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GROWTH AND INSTABILITY ANALYSIS OF JUTE CULTIVATION IN THE BRAHMAPUTRA VALLEY OF ASSAM: A COMPREHENSIVE STUDY

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ABSTRACT

The cultivation of jute in Assam represents a vital intersection of cultural heritage, ecological sustainability and agrarian economics. As the second-largest producer of raw jute in India, the state of Assam contributes significantly to the national output, with nearly four million small and marginal agricultural households relying on the crop for their economic survival, however, the sector has faced significant fluctuations in area and production in recent years. The present study evaluated the dynamics of jute cultivation in the Brahmaputra Valley to address the productivity gap and instability risk threatening the long-term sustainability of the Golden Fibre. The research employed a robust statistical framework to analyze secondary data from 2007-08 to 2024-25, utilizing the Compound Annual Growth Rate (CAGR) to measure growth in area, production, and yield, and the Cuddy-Della Valle Index for quantifying instability. Focusing on major districts including Nagaon, Dhubri, Barpeta and Darrang, the analysis reveals a concerning trend where low instability was paired with negative growth in acreage, indicating a systemic and predictable withdrawal from jute in favour of more remunerative alternatives like Boro rice and Maize. Despite an aggressive increase in the Minimum Support Price to 5,650 Rupees per quintal for the 2025-26 season, land-use patterns showed a persistent decline. Furthermore, industrial constraints, particularly obsolete machinery at the Assam Cooperative Jute Mill, hampered the regional transition toward high-value Jute Diversified Products. To revitalize the sector, the study underscores the importance of the March 2026 tripartite memorandum of understanding between the North Eastern Handicrafts and Handlooms Development Corporation, National Jute Board and Jute Corporation of India to strengthen regional value chains.

Key words : Jute Cultivation, Cuddy–Della Valle index, Growth-Instability Analysis, District-level analysis, Jute-ICARE.

Introduction

Jute, commonly referred to as the “Golden Fibre” of India, belongs to the genus *Corchorus* and is represented primarily by two species: *Corchorus capsularis* (white jute) and *Corchorus olitorius* (tossa jute). As a natural fibre, it is second only to cotton in terms of global production and usage, prized for its high tensile strength, biodegradability and eco-friendly characteristics. In the context of the global transition toward sustainable and green products, jute has emerged as a preferred

alternative to synthetic packaging materials, creating a renewed interest in its cultivation dynamics. India is the world’s largest producer of raw jute accounting for approximately 61.2 percent of the total global output (Singh *et al.*, 2024). Within the Indian subcontinent, the cultivation of this crop is predominantly concentrated in the eastern and north-eastern states, with West Bengal, Bihar and Assam contributing more than 98 percent of the national production. To sustain this leadership, the government has placed a renewed focus on regional value

addition and the promotion of Jute Diversified Products aiming to transition the sector from traditional packaging to high-value export commodities.

Assam holds a unique position in the Indian jute landscape as the third-largest producing state, contributing nearly 9 percent of the country's raw jute production (Das and Chanu, 2016). The Brahmaputra Valley, with its extensive network of river systems and fertile alluvial floodplains, provides an ideal agro-climatic environment for jute. The crop thrives in humid tropical climates characterized by high rainfall (over 2,500 mm), moderate temperatures between 25°C, 35°C and high relative humidity. However, despite these natural advantages, the jute sector in Assam has been experiencing a period of significant volatility. Recent statistical data indicates that while the state produces some of the finest quality fibres in the country, the area under cultivation has been steadily declining, raising concerns about the long-term viability of the crop for marginal farmers. To counter these trends, the Jute-ICARE (Improved Cultivation and Advanced Retting Exercise) initiative has been deployed across the state's jute-growing belts, focusing on enhancing farmer income through the distribution of certified seeds and the adoption of scientific sowing practices (Press Information Bureau, 2026).

