

Happy
New Year
2026

IJIRA

NEWSLETTER

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“When real-time sensing meets mill floors—innovation that crosses the valley of death.”

Come, explore the threads of transformation...

-- Dr. A. K. Sharma
Director, IJIRA

Technology No. 1:

Powering Bamboo Fibre Scale-Up: Automation in Action

IJIRA is breaking productivity barriers with the successful design and prototype testing of our new Automated Feeding System. By integrating this automation with our patented Fiber Opener cum Gum Removal machine, we have supercharged production capacity to handle one ton of fiber per day.

The "Wow" Factor: Scaling from Lab to Land

This innovation is more than an engineering feat; it is the engine for our upcoming Bamboo TRL-2 to TRL-6 project under the National Technical Textiles Mission (NTTM).

- **Industrial Scalability:** Moving from a TRL-2 prototype to TRL-6 commercial readiness ensures IJIRA delivers timely, industrial-grade results for the bamboo sector.
- **Cluster-Mode Implementation:** To ensure fast technology adoption, these units are designed for deployment in specialized clusters directly within bamboo cultivation areas.
- **Unmatched Efficiency:** This automated workflow complements IJIRA's broader mission of high-value fiber engineering, such as our 50:35:15 Jute-Ramie-Viscose blend , which already offers a 197% improvement in elongation and a 41.7% gross margin.

By placing high-capacity, automated technology in the hands of local clusters, IJIRA is bridging the "valley of death" between research and rural prosperity.

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Auto Feeder of Bamboo Fiber to Fiber Opener

Technology No. 2:

IJIRA's CFC: Launch pad for Jute into High-Volume Agro & Geotextiles

IJIRA is officially bridging the "Valley of Death" between laboratory innovation and industrial scale-up. We are proud to announce the establishment of a state-of-the-art Common Facility Centre (CFC) for Jute-based Agromulches and Erosion Control, a ₹7.12 Crore initiative that marks the Jute sector's bold entry into the high-volume Technical Textiles arena.

The "Wow" Factor: A National First

This isn't just a facility; it is a technological revolution for Indian agriculture and civil engineering:

- **Pioneering Technology:** Following due process, IJIRA has placed an order for a state-of-the-art stitch-bonded nonwoven machine from the renowned German company. This advanced technology is being introduced for the first time in India.
- **Scientific Precision:** The CFC will engineer hybrid mulches combining jute caddies with waste wool and agro-residues, systematically designed to match the performance of plastic mulches while remaining fully biodegradable.
- **Field-Proven Results:** Preliminary trials have already shown a 39% yield increase in crops like brinjal, alongside enhanced soil fertility and moisture retention.

Strategic Impact & Sustainability

The CFC addresses critical global gaps by providing rigorous material science characterization—from tensile strength to carbon sequestration potential.

- **Eliminating Plastic:** By targeting a replacement for India's 5 million t/yr plastic mulch use, this center supports the national mission to end plastic pollution and achieve net-zero goals.
- **Civil Engineering Leap:** Beyond the farm, the CFC will develop India's first formal Design Manual for Erosion Control Blankets (ECBs), enabling civil engineers to use jute geotextiles for 99% reduction in soil loss on steep slopes.
- **Economic Driver:** The facility will be open "on-charge" to entrepreneurs and major mills, validating market demand and accelerating industry entry into the \$247B global technical textiles market.

This hub transforms jute from a traditional packaging material into a modern economic driver, positioning Indian natural fibers on the global stage of environmental engineering.



Common Facility Center- Stitch Bonding Non-Woven Plant

Technology No. 3:

From Bio-Catalysts to Living Labs: The Future of Ramie is Green

IJIRA is leading a global shift in textile processing by retiring the "dark side" of chemical degumming—a 70-year-old industry standard notorious for toxic pH levels, massive water waste, and fiber damage. We are proud to announce the perfection of our 2nd Generation Enzymatic Technology and our strategic leap into 3rd Generation Microbial Degumming, turning ramie into the ultimate eco-luxe fiber.

The 2nd Gen Milestone: Precision by Design

Our perfected enzymatic process replaces harsh caustic soda with proprietary bio-catalysts that target only the gum, leaving the "spine" of the cellulose untouched.

