA

1. Introduction – Problems with Jute Manufacturing
2. Thrust Areas – Priorities for Improvement
3. Step 1 – Modernization of the Conventional Mill
4. Step 2 – Equipping the Industry for New Products
5. Step 3 – Unleashing the Potential of the Jute Plant
6. Working Towards the Future

# **PROBLEMS & IMPROVEMENT AREAS**

# INTRODUCTION – THE PROBLEMS

- The Largest Market of Jute – Packaging – faces stiff competition, need protection
- Jute Products are not very successful beyond the packaging application
- Jute Products are expensive
- High consumption of resources including labour and power
- Labour is expensive, availability is poor
- Processing machines are decades old, technologically backward, have low output
- Raw Jute quality and availability is questionable

# THRUST AREAS FOR IMPROVEMENT

## ○ High Labour Cost, Poor Availability

*Machines with higher productivity, lesser stoppage*

*Semi-automatic machines reducing load on worker, better ergonomics*

## ○ Poor Quality of In-Process & Finished Products

*Machines producing better and more consistent quality of product*

*Machines capable of varied end-products*

## ○ Poor Condition & Design of Machines

*Maintenance-friendly machines with lower breakdown*

*Less polluting machines with lower sound*

## ○ High Consumption of Resources for Production

*Cheaper machines - consuming less power, less space*

## ○ Uncertainty and Poor Quality of Raw Jute

*Machines that utilize raw materials more efficiently, reduce burden on farmers*

**1.**

# **MODERNIZATION OF THE CONVENTIONAL MILL**

# NEW MACHINES FOR OLD PRODUCTS

- Key Areas: Higher productivity, use of existing raw materials and low cost
- SPREADER
  - Higher production rate, Lower maintenance
  - Improved sliver evenness through automation/sensors
  - Possible use of 2-stages of Spreading
  - In future: Stapling of fibre

# NEW MACHINES FOR OLD PRODUCTS

## ◎ **CARDING**

- Heavier delivery, Lower maintenance, Reduction of stoppage time through automation
- Integrated machine for reduction of cost, optimal carding of softer jute
- Improvement of quality of output through use of autoleveler
- Possibility of higher machine speed, use of alternate carding media (e.g. wires, flats)

## ◎ **DRAWHEAD**

- Reduction of sliver weight for higher doubling, additional parallelization without any substantial running cost

# NEW MACHINES FOR OLD PRODUCTS

## ◎ DRAWING

- Intersecting Chain-gill Design
- Higher speed, Reduction of stoppage time through automation, modular machine with single/dual heads
- Improvement of quality through more doublings

## ◎ SPINNING

- Optimized-Drag Rotating Spindle Design
- Higher speed using rotating spindles to provide optimized drag on yarn, lowering end-breaks
- Lower running costs, lower power consumption
- Possibility of increasing package size & more controlled drafting system in future for different applications

# NEW MACHINES FOR OLD PRODUCTS

## ◎ WEAVING

- Shuttle-less Reverse Weave Loom
- Higher speed, Lower end-breakage, higher efficiency
- Improvement of quality through auto-stop motions
- In future: adaptation of flexible Rapier technology for plain-weave products for higher speeds and better quality fabrics

## ◎ OTHERS

- More efficient Winding machines to ease burden on operator
- Similar quality improvements in Twisting, Winding, Sizing, Sewing, etc.