The districts of Nagaon, Dhubri, Barpeta and Darrang constitute the heart of the jute-growing belt in the Brahmaputra Valley. Nagaon is historically recognized as the leading district in terms of both area and production, often achieving productivity levels that surpass the state average. This district is also home to the Assam Cooperative Jute Mill Limited (ACJML) at Silghat, which stands as the only functional jute mill in the cooperative sector in India. While the mill is essential for local value addition, it faces significant operational hurdles, including obsolete machinery and a lack of modern technical infrastructure, which impact its overall economic contribution (Khound, 2023). Dhubri and Barpeta, located in the lower valley, also maintain significant acreage, although they are more susceptible to the dual challenges of early-season drought and mid-season flooding. The current study focuses on the period from 2007-08 to 2024-25, a timeframe that encompasses significant shifts in agricultural policy, including a marked increase in the Minimum Support Price (MSP) and the implementation of advanced extension programs aimed at improving retting technologies. These programs specifically introduce microbial retting consortiums like CRIJAF SONA to reduce the time and water required for processing, thereby improving the grade of the final fibre (Press Information Bureau, 2017).

The recent review by the Secretary (Textiles) on

March 18, 2026, underscored a strategic commitment to revitalizing the jute sector in the North Eastern Region (NER) through an integrated policy approach. Central to these measures is the signing of a tripartite Memorandum of Understanding (MoU) between the North Eastern Handicrafts and Handlooms Development Corporation (NEHHDC), the National Jute Board (NJB), and the Jute Corporation of India (JCI) to strengthen both backward and forward linkages. The government has prioritized the continued implementation of the Jute-ICARE (Improved Cultivation and Advanced Retting Exercise) scheme, which focuses on distributing high-yielding certified seeds and promoting advanced retting technologies, such as the use of microbial consortiums like CRIJAF SONA, to enhance fibre quality. Furthermore, a significant technological advancement was introduced via the Jute Crop Information System, developed by NRSC-ISRO, which utilizes geospatial technology for real-time crop monitoring, acreage estimation and data-driven decision-making. These coordinated interventions aim to improve market access, facilitate local value addition and ensure the timely availability of agricultural inputs, thereby addressing the socio-economic challenges faced by jute farmers in the Brahmaputra Valley (Press Information Bureau, 2026).

The rationale for this study is rooted in the critical need to evaluate the changing dynamics of jute cultivation in the Brahmaputra Valley, which remains a vital component of India's agricultural economy. Despite Assam's position as the third-largest producer, the sector faces a complex transition where traditional farming practices are increasingly influenced by shifting policy landscapes and industrial challenges. The main objective of the study was to find out the "productivity gap" and "instability risk" characterizing the Brahmaputra Valley, to ensure that the "Golden Fibre" continues to serve as a reliable livelihood for the region's marginal farmers.

Materials and Methods

The study was conducted in the Brahmaputra Valley of Assam, with a focus on four major jute-growing districts—Nagaon, Dhubri, Barpeta and Darrang. These districts were chosen as they account for the highest concentration of jute acreage and production in the central and lower Brahmaputra regions. Data on area, production and yield (APY) were collected for the crop years from 2007–08 to 2025–26. For better comparison of growth rate of area, production and productivity of jute in the study area over time, the overall time Period-I (2007-08 to 2012-13) was divided into two sub-periods viz. Period-I (2007-08 to 2015-16) and Period-II (2016-17 to 2024-25). The study relied on multiple sources of information, including the Statistical Handbooks of Assam along with

the published by the Directorate of Economics and Statistics, Government of Assam and the reports from the Office of the Jute Commissioner, Ministry of Textiles, Government of India; annual reports and market outlooks from the Jute Corporation of India (JCI) and the Ministry of Agriculture and Farmers' Welfare. To examine the growth trends in area, production and yield, the compound annual growth rate was estimated by fitting an exponential growth function to the time-series data. Sumit *et al.* (2022) in their study also utilize the exponential compound growth function. The standard exponential model is given by:

$$Y_t = ab^t \quad (1)$$

Where, Y_t = Dependent Variable (Area/Production/Yield) for which growth is estimated.

t = Refers to year (time period) (say = 1, 2, 3, ..., n)

a = Refers to intercept

$b = 1 + r/100$,

Where, 'r' refers to the percentage rate of compound growth rate of area, production, productivity per annum.