- **40% Stronger Fibers:** Eliminates the 10–15% strength loss typical of chemical retting.
- **70% Water Savings:** Drastically cuts consumption from 3,000 to 900 liters per kg.
- **93% Cleaner Effluent:** Reduces wastewater COD from a staggering 950 mg/L to a pristine 65 mg/L.

The 3rd Gen Frontier: The "Living" Factory

Moving beyond added enzymes, IJIRA is now pioneering Microbial Degumming—a 3rd generation technology that utilizes controlled fermentation.

- **Energy Efficiency:** Operates at near-ambient temperatures (30–35°C), further slashing carbon footprints.
- **In-Situ Action:** Living microbes produce enzymes directly on the fiber, consuming breakdown sugars to ensure a more complete, natural degumming process.
- **Zero-Chemical Goal:** A purely biological route that promises to be the lowest-energy, lowest-cost bulk processing method in the world.

The "Wow" Factor: Unbeatable Economics

Sustainability at IJIRA isn't just an environmental choice; it's a massive economic win for the industry.

- **65% Cost Reduction:** Processing costs have plummeted from ₹9.5/kg to just ₹3.35/kg.
- **Value Explosion:** Our trial results show a 124% increase in total fiber value, jumping from ₹8,250 (@ ₹235/Kg) to ₹18,500 per batch (@₹460/ Kg premium grade) due to superior fiber fineness and strength.

By bridging the gap between biotechnology and traditional textiles, IJIRA is ensuring that Ramie isn't just the strongest natural fiber—it's the smartest business choice for a sustainable 2026.



Hand Spun Vs. Ring Spun Yarn



Cottage Process

Industrial Process

Ramie Fiber (Noil)



Ramie Fiber

Technology No. 4:

The Triple-Fiber Revolution: Redefining Jute for the Premium Era

IJIRA has developed a next-generation blended yarn—50% Jute : 35% Ramie : 15% Viscose (3 lbs/spyndle)—that transforms conventional jute into a high-performance, premium textile material. This carefully engineered blend combines jute’s cost advantage, ramie’s superior strength and silk-like luster, and viscose’s softness and comfort, delivering a yarn that is stronger, smoother, and far more versatile than pure jute.

The "Wow" Factor: Performance Meets Profit

This isn't just a new yarn; it is a technical leap forward. By strategically combining 50% jute with 35% ramie and 15% viscose, we have achieved results that redefine the performance envelope.

- **Unmatched Strength:** A 18–25% improvement in tensile strength over pure jute yarn.
- **Elasticity Breakthrough:** A staggering 197% increase in breaking elongation, solving jute’s inherent brittleness.
- **Sensory Transformation:** A 60% improvement in drape and a "silk-like luster" that elevates the yarn’s softness rating from a 3/10 to a 7/10
- **Counter-Intuitive Economics:** Despite its premium quality, the blend offers a 12–22% lower raw material cost compared to pure jute in the current 2025 market.

Where does it fit best?

This blended yarn is ideally suited for home textiles (upholstery, curtains, décor), fashion and lifestyle products, automotive interiors, and technical textiles, where buyers increasingly seek strength with sustainability.

Why it matters?

By leveraging existing jute spinning infrastructure with minimal modification, this innovation enables industry to move up the value chain—from low-margin commodity jute to high-margin, sustainable specialty products—aligning perfectly with Make in India, green materials, and global ESG demand.

In essence:

IJIRA’s jute–ramie–viscose blended yarn is not just an incremental improvement—it is a strategic leap, turning natural fibres into a profitable, future-ready solution for modern textiles.



Jute-Ramie-Viscose Blended Yarn

Technology No. 5:

Beyond Burlap: The Triple-Fiber Masterpiece Redefining Modern Textiles

IJIRA is proud to unveil a high-performance Jute-Ramie-Viscose (50:35:15) blend (Pseudo-Linen) that marks the end of "rough" jute and the beginning of sustainable luxury.

When woven with a cotton or PC warp, the blend exhibits a "designed anisotropy"—meaning the warp ensures comfort while the weft provides massive load-bearing capacity resulting in reinforced jute pseudo-linen fabric.

