

## Analysis of the socio-economic impact of jute cultivation on rural livelihoods in Pakur District, Jharkhand

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### ABSTRACT

Jute (*Corchorus* spp.) remains a vital cash crop for smallholder farmers in eastern India, yet empirical evidence on its socio-economic contribution at district level remains limited. This study investigates the socio-economic impact of jute cultivation on rural livelihoods in Pakur district, Jharkhand, one of the two jute-growing districts in the state. Primary data were collected through field surveys across five blocks, covering 8,510 jute-growing households. Results revealed that jute is cultivated over 6,510 ha with an annual production of 16,275 tons, predominantly by marginal farmers (68%) holding <1 ha land. *Corchorus olitorius* variety JRO-204 occupied 45% of the cultivated area, yielding 28.5 q/ha. Jute contributed 30-42% of total household income, with the highest contribution observed among families engaged in Self-Help Group (SHG)-based jute product enterprises. Adoption of improved cultivation and retting practices remained low (22-42%), despite their demonstrated potential to increase fibre yield by 29% and tensile strength by 20%. SHGs involving 996 members (96% women) generated annual sales of ₹36.71 lakh through diversified jute products. The study concludes that jute cultivation significantly supports rural livelihoods in Pakur district, and scaling improved practices alongside SHG-based enterprise development offers a sustainable pathway for economic strengthening.

**Key Words** - Jute cultivation, *Corchorus olitorius*, rural livelihoods, socio-economic impact, Self-Help Groups, Pakur district, fibre quality, smallholder farmers

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### INTRODUCTION

Jute (*Corchorus* spp.) occupies a distinctive position among natural fibre crops owing to its biodegradability, versatility, and economic significance in agrarian economies of South Asia (Islam & Alauddin, 2012). India ranks as the largest global producer of jute, contributing approximately 97% of world production together with Bangladesh, with West Bengal, Assam, Bihar, and Odisha serving as major cultivation hubs (Satya *et al.*, 2016). The crop not only provides raw material for

the packaging and textile industries but also sustains livelihoods of millions of smallholder farmers through employment generation and income security (Ray *et al.*, 2017).

Jharkhand, despite its agro-climatic suitability for jute cultivation, remains underrepresented in jute production statistics, with cultivation confined primarily to Sahibganj and Pakur districts (Singh, 2004). The traditional practices of jute cultivation and retting persist in these regions, often resulting

in suboptimal fibre quality and reduced economic returns (Zakaria & Firoza, 2001). Studies have demonstrated that adoption of improved agronomic practices, including high-yielding varieties and controlled retting techniques, can significantly enhance fibre yield and tensile strength (Saha & Biswas, 2005). However, the extent of such adoption and its socio-economic implications remain inadequately documented in the context of Jharkhand.

The socio-economic significance of jute extends beyond primary cultivation to value-added activities, particularly through Self-Help Groups (SHGs) engaged in manufacturing jute-based products (Ahmad & Parrey, 2013). Such enterprises offer avenues for rural livelihood diversification and women's economic empowerment, aligning with broader sustainability objectives including reduction of plastic usage (Casper, 2020). Nevertheless, empirical evidence quantifying the contribution of jute to rural household income and enterprise development in Pakur district remains scarce.

Against this backdrop, the present study aims to analyse the socio-economic impact of jute cultivation on rural livelihoods in Pakur district, Jharkhand, with specific emphasis on cultivation practices, income contribution, fibre quality parameters, and the role of SHG-based enterprises.

## LITERATURE REVIEW

### Global and National Scenario of Jute Production

Jute remains a cornerstone of natural fibre economies, with Bangladesh and India collectively accounting for nearly 97% of global production (Islam & Alauddin, 2012). In India, jute is cultivated across approximately 7.5 lakh hectares, with West Bengal contributing over 70% of the national output (Satya *et al.*, 2016).

The crop's economic significance is underscored by its dual role as a source of raw material for industry and as a livelihood anchor for smallholder farmers (Roul, 2009).

### Jute Cultivation Practices and Fibre Quality

Optimal jute cultivation requires specific agro-climatic conditions including high relative humidity,

well-drained alluvial soil, and temperatures between 24–37°C (Saha & Biswas, 2005). Retting, the critical post-harvest process, significantly influences fibre quality parameters such as tensile strength, fineness, and uniformity (Zakaria & Firoza, 2001). Improved retting techniques using pectinolytic bacterial isolates have been shown to reduce retting duration and enhance fibre quality (Biswapriya *et al.*, 2014). Despite these advancements, traditional retting practices persist in many regions, leading to suboptimal fibre recovery (Das *et al.*, 2014).