By taking logarithms both side of the equation, it has been reduced to following linear form with log 'Y' as dependent variable and 't' as independent variable:

$$\log Y_t = \log a + \log b$$

For convenience, if we put ' $\log a$ ' = A and ' $\log b$ ' = B, then this can be written as:

$$\log Y_t = A + Bt \quad (2)$$

This is semi log function with time 't' as independent variable. Then by using OLS technique, we have normal equations of the type: $\sum \log Y_t = nA + B\sum t$

$$\sum \log Y_t t = A\sum t + B\sum t^2 \quad (3)$$

Where 'n' is the number of observations (years)

By solving Equation (3), the values of 'A' and 'B' have been computed. For deriving compound growth rate from the computed regression coefficients, the following procedure has been adopted.

When 'B' has positive value, anti-log of 'B' has been obtained and then one was subtracted from anti log value of 'B'. Thereafter, the B-1 value has been multiplied by hundred. Thus, it gave the compound growth rate (CGR) of increasing type, when 'B' had negative value, the procedure of calculating CGR is the same, but the value of growth rate will be negative. This negative CGR indicates the decreasing growth rate over time. Percentage rate of compound growth per annum has been calculated as –

$$r = (b-1) \times 100$$

$$r = (\text{Antilog 'B'} - 1) \times 100$$

Exponential regression provides the most scientifically accurate "fit" because it aligns with the geometric nature of agricultural change, where area expansion or contraction occurs as a percentage of the existing base year rather than a fixed number of hectares. In the Brahmaputra Valley, shifts in land use are driven by socio-economic factors—such as fluctuating market prices or labour availability—which cause farmers to adjust cultivation intensity proportionally. Unlike a linear model, which forces a straight line and assumes the same absolute change every year, the exponential model creates a "curve of best fit" that captures the natural acceleration or deceleration of these trends. By log-transforming the data, this curve is effectively "straightened" to perform a robust statistical analysis, ensures that the resulting growth rate is not biased by a single outlier year and provides the necessary de-trended residuals required to accurately calculate the Cuddy-Della Valle Index (CDVI) for instability analysis (Cuddy and Della, 1978).

Cuddy-Della Valle Instability index (CDVI)

In the analysis of time-series data, the CDVI is a widely accepted analytical technique employed to quantify instability. While the Coefficient of Variation (CV) is a standard measure of dispersion, it often fails to distinguish between systematic trend growth and inherent instability. The CDVI addresses this limitation by correcting the CV for the presence of a deterministic trend, whether positive or negative. The index is designed to provide a more precise measure of variability by adjusting for the line of best fit. The functional form of the Cuddy-Della Valle Index is defined as follows:

$$CDVI = CV * (1-R^2)^{0.5}$$

Where, CV is coefficient of variation defined as the ratio of sample standard deviation to its mean and R^2 is the corrected coefficient of determination of the log linear trend function that fits the time series.

Results and Discussion

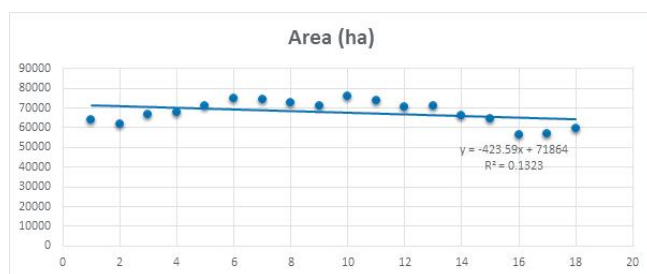
Dynamics of Area, Production and Productivity of Jute in Assam for the period from 2007-08 to 2024-25

The longitudinal analysis of jute cultivation in Assam from 2007-08 to 2024-25 reveals a non-linear trajectory characterized by an initial expansion phase followed by a steady contraction in land allocation. The state reached its peak in both area (75,000 ha) and production (981,000 bales) during the 2012-13 period, after which a gradual decline was observed, with the area settling at 59,505 ha by 2024-25. Despite the reduction in total acreage, the productivity of jute has shown a long-term improvement, rising from 1,724.30 kg/ha in 2007-08 to 2,151.38 kg/ha

Table 1 : Growth (%) / changes in Area, Production, Productivity of Jute in Assam for the period from 2007-08 to 2024-25.

