Indian Journal of Extension Education

Vol.46, No. 1 & 2, (2010) (80-85)

Technology Transfer through Frontline Demonstrations on Jute

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ABSTRACT

The study was conducted at Central Research Institute for Jute and Allied Fibres (CRIJAF), Barrackpore with 131 farmers from different categories of eight villages of two jute growing district viz., North 24 Parganas and Hogly in West Bengal. Frontline demonstration (FLDs) were conducted on high yielding jute varities with recommended package of practices on the farmers' fields. The data were collected through personal interviews, group discussion and empirical observations with the help of semi-structured interview schedule and field record, which compared with farmers practice (FP), commonly undertaken by the local farmers in this region. Results revealed that the technologies emanated through timely and systematic management of the improved cultivation practices has on edge over farmers' practice by increasing the fibre yield up to 15.67 per cent, additional returns up Rs. 5871 /ha and incremental benefit cost ratio of 1:0.13 on additional expenditure cost Rs. 868 /ha. There was scope to reduce cost of cultivation by the introduction of inechanization, wherever possible and chemical weed control. Farmer perceived the results of FLDs as encouraging over their own practice. Thus, forntline demonstration was found an effective tool for technology transfer by building confidence of the praticipating farmers through technology demonstration on their field.

Jute is one of the most important commercial fiber crops of India next to cotton. It plays a vital role in the economy of India specially, Eastern states such as West Bengal, Bihar, Assam, Orissa and Eastern Uttar Pradesh. The cultivation of Jute is being done in about 8.7 lakh hectares spread over 87 districts of India, producing about 100 lakh bales of ras jute. Jute provides raw material to a major industry and contributes significantly to company's economy. About 4 million farmers, 0.25 million industrial workers and 0.5 million traders find gainful employment in jute sector. (Das et. al;, 2006).

The contribution of West Bengal in jute production of India, is nearly 77 per cent covering about 71 per cent of the total area. The average rational productivity of jute is 2346 kg/ha. There is large scope for increasing the productivity of the crop by adopting improved production practices.

The crop is mainly grown by small (25%) and marginal (65%) farmers, costly technologies are not conducive to the farming systems. Besides, economic constraints, lack of awareness about modern cultivation and management practices adversely affects jute production. Jute has faced a severe competition with synthetic fibre during the last two decades, but it has now revived its importance and has got a wider prospect in national as well as international perspective. As there is a little scope for horizontal expansion of land, emphasis should be given on vertical expansion of productivity as well as production of quality fibre. With this backdrop, this study has been delineated to build up confidence for adoptior of the improved technologies through frontline demonstations.

METHODOLOGY

This study was conducted during the year 2005-06. Altogehter 131 farmers from different categories were selected purposively from eight villages of two jute growing district viz, Devok, Koirapur, Masunda, Iswarigacha, Geedha and Teghoria of district North 24 Parganas and Kamarkundu I & II (Bhola) of district Hoogly in West Bengal for conducting frontline demonstratios (FLDs) on their fields. Materials for the present study comprised of five high yielding jute varieties viz. JRO-524, JRO-8432, JRO-66, JRO-128, S-19 and JRO-524E (energized seed with recommendation of N:20,

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P_2O_5:10, K_2O:10 Kg. ha^{-1} fertilizer dose without plant protection measure taken) with the recommended package of practices. Sowing was done in the month of April-May, while harvesting in the month of August-September. Fertilizer schedule was N: 60, P_2O_5: 30, K_2O): 30 kg. ha^{-1} for all the varieties except for JRO-524E. Use of chemicals for plant ptotection was need based. Locally cultivated varieties, which were being practiced by non-adopted farmers with their own management, were used as local checks. In the present study were collected through personal interviews, group discussion and empirical observations with help of semi-structured interview schedule and field record of frontline demonstration (FLD) plots and local practices.

RESULTS AND DISCUSSION

Field performance of the demonstrated jute varieties

It is important to know that the performance of the high yielding varieties tasted at different places for conviction of the farmers. Location-wise performance of the demonstrated varieties was assessed in terms of fibre yield, which are presented in Table 1 and Fig. 1.