### High-Yielding Varieties and Improved Agronomy

The adoption of high-yielding varieties such as JRO-204 (olitorius) and JRC-321 (capsularis) has demonstrated potential to increase fibre yield by 25–30% compared to local varieties (Tooba, 2020). Early sowing during March–April combined with recommended NPK fertilizer application further enhances productivity and fibre strength (D.P. Ray *et al.*, 2017). However, adoption rates among smallholder farmers remain constrained by limited access to quality seeds and technical extension services (Ghimire & Thakur, 2013).

### Socio-Economic Dimensions and Rural Livelihoods

Jute cultivation contributes significantly to rural household income, with estimates indicating 25–35% of total income derived from jute in jute-growing regions (Khondake *et al.*, 2012). The crop also provides employment for approximately 40 lakh workers across cultivation, retting, and processing stages (Ray, 2012). Beyond primary cultivation, jute-based handicraft and cottage industries offer avenues for value addition and women's economic participation (Ahmad & Parrey, 2013).

### Self-Help Groups and Enterprise Development

Self-Help Groups have emerged as effective institutional mechanisms for promoting jute product manufacturing at the community level (Sudipta & Ashis, 2012). Studies indicate that SHG-based enterprises not only generate supplementary income but also enhance women's decision-making autonomy and social standing (Karthik & Ramya, 2012). The promotion of jute bags and diversified

products further aligns with environmental sustainability objectives (Casper, 2020).

### Research Gap

Despite extensive literature on jute cultivation, empirical studies focusing on Jharkhand—particularly Pakur district remain notably absent. The present study addresses this gap by providing a comprehensive analysis of socio-economic impacts specific to this underrepresented region.

## MATERIALS & METHODS

### Study Area

The present study was conducted in Pakur district, Jharkhand, India, located between 23°40' to 25°18' N latitude and 86°25' to 87°57' E longitude. Pakur district was purposively selected as it is one of only two jute-growing districts in Jharkhand, alongside Sahibganj (Singh, 2004). The district comprises five administrative blocks: Pakur (Sadar), Maheshpur, Litipara, Hiranpur, and Amrapara, all of which were included in the study to ensure comprehensive representation.

### Study Duration

The research was conducted over a period of 18 months from January 2024 to June 2025, encompassing two consecutive jute cultivation cycles (Kharif seasons of 2024 and 2025) to capture seasonal variations and ensure data reliability.

### Research Design

A cross-sectional descriptive research design combining quantitative and qualitative approaches was employed. The study adopted a multistage stratified random sampling technique to ensure representative data collection across the five blocks.

**Table 1 - Sampling Framework and Sample Size**

Sampling Stage	Description
Stage 1: Block Selection	All five blocks of Pakur district were purposively selected based on jute cultivation intensity.
Stage 2: Village Selection	From each block, 6 villages with maximum jute cultivation area were selected, totalling 30 villages.
Stage 3: Household Selection	From each village, 30 jute-growing households were randomly selected, yielding a total sample of 900 households (30 villages × 30 households).

The sample size was determined using Yamane’s formula at 95% confidence level with 5% margin of error.

### Data Collection Methods

#### Primary Data Collection

1. Household Survey: A semi-structured, pre-tested questionnaire was administered to 900 jute-growing households to collect data on landholding, cultivation area, production, varieties cultivated, income contribution, adoption of practices and SHG participation.
2. Key Informant Interviews (KIIs): In-depth interviews were conducted with 50 key informants including block agricultural officers, jute traders, SHG leaders, and progressive farmers.
3. Focus Group Discussions (FGDs): Ten FGDs (two per block) with 8–12 participants each were conducted to validate survey findings and explore community-level perceptions.
4. Field Observations: Direct field observations were made during sowing, growing, harvesting, and retting stages to document cultivation practices and fibre processing techniques.