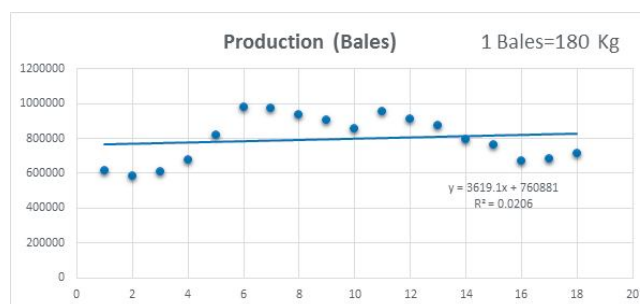
Year	Area (ha)	Percentage change in area (%)	Production (Bales)	Percentage change in Production (%)	Productivity (Kg/ha)	Percentage change in area (%)
2007-08	64200	-	615000	-	1724.3	-
2008-09	62000	-3.43	585000	-4.88	1698.39	-1.50
2009-10	66500	7.26	611000	4.44	1653.83	-2.62
2010-11	68000	2.26	675000	10.47	1786.76	8.04
2011-12	71300	4.85	821500	21.70	2073.91	16.07
2012-13	75000	5.19	981000	19.42	2354.4	13.52
2013-14	74500	-0.67	973000	-0.82	2350.87	-0.15
2014-15	73000	-2.01	936000	-3.80	2307.95	-1.83
2015-16	71000	-2.74	903000	-3.53	2289.3	-0.81
2016-17	76200	7.32	856300	-5.17	2022.76	-11.64
2017-18	74000	-2.89	954000	11.41	2320.54	14.72
2018-19	70810	-4.31	913380	-4.26	2321.82	0.06
2019-20	71320	0.72	871300	-4.61	2199.02	-5.29
2020-21	66000	-7.46	794220	-8.85	2166.05	-1.50
2021-22	64500	-2.27	761500	-4.12	2125.12	-1.89
2022-23	56557	-12.31	671320	-11.84	2093.52	-1.49
2023-24	56722	0.29	680990	1.44	2036.58	-2.72
2024-25	59505	4.91	711210	4.44	2151.38	5.64
ASSAM (Average)	67538	-	784880	-	2074.20	-
CAGR(%) (2007-08 to 2024-25)	-0.95	-	-0.94	-	-0.93	-

Source: Directorate of Economics and Statistics, Assam.

**Fig. 1 :** Graphical representation of Jute Area in Assam from 2007-08 to 2024-25.

in 2024-25 (Table 1).

The year-on-year analysis further indicates considerable fluctuations in all three parameters over the study period (Table 1). The area under jute cultivation recorded its highest annual increase of 7.32% in 2016-17, while the steepest decline of 12.31% occurred in 2022-23.

**Fig. 2 :** Graphical representation of Production (Bales) of Jute in Assam from 2007-08 to 2024-25.

23. Similarly, jute production exhibited substantial variability, with the maximum annual growth of 21.70% observed in 2011-12, followed by another significant increase of 19.42% in 2012-13. In contrast, the highest decline in production (11.84%) was recorded during 2022-23. Productivity also experienced notable year-to-year

Table 2 : District-wise Jute Area (in hectare), Production (in bales of 180 kg), Productivity (in kg/hectare) in Assam from 2022-23 to 2024-25.