Table 1 : Fibre yield of Olitorius jute varieties under demonstation (2005-06)

Sl.No.	Location	Fibre yield (q ha-1)						
		JRO-524	JRO-524E	JRO-8432	JRO-66	JRO-128	S-19	Average
1.	Kamar Ku.-I	28.02	27.68	27.71	26.38	26.77	27.11	27.28
2.	Kamar Ku.-II	25.99	29.45	25.02	24.47	24.06	24.65	25.49
3.	Iswarigacha	29.93	29.37	30.07	27.07	26.48	23.11	27.67
4.	Masunda	29.42	28.83	25.84	27.63	25.50	29.52	27.79
5.	Teghoria	33.07	29.77	31.50	34.00	32.97	31.40	32.12
6.	Devok	35.00	29.80	33.00	31.00	32.00	33.00	32.30
7.	Kairapore	28.26	28.44	28.32	25.32	26.34	25.11	26.97
8.	Geedah	34.37	29.38	29.69	28.91	29.69	29.68	30.29
	Average	30.42	29.09	28.89	28.10	27.98	27.95	

Data show that the highest fibre yield of jute was obtained from the variety JRO-524 (30.42 q ha^{-1}), followed by JRO-524E (29.09 q ha^{-1}), JRO-8432 (28.89 q ha^{-1}), JRO-66 (28.19 q ha^{-1}), JRO-128 (27.98 q ha^{-1}) and S-19 (27.95 q ha^{-1}). However, the difference in fibre yield obtained among the varieties was not substantial. Similar results were also reported by Chapke[A] *et. al*., 2006.

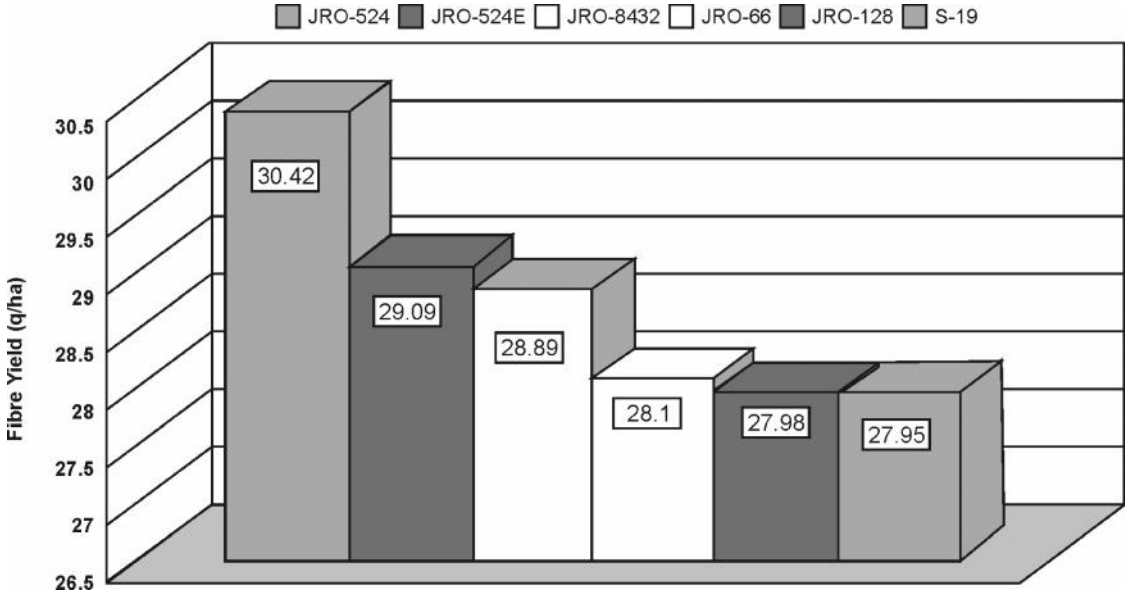

Fig. 1. Fibre yield obtained from Jute varieties under PLD

Benefit-cost analysis

All the input-output cost data, except fixed cost, were recorded during the season, time-to-time, and analyzed. The comparative benefit cost analysis data are presented in the Table 2.

Highest net return was obtained form the variety JRO-524E (Rs. 18538 ha^{-1}) followed by JOR-524 (Rs. 18425 ha^{-1}) JRO-8432 (Rs. 16080 ha^{-1}), JRO-66 (Rs. 15009 ha^{-1}), JRO-128 (Rs. 14840 ha^{-1}). On an average, the cost of cultivation of jute per hectare with improved practices was Rs. 23,493 giving a net return of Rs. 16,272 per hectare due to high price of the fibre this year, which ranged from Rs. 1180 to Rs. 1300 per quintal. In terms of benefit-cost ratio (Fig. 2), the variety JRO-524E ranked first (1.85:1) followed by JRO-524 (1.78:1), JRO-8432 (1.67:1), JRO-66 (1.63:1), JRO-128 (1.62:1) and S-19 (1.62:1)