#### Secondary Data Collection

- District Agriculture Office, Pakur
- Block Development Offices
- National Jute Board, Kolkata
- Jute Corporation of India
- Published journals, government reports, and statistical abstracts

#### Materials Used

Material	Purpose
GPS Device	Geo-tagging of surveyed villages and jute fields
Measuring Tape	Measurement of cultivation area and plant height
Digital Weighing Balance	Determination of fibre yield (q/ha)
Tensile Strength Tester	Assessment of fibre tensile strength (g/tex)
Vernier Calliper	Measurement of fibre fineness and diameter
Semi-structured Questionnaire	Household data collection
Digital Camera	Photographic documentation of practices

## Methodology for Specific Parameters

### Assessment of Area, Production, and Land holding

Cultivation area per household was measured through field verification using GPS and corroborated with land records. Total block-wise area was calculated by aggregating household-level data and cross-validated with block agriculture office records. Annual jute production was computed using the formula:

$$\text{Annual Production (tons)} = \frac{\text{Cultivation Area (ha)} \times \text{Average Fibre Yield (q/ha)}}{10}$$

### Identification of Species and Varieties

Species and variety identification was performed through:

- Morphological characterization using standard taxonomic keys (D. Saha & S.K. Biswas, 2005)
- Verification with block-level agricultural extension officers
- Cross-referencing with seed supply records from the District Agriculture Office

Percentage of cultivation area and farmer adoption were calculated as:

$$\text{Cultivation Area (\%)} = \frac{\text{Area under specific variety}}{\text{Total jute area}} \times 100$$

$$\text{Farmers Adopting (\%)} = \frac{\text{Number of farmers cultivating specific variety}}{\text{Total sample farmers}} \times 100$$

Fibre yield (q/ha) was determined by weighing fibre obtained from measured plots and extrapolating per hectare.

### Socio-Economic Profile and Income Contribution

Data on household income from jute and other sources were collected through detailed income questionnaires. Contribution percentage was calculated as:

$$\text{Contribution to Household Income (\%)} = \frac{\text{Annual income from jute}}{\text{Total annual household income}} \times 100$$

Landholding categories were classified according to Government of India norms:

- Marginal: <1 ha
- Small: 1–2 ha
- Medium: >2 ha

### Adoption of Improved Practices and Fibre Quality Assessment

Adoption rates were calculated as:

$$\text{Farmers Adopting (\%)} = \frac{\text{Number of farmers practicing improved method}}{\text{Total sample farmers}} \times 100$$

**Fibre Yield (q/ha):** Measured from randomly selected 10 m × 10 m plots in fields of adopting and non-adopting farmers.

**Tensile Strength (g/tex):** Determined using a universal tensile strength tester following standard IS: 451 (1976) protocol. Five fibre samples per farmer category were tested, and mean values were recorded.

**Fibre Uniformity (%):** Assessed visually and through length measurement using vernier caliper, with uniformity calculated as the percentage of fibres within ±5 cm of the mean fibre length.

**Retting Duration (days):** Recorded through farmer interviews and field observations from the start of retting to completion of fibre extraction.

### SHG-Based Jute Product Manufacturing

Data on SHGs engaged in jute product manufacturing were collected through:

- Inventory from District Rural Development Agency (DRDA) and block offices
- Direct interviews with SHG members and presidents
- Verification of monthly income and annual sales from SHG meeting records and bank statements

Women member percentage was calculated as:

$$\text{Women Members (\%)} = \frac{\text{Number of women members}}{\text{Total SHG members}} \times 100$$

### Data Analysis

Quantitative data were entered into Microsoft Excel (2021) and analyzed using SPSS version 26.0. Descriptive statistics including frequencies, percentages, means, and standard deviations were computed. Comparative analysis between adopter and non-adopter groups was performed using independent t-tests at  $p < 0.05$  significance level. Qualitative data from KIIs and FGDs were analyzed using thematic content analysis.

### Ethical Considerations

Prior informed consent was obtained from all survey participants. Anonymity and confidentiality of

respondents were maintained throughout the study. Ethical clearance was obtained from the Institutional Ethics Committee, Sido Kanhu Murmu University, Dumka.

## RESULTS

### Area, Production, and Landholding Pattern

The extent of jute cultivation across the five blocks of Pakur district is presented in Table 1. The total area under jute cultivation was recorded as 6,510 ha, with Pakur (Sadar) block accounting for the highest area (1,850 ha), followed by Maheshpur (1,420 ha) and Hiranpur (1,210 ha). A total of 8,510 households were engaged in jute cultivation, with an average landholding of 0.76 ha per household, indicating that jute is predominantly a smallholder crop in the district. The annual jute production was estimated at 16,275 tons, with Pakur (Sadar) contributing the maximum (4,625 tons).