- **Durability:** High tenacity ramie in the weft reduces fabric tear under load by up to 35% compared to cotton equivalents.
- **Wet Strength:** Unlike pure jute, this blend maintains its integrity when saturated, making it ideal for outdoor applications and frequent laundering.
- **Comfort:** The 13.8% moisture regain (vs. 12.5% for jute) and high breathability ensure the fabric feels cool and prevents heat trapping.
- **Dimensional Stability:** Low extensibility ensures the fabric preserves its shape and does not sag over time.

Economic Impact & Market Potential

The blend addresses the "profitability gap" in the jute industry by reducing material costs while simultaneously commanding a price premium.

- **Raw Material Advantage:** As generally the market price of Jute is much lower than that for viscose and ramie this results in a 12–22% lower material cost.
- **Processing Efficiency:** The blend reduces spinning breaks by 20–30%, improving effective capacity and reducing waste.
- **Profitability:** Gross margins are projected to expand from 5.7% (commodity jute) to double digit figures.

Strategic Application



Why this matters for 2026:

As global markets shift toward biodegradable, high-performance materials, this blend offers manufacturers a "plug-and-play" solution that uses existing jute spinning infrastructure. It is no longer just about being "eco-friendly"—it's about delivering a fabric that is stronger than cotton, softer than traditional bast fibers, and significantly more profitable than either and could be sold as Affordable Linen.

Technology No. 6:

From “Non-Viable” to “No-Hands”: IJIRA’s Smart Autodoffing Retrofit Redefines Spinning Automation

From "Non-Viable" to "Necessity"—How IJIRA’s latest automation breakthrough is turning the 4 1/4” S.D. Spinning Frame into a self-running powerhouse.

The Challenge

For years, the industry stood at a crossroads: the desire for automation was high, even the IJIRA’s lowest price tag of ₹4.5 Lakhs for full spinning frame automation was a hurdle too high for many. The industry spoke, and IJIRA listened.

The Innovation: "Set it, Forget it, Spin it."

Our engineers have stripped away the financial weight of traditional automation, replacing it with a sleek, high-intelligence retrofit designed specifically for the 110-spindle 4 1/4 inch S.D. Spinning Frame.

What Makes It a Game-Changer

- Zero manual intervention for builder movement during doffing
- Simple retrofit—no major modification to the spinning frame
- Panel-based control, where the operator inputs:
 - Doffing time
 - Doffing loss time
- Uninterrupted operation: once set, the machine can run the entire day in a single cycle
- Reduced dependency on skilled manpower and minimized human error

“We didn’t just automate a machine; we optimized an investment. This retrofit proves that high-tech efficiency doesn’t have to come with a high-end price tag.”



True innovation lies not in what is technically possible, but in what industry can confidently adopt

Technology No. 7:

From Smart Sensors to Shopfloor Success

IJIRA is turning the "Golden Fiber" into a high-tech powerhouse. We are officially bridging the gap between innovative research and industrial reality with our latest pneumatic-controlled roll-former—a game-changer featuring real-time sliver weight and moisture detection.

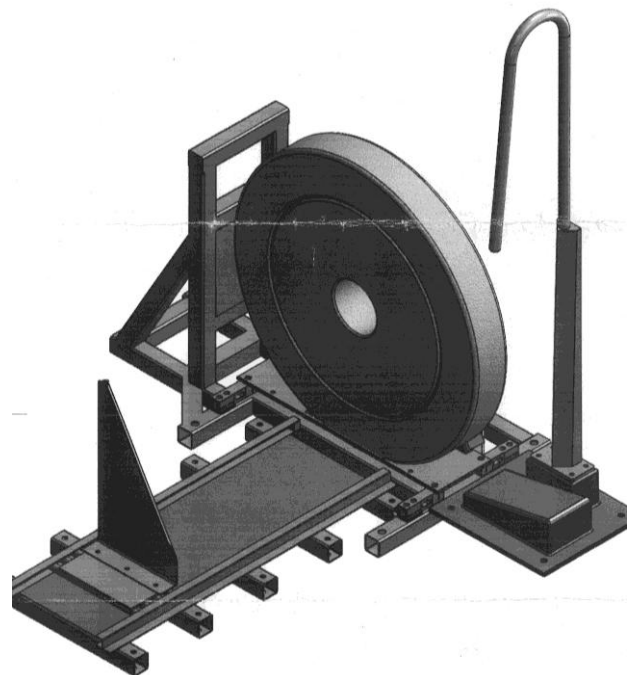
The "Wow" Factor: From Blueprint to Birla

This isn't just a prototype; it's a commercial success story. Birla Corporation Ltd. (Birla Jute Mill) is already on board, and IJIRA has commenced the transition to the factory floor.

