Economic Affairs, Vol. 68, No. 02, pp. 1107-1112, June 2023
DOI: 10.46852/0424-2513.2.2023.16

AESSRA

Research Paper

Comparative Exploration of Traditional versus Improved Cultivation Practices vis-à-vis Return on Investment of Jute Production System in Lower Gangetic Plain of India

Amrita Kumar Sarkar and Sudhanand Prasad Lal*

Department of Extension Education, Post Graduate College of Agriculture, Dr. Rajendra Prasad Central Agricultural University, Pusa, Samastipur, Bihar, India

*Corresponding author: sudhanand.lal@rpcau.ac.in (**ORCID ID:** 0000-0002-6288-5276)

Received: 13-02-2023 **Revised:** 25-05-2023 **Accepted:** 03-06-2023

ABSTRACT

In the current study, an effort has been conferred to estimate the comparative return value per one-rupee investment for jute cultivation with traditional and improved practices. The research was carried out in four villages of two selected blocks of Murshidabad district in West Bengal and cost concepts were used for the estimation of the return on investment. In this inquiry, all calculations were done as per the land unit of acre (1 acre = 0.406 ha or 3.03 bigha). There were 35.85% savings in case of hired labour costs, while following improved practices over traditional practices. The Cost C_2 for improved practices was almost 20% less than the Cost C_2 incurred for traditional practices. Both the probability metric, B:C ratio and return on investment had been calculated in this manuscript. The benefit-cost (B:C) ratio over Cost C_2 (includes all the production costs) and Cost B_1 (total cost excluding the rental value of owned land and imputed value of family labour) for improved practices were 40.16% and 49.62% higher than that of traditional practices, respectively. The return on investment over both the Cost C_2 and Cost B_1 for improved practices were almost 100% than the traditional practices. That's why the inclusion of improved technologies like multi-row seed drill, CRIJAF nail weeder, high-quality seeds like JRO 204, talc-based microbial consortium 'CRIJAF SONA', etc. are indispensable for jute production. So, it was evident that there was much more profitability in case of jute cultivation with improved practices for the marginal land-holding farmers.

HIGHLIGHTS

- Both for Cost C_2 (total production cost) and Cost B_1 (total cost excluding the rental value of owned land and imputed value of family labour), the farmers who followed improved cultivation practices had a double return on investment than the traditional cultivation practices.

Keywords: B:C ratio, doubling the farmers' income, improved cultivation practices, jute cultivation, return on investment

Jute is considered as a major cash crop of India. It is an important fibre crop just after cotton in the country in terms of production and acreage. India tops in the world both in terms of production and consumption of jute. But it comes in the second position in the export of jute and jute goods, preceded by Bangladesh (FAOSTAT, 2019). Despite covering only 0.47% of the gross cropped area (Das *et al.* 2017), the jute industry provides support to about 40 lakh farm households of India for their livelihood (PIB Delhi, 2023). But due to the reasons of reduced return, increasing cost of cultivation, occupying the market of jute by cheaper and durable plastic, the area of jute production was

How to cite this article: Sarkar, A.K. and Lal, S.P. (2023). Comparative Exploration of Traditional versus Improved Cultivation Practices vis-à-vis Return on Investment of Jute Production System in Lower Gangetic Plain of India. *Econ. Aff.*, **68**(02): 1107-1112.