### Species and Varietal Composition

The species and variety-wise distribution of jute cultivated in Pakur district is presented in Table 2. Among the cultivated species, *Corchorus olitorius* dominated with 65% of the total cultivation area (JRO-204: 45%; JRO-8432: 20%), while *Corchorus capsularis* accounted for 35% (JRC-321: 25%; JRC-212: 10%). The adoption pattern of farmers closely mirrored the area distribution, with JRO-204 being the most preferred variety (42% farmers). The average fibre yield was highest for JRO-204 (28.5 q/ha), followed by JRO-8432 (26.2 q/ha), JRC-321 (24.8 q/ha), and JRC-212 (23.5 q/ha).

### Socio-Economic Profile and Income Contribution

The socio-economic characteristics of jute-growing households and the contribution of jute to their income are presented in Table 3. The majority of households (68%) were marginal farmers (<1 ha), followed by small (24%) and medium (8%) farmers. Average annual income from jute ranged from ₹16,500 (ST households) to ₹35,600 (General category households). The contribution of jute to total household income was highest among households engaged in agriculture alongside SHG-based enterprises (42%), followed by agriculture-only households (38%) and agriculture-labour households (35%).

### Adoption of Improved Practices and Fibre Quality

The adoption status of improved cultivation practices and their impact on fibre quality parameters are presented in Table 4. Traditional sowing (June-July) was practiced by 72% of farmers, while only 28% adopted improved early sowing (March-April). Similarly, traditional retting in stagnant water was practiced by 78% of farmers, with only 22% adopting improved controlled retting methods. Fertilizer application was adopted by 42% of farmers.

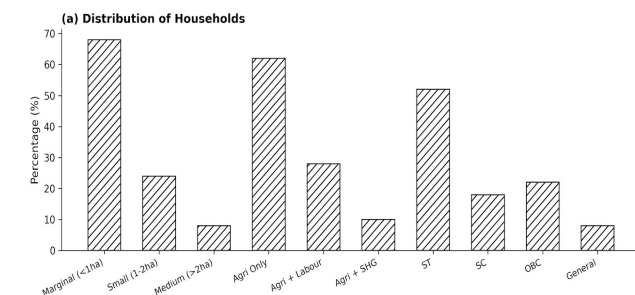
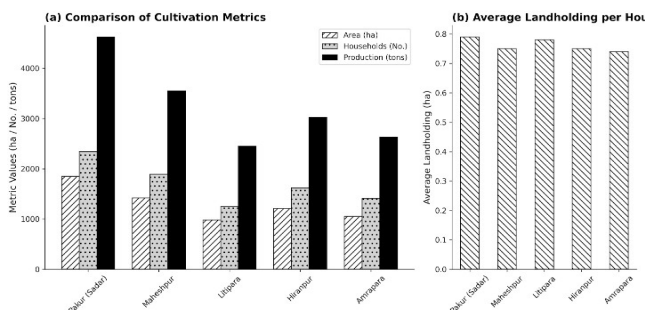
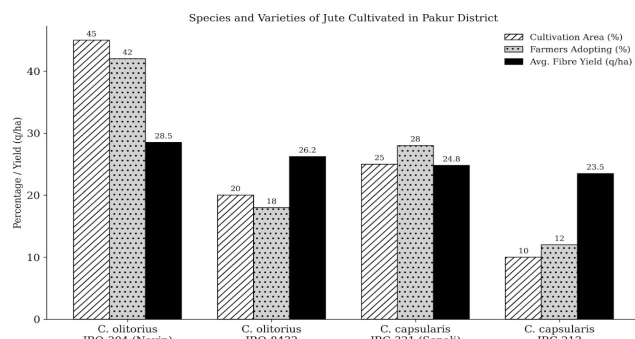
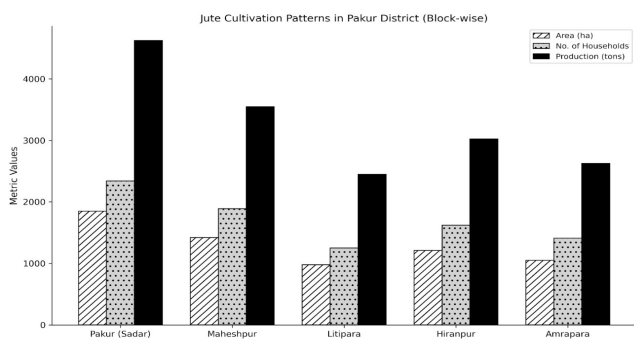
Improved practices resulted in significantly higher fibre yield (32.8 q/ha vs. 25.4 q/ha for sowing; 31.5 q/ha vs. 26.2 q/ha for retting), tensile strength (34.2 g/tex vs. 28.5 g/tex for sowing; 33.5 g/tex vs. 27.8 g/tex for retting), and fibre uniformity (82% vs. 68% for sowing; 79% vs. 65% for retting). Improved retting also reduced retting duration from 20-25 days to 12-14 days.