Table 2. Economics of cultivation of different varieties of jute

Sl. No.	Jute variety	Fibre yield (q ha^{-1})	Cost of cultivation (Rs. ha^{-1})	Gross return (Rs. ha^{-1})	Net return (Rs. ha^{-1})	B:C ratio	% of additional yield over FP	Additional return over FP (Rs. ha^{-1})
1.	JRO-524E	29.09	21874	40412	18538	1.85	10.61	5871
2.	JRO-524	30.42	23664	42089	18425	1.78	15.67	5758
3.	JRO-8432	28.89	23871	39952	16080	1.67	9.84	3413
4.	JRO-66	28.10	23871	38880	15009	1.63	6.84	2342
5.	JRO-128	27.98	23808	38648	14840	1.62	6.39	2173
6.	S-19	27.95	23871	38609	14738	1.62	6.27	2071
	Average	28.74	23493	39765	16272	1.69	9.27	3605
7.	Check	26.30	22618	35385	12667	1.56	.....	.....

Variety-wise comparison of additional gain has reflected that the demonstrated improved varieties gave more fibre yield under FLDs, which ranged from 6.27 per cent (S-19) to 15.67 per cent (JRO-524) over farmers' practice (FP). Besides that, the additional economic return ranged from Rs. 2071.00 (S-19) to Rs. 5871.00 (JRO-524E) over farmers' practice. It is obvious from the above data that JRO-524E gave more benefit due to less involvement in cost of cultivation and JRO-524 gave more fibre yield may be due well fitted in the climatic conditions. Chapke *et. al.*, 2006 also reported that variety JRO-524 perceived as more suitable variety both in terms of yield and economic return in this area by the farmers.

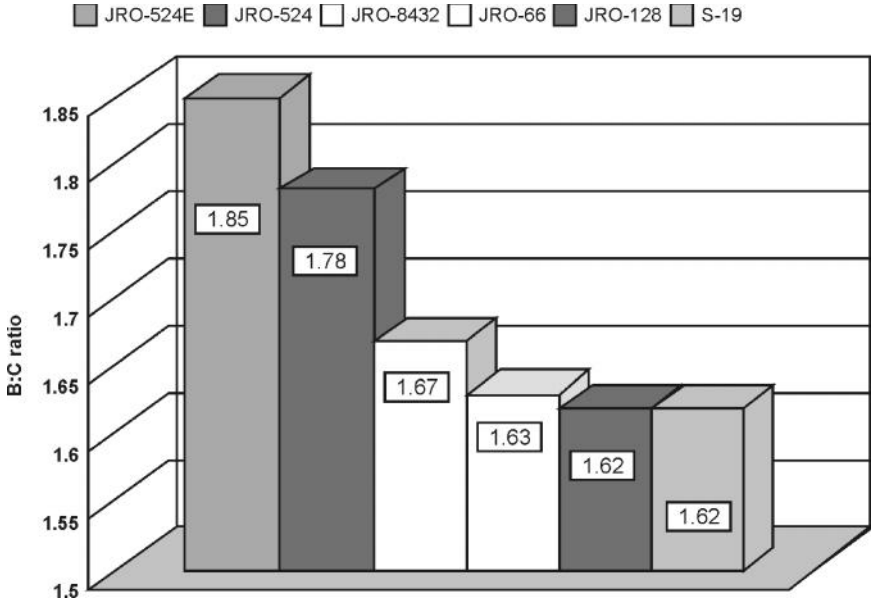

Fig. 2. Benefit-cost ratio of Jute varieties

Comparative analysis of yield performance of the demonstrated jute variety JRO-524 with local check (farmers' practice)

JRO-524 being the most popular variety among the farmers, and spread over about 90 per cent area under jute cultivation with different local names (Das *et. al*., 2006) was compared with the farmers' practice. The advantage in fibre yield of variety JRO-524 over local check reveal the increase in yield under FLD vried from 3 per cent at Masunda to 39 per cent at Kamar Kundu-I (Table-3). Across the locations, yield increase under FLD was about 16 per cent over the check yield (Fig. 3). Demonstrated yield was higher than the check yield in all the eight locations. It also determined that the realizable fibre yield gap was 4.12 q ha^{-1} which varied from location to location ranging from 0.4 q ha^{-1} at Masunda to 7.83 q ha^{-1} at Kamarkandu-I. It may be due to different climatic and soil conditions. During the study period, the crop was affected due to scarcity of rainfall and unavailability of the irrigation facilities at the age of 30-45 days at Koirapur. At some palces, the crop suffered from intensive weed, which could not be controlled due to paucity of the labour. It indicated that the timely and systematic implementation of improved practices gave better response even in the different climate situations. It is also inferred that yield of jute fibre can be enhanced by 16.33 per cent by following simple agronomic practices such as appropriate seed rate, line sowing, balance fertilizer use and need-based pest and disease control.