Source of Support: None; **Conflict of Interest:** None

facing a declining trend (Kumar *et al.* 2014; ICAR, 2019; Ghorai and Chakraborty, 2020). As far as environmental sustainability and protection are concerned, jute production is getting back its lost glory. The institutions solely dedicated to the advancement of production, processing as well as marketing of jute and allied fibres such as CRIJAF, NIRJAFT, NJB, JCI etc. continuously give their effort to the all-round development of the jute sector. So, in this present study, a re-evaluation of the economics of jute production for the interest of the sector's sustainability had been done. To serve the purpose, benefit-cost analysis (BCA) and Return on Investment (RoI) analysis had been done in this study. BCA is a method of assessing a project or investment by evaluating the monetary benefits against the activity's economic costs (Shively and Galopin, 2012). RoI refers to a financial return from any financial investment (Fraser, 2015). The inter-ministerial committee constituted by the Government of India, recommended 7 sources of income growth as doubling farmers' strategies such as increasing crop productivity, resource use efficiency or reducing the cost of production, increasing the cropping intensity, etc. (PIB, 2020). The intention of the Government was to double the income of the farmers by enhancing the real prices received by the farmers (NITI Aayog, 2017; PIB, 2020). Specially for jute, Jute-ICARE (Jute-Improved Cultivation and Advanced Retting Exercise), a new initiative was introduced in 2015 by the Government of India. As a consequence of that some improved practices of jute cultivation like high yielding seed varieties, multi-row seed drill, nail weeder, herbicide brush, CRIJAF SONA, fibre extractor etc. were introduced (Singh *et al.* 2019). The impact was evidenced by an increase in average yield (20.5%), improvement in fibre grade or quality (1–2 grade), reduction in labour cost and an additional income through these (Satpathy *et al.* 2017). Moreover, there is less number of research regarding jute economics that is peer-reviewed. Therefore, an effort had been given to calculate the return on investment of jute production keeping in view the following objectives:

1. To determine the economic feasibility of jute cultivators apropos traditional and improved cultivation practices.
2. To suggest policy recommendations for doubling the farmers' income.

MATERIALS AND METHODS

The research was carried out in four villages of two selected blocks of Murshidabad district in West Bengal during 2020-21. The district Murshidabad is fallen under the lower Gangetic plain of India. In case of state and district, the purposive sampling method was adopted for data collection. A simple random sampling method was followed for block and village selection and a total of 120 respondents were interviewed through focus group discussion methods. Jute is cultivated mainly by small and marginal farmers (ICAR, 2019). So, all the calculations had been done in this investigation on a small scale (as per acre). In the case of West Bengal, one acre is equivalent to 0.406 hectare or 3.03 bigha of land (Hextobinary, 2020). A parallel attempt was done to do a comparative analysis of the profitability of jute production from traditional as well as improved practices. Though, most of the farmers were following traditional practices for jute, some of them were found to be incorporated multi-row seed drill and nail weeder with their existing jute cultivation practices. So, the influence of those two improved practices in cost of cultivation and profitability of jute had been studied here.

For estimation of return on investment, cost concepts and profitability aspect were followed. The probability metric, B:C ratio and return on investment had been calculated to see the overall return or benefit and also the net return or benefit over the investment, respectively (Fraser, 2015). A project is anticipated to provide a firm and its investors with a positive net present value if its B:C ratio is greater than 1.0 (Hayes, 2022). Similarly, if the return on investment of a project is greater than 0, it indicates that earnings exceed expenses and the project should be considered (Market Business News, 2023).

1. The cost of cultivation was presented here as per cost concepts
2. The profitability aspects were considered as follows:

(a) **Gross return:** Total return from main product and by-product.

(b) **Net return:** Gross return – Gross expenditure

(c) **Benefit-cost (B:C) ratio** Gross return/ Gross expenditure (Chakraborty and Bera, 2014; Lal and Jha, 2018)

(d) **Return on investment:** Net return/ Gross expenditure (FGDC, 2009)

RESULTS AND DISCUSSION

1. Cost of cultivation

In Table 1, the cost incurred for various inputs or materials under different cost concepts had been depicted (DES, 2021). Chakraborty & Bera (2014) and Punit *et al.* (2018) also followed the cost concepts in their economic research. For traditional jute cultivation practices, the hired human labour cost (₹ 25090.00/acre) had the major contribution (54.02%) in total cost (Cost C_2). It was followed by rental value of owned land (16.15%). For improved cultivation practices also, the hired human labour cost (₹ 16094.00/acre) contributed the highest (43.17%) in Cost C_2 and it was followed by rental value of owned land (20.12%). It is in agreement with the result of Hossain *et al.* (2014), who reported that the human labour (65%) had the largest share in the total cost of jute, followed by the value of land use (11%). So, there was a considerable amount of hired labour-saving (35.85%) while following improved practices of jute cultivation. The reason behind it is, the intercultural operations and harvesting of jute requires lesser number of labours in line sowed jute than broadcasted jute. The seed cost was also lower in improved practices. As the farmers claimed that per acre approximately 600g less seed was required for line sowing through multi-row seed drill as compared to broadcasting method. Moreover, it allows to run nail weeder between the rows which makes it possible to do intercultural operations within a very short time and with very less number of labours. But the imputed value of family labour was higher in improved practices (₹ 3133.00/acre) than traditional practices (₹ 2782.00/acre). It envisages that improved practices had the high potentiality of employment generation for family labour (Chakraborty & Bera, 2014) compared to traditional practices.