# Focus Areas

### Opening

- Evenness of Feed & Delivery



### Carding

- Intensity of Carding to be as per fibre
- Auto Feed
- Can Delivery



### Drawing

- Maximum doublings
- Intersecting pin penetration



### Spinning

- Lower break-rates of yarn
- Larger package



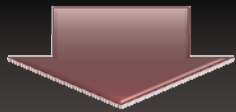
### Preparatory

- Larger packages
- Automated Material Handling



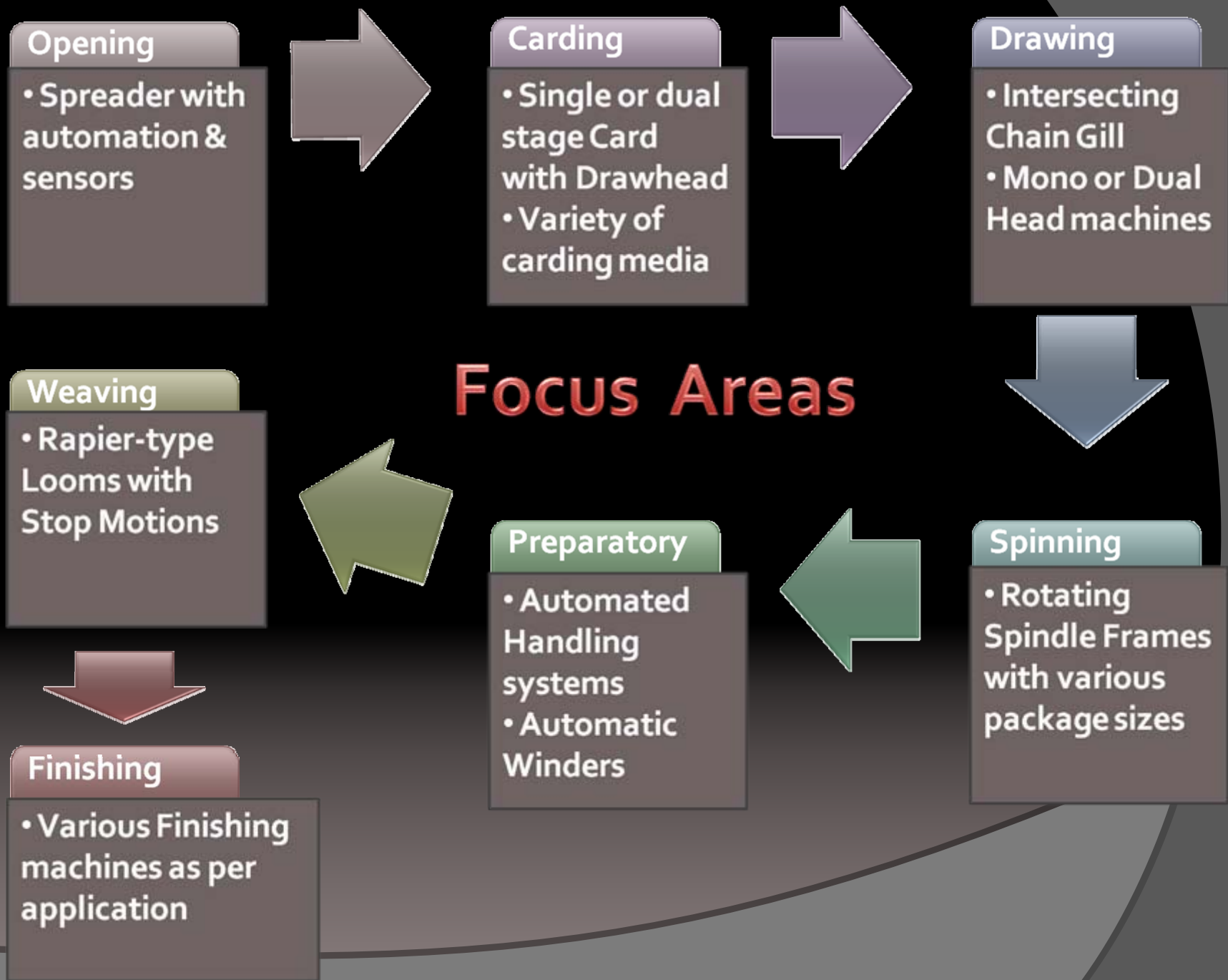
### Weaving

- Lower stress on yarn
- Lower operator involvement



### Finishing

- Versatility of application



# NEW MACHINES FOR OLD PRODUCTS

- Apart from Machinery Development, further steps to be taken for improvement:
  - Updation of existing machines, replacement of obsolete machinery
  - Adoption of best practices in machine maintenance
  - Renewed focus on quality of production to improve product quality as well as machine efficiency
  - Maintaining clean premises, suitable working atmosphere

**2.**

**EQUIPPING THE INDUSTRY FOR  
NEW PRODUCTS**

# NEW PRODUCT & TECHNOLOGY

- New Products need to be developed to reduce reliance on packaging
- Diversified products existing currently, such as Shopping Bags, Carpet lining, or even Carpet Yarn need to be strengthened
- Technology development must go hand-in-hand to address concerns of quality as well as to reduce cost

# NEW PRODUCT & TECHNOLOGY

- ◎ YARN, SHOPPING BAGS, CARPET BACKING, ETC.
  - Key Issue: Quality of yarn, Lighter Counts
  - Development needed: Machines for improving sliver quality such as Intersecting Drawing, Additional stages of Opening and Drawing, Finer-clothed Carding
  - Larger Package Spinning Frames with lower Hairiness
  - Spinning Frames with optimized Drafting system for better yarn control for lighter counts
  - Wider/Special Looms for weaving required fabrics

# NEW PRODUCT & TECHNOLOGY

## ◎ NON-WOVENS

- Key Issue: Product Acceptance, Lighter Counts, Quality of Web-formation
- Development needed: Product engineering
- Machines for finer opening
- High-speed Carding machines with auto-feeders and fine clothing for random fleece
- Needle Looms and other Bonding machines for making various non-woven fabrics and components