District	Area (ha)			Average Yield (kg/ha)			Production (Bales)		
	2022-23	2023-24	2024-25	2022-23	2023-24	2024-25	2022-23	2023-24	2024-25
Dhubri	6297	7210	8510	2262	2272	1814	79115	90994	85773
South Salmara	2700	2700	3110	2044	1847	1542	30660	27705	26642
Kokrajhar	1443	1256	1330	2100	2401	1417	16833	16753	10467
Bongaigaon	1685	1866	2075	1856	2109	1786	17375	21867	20583
Chirang	1455	1456	1466	1795	1687	2031	14509	13649	16539
Goalpara	3144	3164	3055	1745	1520	1204	30479	26718	20435
Kamrup (R)	5317	5316	5286	1733	1854	1218	51179	54758	35776
Kamrup (M)	42	47	45	2139	2160	2152	499	564	538
Nalbari	3530	3530	3054	1821	1622	2760	35712	31809	46828
Bajali	244	236	232	2712	2061	1729	3676	2702	2228
Barpeta	4517	3882	4080	2328	2356	2295	58420	50811	52020
Baksa	276	168	260	2137	1906	2049	3277	1779	2960
Tamulpur	140	100	140	2137	1492	1962	1662	829	1526
Sonitpur	2606	1894	2390	1636	1311	1708	23686	13795	22678
Biswanath	803	840	847	2098	2404	2570	9361	11220	12091
Darrang	3295	3551	3553	2158	2513	3357	39503	49576	66263
Udalguri	1890	2054	2376	2004	1985	1031	21042	22650	13605
Nagaon	9770	9336	9250	2468	2555	3530	133951	132516	181405
Hojai	437	440	901	2928	2720	2510	7109	6649	12564
Morigaon	5469	6157	6137	2485	2497	1861	75499	85411	63460
Jorhat	10	9	9	2142	2160	2160	119	108	108
Majuli	20	25	26	2133	2160	2153	237	300	311
Golaghat	113	160	125	2138	2161	2151	1342	1921	1494
Sibsagar	13	23	16	2146	2160	2149	155	276	191
Charaideo	5	5	5	2124	2160	2160	59	60	60
Lakhimpur	73	56	118	2135	2160	2152	866	672	1411
Dhemaji	71	72	99	2137	2160	2153	843	864	1184
Dibrugarh	9	10	6	2140	2160	2160	107	120	72
Tinsukia	4	11	6	2160	2160	2160	48	132	72
Cachar	33	22	20	2138	2160	2151	392	264	239
Hailakandi	12	11	12	2130	2160	2145	142	132	143
Sribhumi	48	52	47	2138	2160	2152	570	624	562
Karbi Anglong	491	485	395	2137	2161	2151	5829	5823	4720
West Karbi Anglong	585	575	521	2137	2161	2151	6945	6903	6226
Dima Hasao	10	3	3	2142	2160	2160	119	36	36
ASSAM	56557	56722	59505	2133	2105	2081	671320	680990	711210

Source: Directorate of Economics and Statistics, Assam.

fluctuations, registering the highest annual increase of 16.07% in 2011-12, followed by 14.72% in 2017-18, whereas the maximum decline of 11.64% occurred in 2016-17, reflecting the influence of climatic conditions and production practices on yield performance. Over the entire study period, the average area, production and productivity of jute in Assam were 67,538 ha, 784,880 bales and 2,074.20 kg/ha, respectively. The compound

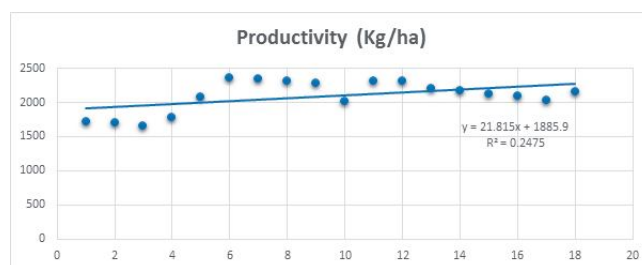
**Fig. 3 :** Graphical representation of Productivity of Jute in Assam from 2007-08 to 2024-25.

Table 3 : District-wise Jute Area (in hectare), Production (in bales of 180 kg), Productivity (in bales/hectare) share in total area and total production (in percent) in Assam during 2022-23 to 2024-25.