Except the seed and labour (hired and family labour) costs, the cost incurred for other inputs or materials were almost same both for traditional and improved cultivation practices. The depreciation cost for multi-row seed drill and nail weeder were skipped in the cost calculation of improved

Table 1: Cost (₹/acre) incurred in jute cultivation for traditional and improved practices

Sl. No.	Items	Traditional practices (Cost and percentage)	Improved practices (Cost and percentage)
Cost components			
i.	Hired machine labour (Tractor) cost	2424.00 (5.22%)	2424.00 (6.50%)
ii.	Seed (JRO 524)	336.94 (0.73%)	252.70 (0.68%)
iii.	Fertilizers	1337.14 (2.88%)	1337.14 (3.59%)
iv.	FYM	1515.00 (3.26%)	1515.00 (4.06%)
v.	Lime ($CaCO_3$)	787.80 (1.70%)	787.80 (2.11%)
vi.	Irrigation cost (For hired Diesel Water Pump set)	1350.00 (2.91%)	1350.00 (3.62%)
vii.	Herbicide (Propaquizalfop 10% EC)	480.00 (1.03%)	480.00 (1.29%)
viii.	Insecticide (Cypermethrin 10% EC)	200.00 (0.43%)	200.00 (0.54%)
ix.	Hired human labour cost	25090.00 (54.02%)	16094.00 (43.17%)
ix.	Interest on working capital	1717.95 (3.70%)	1280.57 (3.43%)
xi.	Depreciation on implements and farm buildings	761.14 (1.64%)	761.14 (2.04%)
xii.	Land revenue, cesses and taxes	120.00 (0.26%)	120.00 (0.32%)
(A)	**Cost A_1**	**36119.97**	**27148.35**
xiii.	Interest on fixed capital (excluding rental value of owned land)	45.16 (0.10%)	45.16 (0.12%)
(B)	**Cost B_1**	**36165.13**	**27193.51**
xiv.	Rental value of owned land	7500.00 (16.15%)	7500.00 (20.12%)
(C)	**Cost B_2**	**43665.13**	**34693.51**
xv.	Imputed value of family labour	2782.00 (5.99%)	3133.00 (8.40%)
(D)	**Cost C_2**	**46447.13 (100%)**	**37280.51 (100%)**

practices. Because the equipments had not been commercialized so far. These were found to be distributed by the Block Agriculture office, FPOs, Farmers' club etc. to the farmers. Therefore, the depreciation cost was kept same for both the traditional and improved cultivation practices.

Thus, Cost A_1 were estimated to be ₹ 36119.97/acre and ₹ 27148.35/acre for traditional and improved cultivation practices, respectively. The Cost B_1 which was obtained by adding the interest on fixed capital (excluding rental value of owned land) to Cost A_1 were ₹ 36165.13/acre and ₹ 27193.51/acre in the same order. While Cost B_2 which is the combined cost of rental value of own land and Cost B_1 were accounted to be ₹ 43665.13/acre and ₹ 34693.51/acre in the same order, respectively. The respondent jute growers following improved practices had a total expenditure (Cost C_2) of ₹ 37280.51/acre which was almost 20% less than the same for traditional practices (₹ 46447.13/acre). The reasons behind higher production costs required for traditional practices are paucity of mechanisation, high labour demand and expenditures, resulting in low farm returns in varied cropping systems (Gathala *et al.* 2016).