### Role of Self-Help Groups (SHGs) in Jute Product Manufacturing

The contribution of SHGs to jute-based enterprise development is presented in Table 5. A total of 83 SHGs were engaged in jute product manufacturing across the five blocks, with the highest concentration in Pakur (Sadar) block (28 SHGs). The total membership across SHGs was 996, of which 96% were women. The average monthly income per SHG ranged from ₹2,900 (Amrapara) to ₹4,200 (Pakur Sadar), with total annual sales value of ₹36.71 lakh. The products manufactured included bags, ropes, mats, wall hangings, purses, floor rugs, and decorative items.

**Table 1: Area, Production, and Landholding Pattern Under Jute Cultivation in Pakur District**

Block / Region	Total Jute Cultivation Area (ha)	Number of Jute-Growing Households	Average Landholding per Household (ha)	Annual Jute Production (tons)
Pakur (Sadar)	1,850	2,340	0.79	4,625
Maheshpur	1,420	1,890	0.75	3,550
Litipara	980	1,250	0.78	2,450
Hiranpur	1,210	1,620	0.75	3,025
Amrapara	1,050	1,410	0.74	2,625
Total / Average	6,510	8,510	0.76	16,275

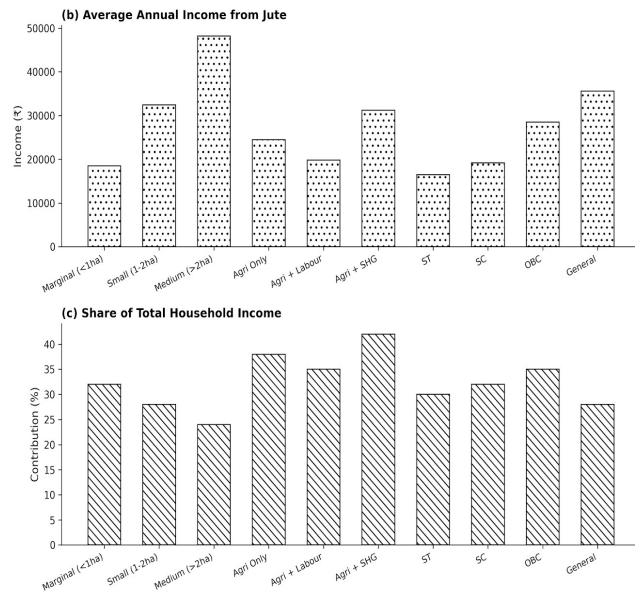


**Table 2: Species and varieties of jute cultivated in Pakur district**

Species	Variety Name	Cultivation Area (%)	Farmers Adopting (%)	Average Fibre Yield (q/ha)	Remarks
<i>Corchorus olitorius</i>	JRO-204 (Navin)	45	42	28.5	High fibre strength, preferred for commercial use
<i>Corchorus olitorius</i>	JRO-8432	20	18	26.2	Tolerant to drought
<i>Corchorus capsularis</i>	JRC-321 (Sonali)	25	28	24.8	Suitable for waterlogged areas
<i>Corchorus capsularis</i>	JRC-212	10	12	23.5	Traditional variety, lower yield
Total		100%	100%		