District	Area (ha)					Production (Bales)						
	2022-23	Share in total area (%)	2023-24	Share in total area (%)	2024-25	Share in total area (%)	2022-23	Share in total production (%)	2023-24	Share in total production (%)	2024-25	Share in total production (%)
Dhubri	6297	11.13	7210	12.71	8510	14.301	79115	11.7850	90994	13.3620	85773	12.0602
South Salmara	2700	4.77	2700	4.76	3110	5.2265	30660	4.5671	27705	4.0683	26642	3.7460
Kokrajhar	1443	0.0003	1256	0.0002	1330	0.0002	16833	0.0003	16753	0.0002	10467	0.0001
Bongaigaon	1685	2.98	1866	3.29	2075	3.4871	17375	2.5882	21867	3.2111	20583	2.8941
Chirang	1455	2.57	1456	2.57	1466	2.4637	14509	2.1613	13649	2.0043	16539	2.3255
Goalpara	3144	5.55	3164	5.57	3055	5.1340	30479	4.5402	26718	3.9234	20435	2.8733
Kamrup (R)	5317	0.0009	5316	0.0009	5286	0.0009	51179	0.0008	54758	0.0008	35776	0.0005
Kamrup (M)	42	0.07	47	0.083	45	0.0756	499	0.0743	564	0.0828	538	0.0756
Nalbari	3530	6.24	3530	6.22	3054	5.1323	35712	5.3197	31809	4.6710	46828	6.5843
Bajali	244	0.43	236	0.41	232	0.3899	3676	0.5476	2702	0.3968	2228	0.3133
Barpeta	4517	7.98	3882	6.84	4080	6.8566	58420	8.7023	50811	7.4613	52020	7.3143
Baksa	276	0.48	168	0.29	260	0.4369	3277	0.4881	1779	0.2612	2960	0.4162
Tamulpur	140	0.25	100	0.17	140	0.2353	1662	0.2476	829	0.1217	1526	0.2146
Sonitpur	2606	4.61	1894	3.34	2390	4.0165	23686	3.5283	13795	2.0257	22678	3.1887
Biswanath	803	1.42	840	1.48	847	1.4234	9361	1.3944	11220	1.6476	12091	1.7001
Darrang	3295	5.82	3551	6.26	3553	5.9709	39503	5.8844	49576	7.2800	66263	9.3169
Udalguri	1890	3.34	2054	3.62	2376	3.99	21042	3.1344	22650	3.3260	13605	1.9129
Nagaon	9770	17.27	9336	16.46	9250	15.54	133951	19.9534	132516	19.4593	181405	25.5065
Hojai	437	0.77	440	0.78	901	1.51	7109	1.0590	6649	0.9764	12564	1.7666
Morigaon	5469	9.67	6157	10.85	6137	10.31	75499	11.2464	85411	12.5422	63460	8.9228
Jorhat	10	0.02	9	0.016	9	0.0151	119	0.0177	108	0.0159	108	0.0152
Majuli	20	0.04	25	0.04	26	0.0437	237	0.0353	300	0.0441	311	0.0437
Golaghat	113	0.20	160	0.28	125	0.2101	1342	0.1999	1921	0.2821	1494	0.2101

Table 3 continued...

Table 3 continued...

Sibsagar	13	0.02	23	0.041	16	0.0269	155	0.0231	276	0.0405	191	0.0269
Charaideo	5	0.008	5	0.0088	5	0.0084	59	0.0088	60	0.0088	60	0.0084
Lakhimpur	73	0.13	56	0.099	118	0.1983	866	0.1290	672	0.0987	1411	0.1984
Dhemaji	71	0.13	72	0.127	99	0.1664	843	0.1256	864	0.1269	1184	0.1665
Dibrugarh	9	0.016	10	0.017	6	0.0101	107	0.0159	120	0.0176	72	0.0101
Tinsukia	4	0.007	11	0.019	6	0.0101	48	0.0072	132	0.0194	72	0.0101
Cachar	33	0.058	22	0.038	20	0.0336	392	0.0584	264	0.0388	239	0.0336
Hailakandi	12	0.021	11	0.0194	12	0.0202	142	0.0212	132	0.0194	143	0.0201
Sribhumi	48	0.085	52	0.0917	47	0.0790	570	0.0849	624	0.0916	562	0.0790
Karbi Anglong	491	0.86	485	0.8550	395	0.6638	5829	0.8683	5823	0.8551	4720	0.6637
West Karbi Anglong	585	1.03	575	1.0137	521	0.8756	6945	1.0345	6903	1.0137	6226	0.8754
Dima Hasao	10	0.018	3	0.0053	3	0.0050	119	0.0177	36	0.0053	36	0.0051
ASSAM	56557	-	56722	-	59505	-	671320	-	680990	-	711210	-

Source: Directorate of Economics and Statistics, Assam.

annual growth rates (CAGR) for area, production and productivity were -0.95% , -0.94% and -0.93% , respectively, indicating a marginal but persistent long-term decline in all three parameters. Although productivity in 2024-25 remained substantially higher than the base year (2007-08), the negative CAGR suggests that the gains achieved during the middle years of the study period were not sustained consistently due to fluctuations in cultivated area, production and yield (Table 1).