2. Profitability of jute production

Table 2 demonstrated that the gross return of jute production in traditional practices was ₹ 72750.00/ acre which included the return from both fibre yield (12 q) and the by-product *i.e.,* jute stick (18 q). Whereas, the same was estimated to be ₹ 81843.75/ acre in improved practices with the fibre yield of 13.50 q and jute stick of 20.25 q. Because, increased height and thickness of the jute fibres were realized from improved practices. Basically jute stick yields two times than the fibre (Islam, 2019). But farmers opined that they got 1.4 to 1.6 times stick yield than the fibre yield from one acre of jute production. For our calculation, we took the average 1.5 times stick yield. This was in congruence with the findings of Kumar *et al.* (2015). Though, in most of the cases, they used the sticks as domestic fuel and for fencing purposes. Farmers had received on an average ₹ 5125 and ₹ 625 per quintal of jute fibre and jute stick, respectively. During the COVID-19 outbreak, the market price of jute fluctuated a lot and the MSP (₹ 4225.00/q) was less than the average market price for jute (Logesh *et al.* 2020).

In the present study, the effect of only two improved technologies i.e., multi-row seed drill and nail weeder on increasing the yield and capability of lowering the production cost were considered. If it is possible to incorporate the other improved practices *viz.*, sowing of latest high yielding and disease and pest resistant varieties (like JRO 204), using herbicide brush for application of non-selective herbicides, application of soil-test based recommended fertilizer and its doses, application of talc-based microbial consortium 'CRIJAF SONA' for retting etc., it could reach the maximum potential yield *i.e.*, 16.24 q/acre (Directorate of Jute Development, 2020).

Return on investment from jute for traditional and improved practices

In this study, the profitability was deliberately calculated only for Cost C_2 and Cost B_1 to see the profitability over total production cost and the profitability excluding the rental value of owned land and family labour cost, respectively. The profitability of jute production had been depicted in Table 3. The net return over Cost C_2 was ₹ 26302.88/ acre for traditional practices and the same was ₹ 44563.24/acre for improved practices. Whereas the net return over the total cost without the rental value of owned land and imputed value of family labour, *i.e.*, Cost B_1 was ₹ 36584.88 and ₹ 54650.24/acre, respectively for traditional and improved practices.

Table 2: Gross return for jute cultivation (₹/ acre)

Return items		Output	Rate (₹)	Price (₹)
Traditional practices	Fibre yield	12 q	5125.00/ q	61500.00
	Jute stick yield	18 q	625.00/ q	11250.00
			Total return (a)	72750.00
Improved practices	Fibre yield	13.50 q	5125.00/ q	69187.50
	Jute stick yield	20.25 q	625.00/ q	12656.25
			Total return (b)	81843.75

Table 3: Differences in the profitability of jute production between traditional and improved practices (₹/ acre)

Sl. No.	Particulars	Amount		Percentage difference
		Traditional practices	Improved practices	
i.	Net return over Cost B_1	₹ 36584.88	₹ 54650.24	49.38
ii.	Net return over Cost C_2	₹ 26302.88	₹ 44563.24	69.42
iii.	Benefit-cost ratio (B:C) over Cost B_1	2.01	3.01	49.62
iv.	Benefit-cost ratio (B:C) over Cost C_2	1.57	2.20	40.16
v.	Return on investment over Cost B_1	1.01	2.01	98.66
vi.	Return on investment over Cost C_2	0.57	1.20	111.08

So, it is found that the jute growers following improved practices, realised 69.42% and 49.38% higher net return, respectively over Cost C_2 and Cost B_1 than that of traditional practices. The B:C ratio over Cost C_2 was 1.57 and 2.20 for traditional and improved practices, respectively which had shown the lucrative cultivation of jute. Whereas the B:C ratio over Cost B_1 was 3.01 for improved practices which was 49.62% higher than the B:C ratio over Cost B_1 for traditional practices (2.01). Therefore, the jute cultivation with improved practices was more profitable compared to the traditional practices in all ways. Furthermore, it was observed that the return on investment over Cost C_2 were 0.57 and 1.20 for traditional and improved practices, respectively. It implies that the net return against one rupee Cost C_2 for improved practices was more than 100% higher than the traditional practices. Whereas the return on investment over Cost B_1 for improved practices (2.01) was also around 100% higher than the return on investment over Cost B_1 for traditional practices, which was 1.01. Hence, both for Cost C_2 and Cost B_1, the jute growers who followed improved cultivation practices had almost double return on investment with respect to traditional cultivation practices.