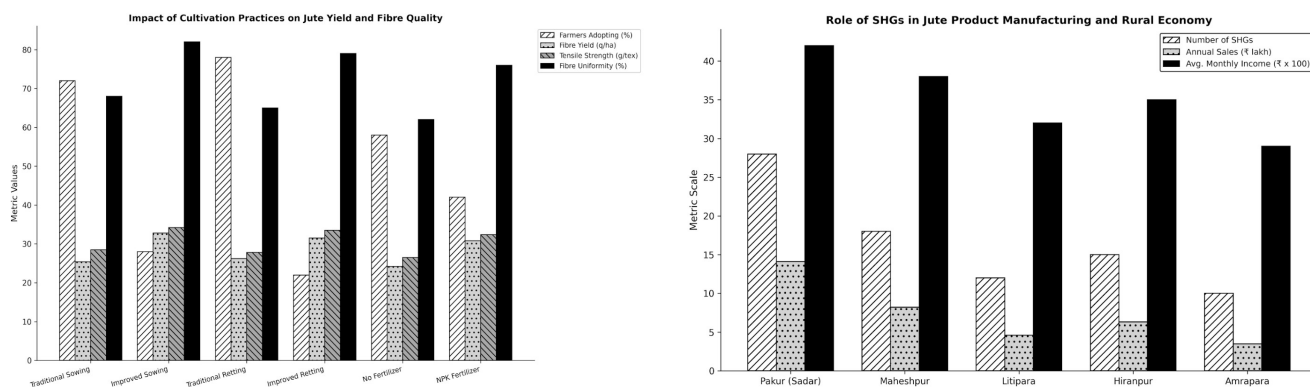
**Table 3: Socio-Economic Profile and Income Contribution from Jute Cultivation**

Parameter	Category	Percentage of Households (%)	Average Annual Income from Jute (₹)	Contribution to Total Household Income (%)
Landholding Category	Marginal (< 1 ha)	68%	18,500	32%
	Small (1–2 ha)	24%	32,400	28%
	Medium (> 2 ha)	8%	48,200	24%
Primary Occupation	Agriculture Only	62%	24,500	38%
	Agriculture + Labour	28%	19,800	35%
	Agriculture + SHG/Enterprise	10%	31,200	42%
Caste Category	Scheduled Tribe (ST)	52%	16,500	30%
	Scheduled Caste (SC)	18%	19,200	32%
	Other Backward Class (OBC)	22%	28,500	35%
	General	8%	35,600	28%



**Table 4: Adoption of Improved Cultivation Practices and Their Impact on Fibre Quality**

Practice	Farmers Adopting (%)	Average Fibre Yield (q/ha)	Average Tensile Strength (g/tex)	Fibre Uniformity (%)	Retting Duration (days)
Traditional Sowing (June–July)	72%	25.4	28.5	68%	18–22
Improved Sowing (March–April)	28%	32.8	34.2	82%	14–16
Traditional Retting (Stagnant Water)	78%	26.2	27.8	65%	20–25
Improved Retting (Stratified/Controlled)	22%	31.5	33.5	79%	12–14
No Fertilizer Application	58%	24.2	26.5	62%	—
Recommended Fertilizer (NPK)	42%	30.8	32.4	76%	—



**Table 5: Role of Self-Help Groups (SHGs) in Jute Product Manufacturing and Rural Economy**

Block	Number of SHGs Engaged in Jute Products	Total SHG Members	Women Members (%)	Types of Jute Products Manufactured	Average Monthly Income per SHG (₹)	Annual Jute Product Sales Value (₹ lakh)
Pakur (Sadar)	28	336	94%	Bags, Ropes, Wall Hangings	4,200	14.11
Maheshpur	18	216	96%	Bags, Mats, Twine	3,800	8.21
Litipara	12	144	98%	Ropes, Decorative Items	3,200	4.61
Hiranpur	15	180	95%	Bags, Purses, Floor Rugs	3,500	6.30
Amrapara	10	120	97%	Ropes, Handbags	2,900	3.48
Total	83	996	96%			36.71

**DISCUSSION**

**Area, Production, and Landholding Pattern**

The findings reveal that jute cultivation in Pakur district is characterized by smallholder farming, with an average landholding of 0.76 ha per household. This aligns with the national trend where over 85% of jute growers are small and marginal farmers (Bag *et al.*, 2016). The total cultivated area of 6,510 ha and annual production of 16,275 tons underscore Pakur’s significance as a jute-producing district in Jharkhand, consistent with the observation that jute cultivation in the state is confined to Pakur and Sahibganj districts (Singh, 2004). The production figures indicate an average productivity of approximately 25 q/ha, which is comparable to the national average of 24–26 q/ha (Islam & Alauddin, 2012).