## ◎ OTHER AREAS

**3.**

**UNLEASHING THE POTENTIAL  
OF THE JUTE PLANT**

# JUTE PLANT EXTRACTION & USE

- It is essential to make Jute Cultivation simpler and better-tailored for the Industry's use
- Maximization of use of the various parts of the jute plant by the industry
- Better Utilization



Higher Prices



Higher Cultivation

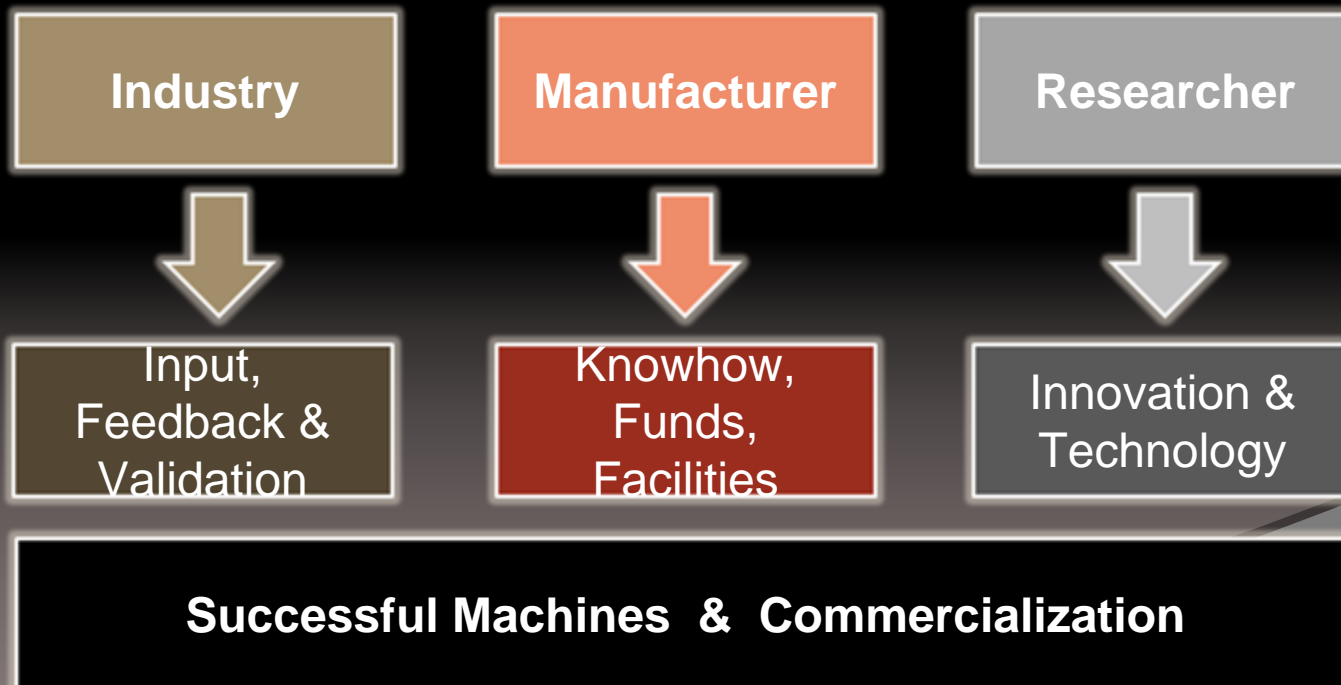
# JUTE PLANT EXTRACTION & USE

- **CULTIVATION:** Mechanized Farming/Harvesting
  - Improved Yields
  - Improvement in Quality of Fibre
- **EXTRACTION:** Mechanized Fibre Extraction/Ribboning
  - Easier Fibre Extraction involving lower cost to farmer
  - Improved Retting leading to higher quality
  - Preservation of Core/Sticks due to ribbon retting
- **SECONDARY USES:**
  - Lignin – Machines for Extraction: Steam Explosion
  - Jute Core/Stick – Decorticating Machine

**WORKING TOWARDS THE  
FUTURE**

# HOW TO GET THERE?

- A Dedicated Approach is required for successful Research & Development
- Involvement and stake of Industry, Manufacturers & Researchers are essential, as in a P-P-P



# HOW TO GET THERE?

- Requirements:
  - Feedback from Industry
  - Collective Approach
  - Funds and Initiative for Technology Transfer, especially in new areas
- Pitfalls:
  - Multiplicity of approach
  - Lack of feedback, secrecy
  - Dearth of talent
  - High cost of Technology Transfer

**THANK YOU**