CONCLUSION

The study found that the hired human labour contributed significantly to the overall cost of jute cultivation, both in traditional and improved practices. But the use of improved practices led to a significant decrease in the costs associated with hired labour. It implies that jute production can become more efficient and labour-saving by promoting mechanisation and improved cultivation techniques. According to the profitability analysis, the jute growers who used improved practices had higher gross returns than those who used conventional techniques. The use of multi-row seed drill and nail weeders resulted in improved fibre yield which led to higher gross returns per acre. Moreover, there was a significantly greater net returns over both Cost B_1 and Cost C_2 for improved practices. This illustrates the economic viability and profitability of adopting improved cultivation techniques. Both for Cost C_2 and Cost B_1, the farmers following improved cultivation practices had a double return on investment with respect to traditional cultivation practices. Jute production can be made more productive, more cost-effective, and more profitable by promoting the use of mechanization (such as multi-row seed drill, CRIJAF nail weeder etc.), sharing information about better practices, and giving farmers the assistance, they need. The supply of high-quality seeds like JRO 204 is also indispensable for jute production. Comprehensive policies that encourage the use of new methods, support research and development, and ease market access for jute growers should be created by policymakers. By doing this, they may encourage the jute industry's sustained economic growth, the creation of employment, as well as the rural development. Then doubling the farmers' income will not be a distant dream.

REFERENCES

Chakraborty, A.J. and Bera, B. 2014. A comparative study on the economic viability of jute production by organic system of farming in West Bengal. *Econ. Aff.*, **59**(4): 547-553.

Das, S., Majumdar, B., Saha, A.R., Sarkar, S., Jha, S.K., Sarkar, S.K. and Saha, R. 2017. Comparative study of conventional and improved retting of jute with microbial formulation. *Proceedings of the National Academy of Sciences, India Section B: Biological Sci.*, **88**(4): 1351-1357.

DES. 2021. Cost Concept – Cost of Cultivation & Production. Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Government of India. https://eands.dacnet.nic.in/Cost_Concept/Cost_Con.pdf

Directorate of Jute Development. 2020. Tossa jute (*Corchorus olitorius*) varieties available in India. Directorate of Jute Development, Goverment of India. https://jute.dac.gov.in/TossaJute.aspx

FAOSTAT. 2019. Statistical database of the Food and Agriculture Organisation of the United Nations (FAO). http://www.fao.org/faostat/en/#data

FGDC. 2009. Economic Justification: Measuring Return on Investment (ROI) and Cost Benefit Analysis (CBA). Federal Geographic Data Committee, Reston, USA. https://www.fgdc.gov/initiatives/50states/newspbp/EconomicJustification_ROI-CBA-Tutorial_v2_052809_FinalVersa.pdf

Fraser, M.A. 2015. Principles for the use of return on investment [ROI]; benefit-cost ratio [BCR]; and cost-effectiveness analysis [CEA] financial metrics in a public relations/communication (PR/C) department. Likely Communication Strategies. https://painepublishing.com/wp-content/uploads/2015/02/Fraser-Likely-Principles-for-the-Use-of-ROI-BCR-CEA-metrics-in-PR_Communication1.pdf

Gathala, M.K., Timsina, J., Islam, M.S.… and McDonald, A. 2016. Productivity, profitability, and energetics: A multi- criteria assessment of farmers' tillage and crop establishment options in intensively cultivated environments of South Asia. *Field Crops Res.*, **186**: 32-46.

Ghorai, A.K. and Chakraborty, A.K. 2020. Economy of Low Density Sowing in Jute (*Corchorus olitorius* L.). *Int. J. of Curr. Microbio. and App. Sci.*, **9**(9): 292-300.

Hayes, A. 2022. Benefit-cost ratio (BCR): definition, formula, and example. Investopedia. Updated on March 28, 2022. https://www.investopedia.com/terms/b/bcr.asp

Hextobinary. 2020. Covert Acre to Other Area Units. Acre to bigha (West Bengal). https://www.hextobinary.com/unit/area/from/acre/to/bighawb

Hossain, M.B., Uddin, M.N., Alam, M.J., Ali, M.Y. and Rahman, M.R. 2014. Economic performance of jute cultivation at farm level in some selected areas of Bangladesh. *J. of Experimental Biosci.*, **5**(1): 97-104.