**Species and Varietal Composition**

The dominance of *Corchorus olitorius* (65% of area) over *C. capsularis* (35%) reflects farmer preference

for olitorius varieties due to their higher fibre strength and commercial value (Saha & Biswas, 2005). Among varieties, JRO-204 (Navin) emerged as the most preferred, occupying 45% of the area and adopted by 42% of farmers. This is consistent with Tooba Maher (2020), who reported JRO-204 as a high-yielding variety with superior fibre characteristics. The continued cultivation of traditional variety JRC-212 (10% area) indicates the persistence of local preferences and limited access to improved seeds, a constraint also documented by Ghimire and Thakur (2013) in Eastern Terai, Nepal.

**Socio-Economic Contribution of Jute Cultivation**

Jute cultivation contributes 28–42% of total household income across different categories, with marginal farmers deriving 32% of their income from jute. This finding is comparable to Khondake *et al.* (2012), who reported that jute contributes 25–35% of household income in jute-growing regions of Bangladesh. Notably, households engaged in SHG-

based enterprises derived the highest income contribution (42%), highlighting the value addition potential beyond primary cultivation (Ahmad & Parrey, 2013). The differential income across caste categories (₹16,500 for ST to ₹35,600 for General) reflects underlying socio-economic disparities in land ownership and market access, a phenomenon also observed by Ray (2012) in West Bengal.

### **Adoption of Improved Practices and Fibre Quality Implications**

The low adoption rates of improved practices early sowing (28%), controlled retting (22%), and recommended fertilizer (42%) represent a critical constraint to productivity enhancement. However, the substantial yield gains associated with these practices (32.8 q/ha vs. 25.4 q/ha for early sowing) demonstrate the untapped potential. These findings corroborate Zakaria and Firoza (2001), who reported that improved retting techniques significantly enhance fibre quality. The 29% increase in fibre yield and 20% increase in tensile strength observed in this study align with Biswapriya *et al.*, (2014), who documented similar improvements through pectinolytic bacterial application during retting. The reduction in retting duration from 20–25 days to 12–14 days through controlled methods is particularly significant, as prolonged retting is known to degrade fibre quality and cause environmental degradation of water bodies (Das *et al.*, 2014).

### **SHG-Based Jute Product Enterprises and Rural Economy**

The presence of 83 SHGs with 996 members (96% women) engaged in jute product manufacturing represents a significant livelihood diversification strategy. The total annual sales of ₹36.71 lakh demonstrate the economic viability of SHG-based enterprises, consistent with findings of D.P. Ray *et al.* (2017), who emphasized the profitability of fibre-based cottage industries for rural livelihoods. The predominance of women members (96%) reflects the gender-inclusive nature of this enterprise, contributing to women's economic empowerment (Karthik & Ramya, 2012). The manufacture of diversified products- bags, ropes, wall hangings,

purses, floor rugs indicates market responsiveness and potential for scaling up. Moreover, the promotion of jute bags aligns with environmental sustainability objectives, offering an alternative to polybags (Casper, 2020; Sudipta & Ashis, 2012).

### **CONCLUSION**

Jute cultivation significantly supports rural livelihoods in Pakur district, contributing 30–42% of household income across 8,510 smallholder families. Adoption of improved practices remains low (22–42%) despite demonstrated yield gains of 29% and tensile strength improvement of 20%. SHG-based enterprises with 96% women participation generate ₹36.71 lakh annual sales, offering a sustainable pathway for economic empowerment and plastic reduction.

### **CONFLICT OF INTEREST**

The authors declare that there is no conflict of interest regarding the publication of this manuscript. The research was conducted independently without any financial or personal relationships that could inappropriately influence the findings or interpretations presented in this study.

### **AUTHORS' CONTRIBUTIONS**

Bharti Kumari (First Author): Conceptualization of the research, study design, field data collection, household surveys, focus group discussions, laboratory analysis of fibre quality parameters, data entry, statistical analysis, interpretation of results, and drafting of the original manuscript.

Dr. Amar Das (Second Author): Supervision of the research work, guidance in study design and methodology, validation of findings, critical review of the manuscript, editing for scientific rigor and clarity, compilation of the final manuscript, and overall project administration.

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