This decoupling of area and productivity suggests that while the land base is shrinking, the efficiency of cultivation has improved due to technological and varietal advancements. At the district level, Nagaon remains the most significant contributor, accounting for 25.51% of the state's total production in 2024-25 (Table 3), supported by the highest productivity rate of 3,530 kg/ha (Table 2). Conversely, districts like Dhubri, while maintaining a high share of total area (14.30%) (Table 3), have experienced fluctuations in yield, recorded at 1,814 kg/ha in the most recent period (Table 2). A primary reason for the decline in jute acreage is the shift of land toward more remunerative or less labour-intensive crops (Ghorai *et al.*, 2026). Research by Khatun and Deka (2013) indicates that farmers in the Brahmaputra Valley are increasingly diversifying toward Boro (summer) rice, which offers more stable market prices and better integration into food security cycles. While floods are a perennial challenge in the Brahmaputra Valley, jute is relatively more resilient to early-monsoon flooding compared to other major crops like summer paddy (Saikia, 2015). The monetary loss associated with jute during flood events is often lower, which sustains its cultivation in the most flood-prone riparian tracts of the valley as evidenced by the high production shares in riverine districts like Dhubri and Barpeta in Table 3.

The compound annual growth rate (CAGR) of jute area, production and productivity for overall and two periods is shown in Table 4. The growth performance of jute in Assam exhibits a significant paradigm shift between the two studied sub-periods. During Period-I (2007-08 to 2015-16), the crop experienced a robust and statistically significant expansion across all parameters, with area, production and productivity growing at CAGR of 2.09% ($p < 0.05$), 7.98% ($p < 0.01$) and 5.76% ($p < 0.01$), respectively. However, this momentum was reversed in Period-II (2016-17 to 2024-25), where the sector faced a sharp contraction, particularly in land allocation (-3.91% , $p < 0.01$) and total production (-5.04% , $p < 0.01$). This decline in acreage is primarily attributed to the increasing competition with more remunerative and less labour-intensive crops like Boro rice and maize, as farmers in

Table 4 : CAGR of jute area, production and productivity.

S. no.	Component	Particulars	Period-I (2007-08 to 2015-16)	Period-II (2016-17 to 2024-25)	Overall (2007-08 to 2024-25)
1	Area(ha)	CAGR(%)	2.09**	-3.91***	-0.67
		t value	3.12	-5.91	-1.64
		p value	0.02	0.00	0.12
2	Production (Bales)	CAGR(%)	7.98***	-5.04***	0.61
		t value	4.55	-6.79	0.75
		p value	0.00	0.00	0.46
3	Productivity (kg/ha)	CAGR(%)	5.76***	-1.60**	1.16**
		t value	4.91	-3.96	2.47
		p value	0.00	0.01	0.02

Source: Author's own computation.

*** Significant at 1 percent level of probability

**Significant at 5 percent level of probability

*Significant at 10 percent level of probability

Table 5 : Instability indices of area, production and productivity of Jute in Assam.

S. no.	Component	Particulars	Period-I (2007-08 to 2015-16)	Period-II (2016-17 to 2024-25)	Overall (2007-08 to 2024-25)
1	Area(ha)	Mean	69500.00	66179.33	67839.67
		CV(%)	6.61	11.19	9.16
		CDVI(%)	1.26	0.82	3.92
2	Production (Bales)	Mean	788944.44	801580.00	795262.22
		CV(%)	21.16	12.85	16.94
		CDVI(%)	2.56	0.74	8.18
3	Productivity (kg/ha)	Mean	2026.63	2159.64	2093.14
		CV(%)	15.19	5.00	11.18
		CDVI(%)	1.51	0.69	4.04

Source: Author's own computation.

the Brahmaputra Valley adopt crop diversification as a risk-mitigation strategy against recurring floods. Jute remains a highly labour-intensive crop, with weeding and retting (the process of extracting fibre from the stalk) accounting for approximately 30% of the total cost of cultivation. Traditional water retting requires vast quantities of clean, slow-moving water; however, increasing water scarcity and the use of stagnant, polluted ponds often result in lower-grade fibre (*e.g.*, TDN4), which fetches lower market prices and reduces farmer profitability. As noted by Ghorai *et al.* (2013), the acute shortage of agricultural labour and the lack of clean water bodies for traditional retting have forced many farmers

to abandon the crop in favour of winter vegetables. In districts like Nagaon and Barpeta, the acute shortage of agricultural labour during the peak retting season has forced marginal farmers to reduce jute acreage in favour of less labour-intensive crops. Despite the contraction in area, the overall productivity maintained a positive growth rate of 1.16% ($p < 0.05$) across the entire study period, largely due to the introduction of high-yielding certified seeds and scientific agronomic practices under initiatives like the Jute-ICARE program (Kumar *et al.*, 2024).