- **Precision Engineering:** We are currently finalizing a custom 3D model specifically designed to integrate seamlessly with the mill's existing machinery.
- **Rapid Deployment:** The countdown has begun for a full-scale installation scheduled for February 2026.
- **Proven Results:** Beyond the roll-former, trials with our larger 34" carding rolls in mills across North & South 24 Parganas are already delivering significant leaps in efficiency and sliver quality.

Generating Tangible Value

By converting sophisticated lab innovations into industrial standards, IJIRA is doing more than just advancing science—we are generating tangible value and royalty for the institute. This leap ensures that the next generation of jute processing is smart, sustainable, and commercially unstoppable.



3-D drawing of roll receiving part

Skill Initiatives

🏗️ Architecting the Future: IJIRA's NTTM Skilling Mission Empowers Next-Gen Engineers

IJIRA is officially building the high-tech workforce required to lead India's technical textile revolution. Under the NTTM, we have launched a dual-track skilling offensive to bridge the talent gap from the classroom to the shopfloor:

- **TG-01 | Engineering the Future:** IJIRA has partnered with two premier engineering colleges to transform Civil Engineering students into specialists in sustainable infrastructure.
- **Mobilization Milestone:** Infrastructure arrangements and student mobilization through the ABACUS Institute (Magra, Hooghly) are complete, with registered students set to begin intensive on-campus training at IJIRA shortly.
- **National Impact:** These students will be uniquely equipped to integrate advanced jute geotextiles into road cuts, embankments, and watersheds, aligning with international best practices.
- **TG-02 | Shop floor Excellence:** Our industry-integrated skilling programs are already live and "hands-on" at IJIRA Kolkata and Bowreah Jute Mills, Howrah, ensuring immediate value generation for the jute sector.

By empowering the next generation of civil engineers and mill professionals, IJIRA is ensuring that the "soft revolution" in natural fibers is powered by world-class technical expertise



Skill programme for TG 2 under NTTM (Skilling) at Bowreah Jute Mills – Theory & Practical

Testing / Consultancy Services

Performance of service departments:-

	Physical Testing	Chemical Testing
Sample tested	27	46 (Non-FGJP)
Moisture Meter calibrated	17	-
FGJP Lot inspected & tested	-	06
FGJP Interim audit	-	-
580g B.Twill bag inspected	1,36,888 bales	
NAFED & Others bag inspected	15,273 bales	

Events

- ✚ Director visited IIIT Naya Raipur, Chattishgarh to explore possibility of collaboration in the field of automation in Jute Industry.
- ✚ Director attended 1st Coordination meeting of TRA's in Vigyan Bhawan, Delhi,
- ✚ Director visited Indira Gandhi Agriculture Visyavidyalaya, Raipur for discussion of more in-depth & scientific validation studies on IJIRA developed bio-agromulch.
- ✚ Smt. Soumita Choudhury attended the 33rd meeting of TXD 01.
- ✚ Smt. Soumita Choudhury attended a two days training at NABL, Kolkata
- ✚ Visit paid by Smt. Soumita Choudhury at Birla Jute mill for implementation of Semi automatic morah feeding system and implementation of second Morah Weight control and monitoring system.
- ✚ A trial of 530g bag with revised dimension used for Soyabean seed packing has been conducted at Hukumchand Jute Mill and Gloster Ltd. by Gopal Mukhopadhyay..
- ✚ Gopal Mukhopadhyay attended meeting on Review of supply of jute bales from Kolkata under RMS 2026-27 at Patsan Bhawan.

Innovating Natural Fibre

for
Sustainable Future

INDIAN JUTE INDUSTRIES' RESEARCH ASSOCIATION

17, Taratala Road, Kolkata - 700 088

Telephone: (033) 6626 9200 * Fax: (033) 6626 9204 * E-mail: ijiraweb@ijira.org.in *

Website: www.ijira.org.in