ICAR. 2019. State specific strategies for doubling farmers income- 2022. https://icar.org.in/file/9941/download?token=wDDPe7kH

Islam, M.M. 2019. Advanced production technology and processing of jute. P. 387-440. *In* M. Hasanuzzaman (eds.) Agronomic Crops: Volume 1: Production Technologies, Springer. https://doi.org/10.1007/978-981-32-9151-5_20

Kumar, M., Mitra, S., Tripathi, M.K., Naik, M.R., Naik, R.K., Jha, A.K., Gawande, S.P., Mazumdar, S.P., Singh, A., Saha, A.R. and Majumdar, B. 2015. Energy and economic analysis for jute and allied fibres crops. Technical Bulletin 2/2015, ICAR-CRIJAF, Barrackpore, Kolkata-700120. https://www.researchgate.net/publication/273897246_Energy_and_economic_analysis_for_jute_and_allied_fibres_crops

Kumar, S., Ghorai, A.K., Kumar, M., Nayak, R.K. and Tripathi, A.N. 2014. Cost effective technologies of jute production. *Popularkheti. ISSN*, 2321-0001. http://www.popularkheti.com/documents/2014-2/PK-2-2-3-12-15.pdf

Lal, S.P. and Jha, S.K. 2018. Benefit-cost and constraints analysis of beekeeping in green revolution province of India. *Bhartiya Krishi Anusandhan Patrika*, **33**(1): 38-42.

Logesh, M., Paul, M.J. and Nisha, A. 2020. Effect of COVID-19 Pandemic on the Market Price of Jute in India. *Curr. Agri. Res. J.*, **8**(2): 89-97.

Market Business News. 2023. What is Return on Investment (ROI)? https://marketbusinessnews.com/financial-glossary/return-on-investment-roi/#:~:text=An%20ROI%20higher%20than%200,costs%20are%20more%20than%20returns.

NITI Aayog. 2017. Doubling Farmers' Income. NITI Policy Paper No.1/2017. National Institution for Transforming India, Government of India, New Delhi. https://niti.gov.in/writereaddata/files/document_publication/DOUBLING%20FARMERS%20INCOME.pdf

PIB Delhi. 2023. Reservation norms for Jute Packaging Materials for Jute Year 2022-23 under JPM Act, 1987. https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1901434

PIB. 2020. Steps for Doubling Farmers' Income. PIB Delhi, Ministry of Agriculture and Farmers Welfare. Published on 18.9.2020. https://pib.gov.in/PressReleasePage.aspx?PRID=1656148#:~:text=The%20DFI%20strategy%20as%20recommended,%3B%20(v)%20diversification%20towards%20high

Punit, K.A., Agarwal, P.K., Yavad, P. and Mondal, S. 2018. Economic analysis of cost and return structure of paddy cultivation under traditional and SRI Method: A comparative study. *Int. J. of Agri. Sci.*, **10**(8): 5890-5893.

Satpathy, S., Sarkar, S.K., Maruthi, R.T., Pandey, S.K., Singh, A.K., Kumar, M., Datta, S., Sarkar, S., Jha, S.K. and Kumar, S. 2017. Annual Report 2016-17. ICAR-Central Research Institute for Jute and Allied Fibres, Barrackpore, Kolkata. http://www.crijaf.org.in/pdf/anrep/an_rep_2016-17.pdf

Shively, G. and Galopin, M. 2012. An Overview of Benefit Cost Analysis. Department of Agricultural Economics, Purdue University. http://www2.econ.iastate.edu/classes/crp274/swenson/URP290/Readings/Purdue_An%20Overview%20of%20Benefit.pdf

Singh, A.K., Jha, S.K., Majumdar, B., Roy, M.L., Sarkar, S. and Ghorai, A.K. 2019. Impacts of climate smart jute farming on resource use efficiency, productivity and economic benefits in rural Eastern India. *Outlook on Agri.*, **48**(1): 75-82.