The analysis of instability using the Cuddy-Della Valle Index (CDVI) reveals that jute cultivation in Assam is characterized by moderate variability that fluctuates significantly over the long term as seen in Table 5, while the Coefficient of Variation (CV) for production reached 21.16% in Period-I, the detrended instability (CDVI) remained relatively low at 2.56%, suggesting that much of the variation during this phase was part of a consistent growth trend. Interestingly, the instability in all three components—area (0.82%), production (0.74%), and productivity (0.69%)—decreased significantly in Period-II, indicating a “stable decline” where the contraction of the crop followed a more predictable downward trajectory. However, the overall period (2007-08 to 2024-25) displays a markedly higher production instability of 8.18%, which is more than double the instability found in either sub-period. This heightened long-term volatility is driven by the susceptibility of the jute-growing riverine

tracts to extreme weather events, particularly irregular monsoon floods and early-season droughts, which devastate standing crops in districts like Barpeta and Dhubri. Such fluctuations are further exacerbated by market price volatility and a lack of adequate post-harvest infrastructure, forcing marginal farmers to shift their land use patterns frequently in response to climatic and economic shocks (Kundu *et al.*, 2025).

Conclusion

The analysis of jute cultivation in Assam from 2007-08 to 2024-25 identifies a clear transition from a period of expansion to a period of steady decline, despite significant government price support. During Period I

(2007-08 to 2015-16), the growth in area (2.09%) and production (7.98%) was driven by favourable market conditions and the adoption of high-yielding varieties, establishing a strong growth trend with low instability (CDVI of 2.56% for production). In contrast, the significant reduction in area (-3.91%) and production (-5.04%) during Period II (2016-17 to 2024-25) is attributed to farmers shifting toward more profitable crops like Boro rice and Maize, even as the Minimum Support Price (MSP) for raw jute was aggressively increased from ¹ 2,400 per quintal in 2014-15 to ¹ 5,650 per quintal for the 2025-26 season by CACP. The exceptionally low instability during this second period (CDVI of 0.82% for area and 0.74% for production) reveals that this decline is not due to random seasonal failures but is a consistent change in land-use patterns that has become unresponsive to MSP hikes. This suggests that the steady withdrawal from jute is driven by deep-seated issues like high labour costs for retting, which outweigh the benefits of price supports. Ultimately, the significantly higher overall production instability (8.18%) compared to the individual sub-periods determines that the long-term volatility of jute in Assam is primarily caused by the sharp drop in acreage between these two decades rather than year-to-year yield fluctuations.

Policy Recommendations

To revitalize the jute sector in the Brahmaputra Valley, a multi-pronged policy approach is essential, focusing on technological modernization, market stability and enhanced farmer incentives. Addressing the high labour costs—which account for approximately 30% of cultivation expenses—requires the urgent mechanization of the retting process through the mandatory adoption of the Jute-ICARE initiative and microbial consortiums like CRIJAF SONA to enhance fibre quality. Simultaneously, the industrial infrastructure must be upgraded, specifically by replacing obsolete machinery at the Assam Cooperative Jute Mill (ACJML) to facilitate the transition toward high-value Jute Diversified Products (JDPs). This industrial shift should be supported by the full implementation of the March 2026 tripartite memorandum of understanding between the North Eastern Handicrafts and Handlooms Development Corporation, the National Jute Board and the Jute Corporation of India to strengthen regional value chains. To mitigate long-term production instability, the state must integrate the Jute Crop Information System (ISRO) for real-time geospatial monitoring, allowing for informed, data-driven decision-making. Furthermore, policy should promote diversification through intercropping models, such as jute-green gram or low-density sowing, to enhance the farm

economy and alleviate labour bottlenecks. Finally, shifting the focus from mere acreage expansion to quality-based premiums—by providing direct cash incentives for farmers achieving superior grades like TDN1 or TDN2 through scientific retting—is crucial to ensure the economic resilience of marginal farmers amidst the “stability of decline” in traditional acreage.

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