Table 3. Yield of JRO-524 under FLD and local check (farmers' practice)

Location		Fibre yield (q. ha^{-1})		% of increase	Yield gap
		FLD	Local check	in yield	(q. ha^{-1})
1.	Devok	35.00	28.82	21.44	6.18
2.	Masunda	29.42	28.56	03.01	0.86
3.	Geedah	34.37	27.90	23.19	6.47
4.	Kairapore	28.26	26.02	08.61	2.24
5.	Teghoria	33.07	29.88	10.68	3.19
6.	Iswarigachia	29.93	26.21	14.19	3.72
7.	Kamar Kandu-1	28.02	20.19	38.78	7.83
8.	Kamar Kandu-II	25.29	22.83	10.77	2.46
	Average	30.42	26.30	16.33	4.12

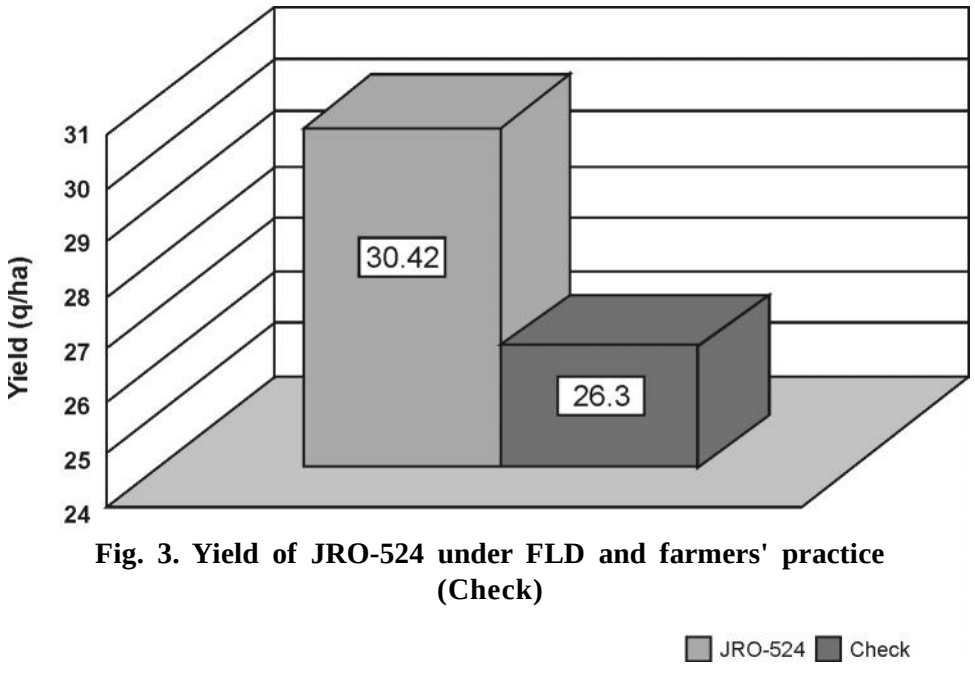

Fig. 3. Yield of JRO-524 under FLD and farmers' practice (Check)

Additional input used under FLDs over farmers' practice

Cost of cultivation plays a vital role in profitability of the jute cultivation. Farmers always strive to maximize the profitability from jute crop (Pathak, 2001). Keeping this in view the additional input cost required to implement improved jute production technologies for all the varieties and the input-cost data were calculated and are presented in the Table-4.

Table 4. Additional input used under FLDs over farmers' practice

Sl. No.	Item	FLD (Rs. ha^{-1})	Farmers Practice (Rs. ha^{-1})	Additional input used under FLD (Rs. ha^{-1})
1.	Seed	491	816	(-) 325
2.	Chemical fertilizer	1281	1349	(-) 68
3.	Plant protection	203	269	(-) 66
4.	Irrigation	2443	2637	(-) 194
5.	Ploughing	2047	1608	439
6.	Human labour	17028	15946	1082
	Total cost	23493	22625	868

From the table 4 it is revealed that the additional cost was required to carry out timely and systematic intercultural and tillage practices which plays a vital role in maximizing the benefit. However, the input cost required for seed, fertilizer and plant protection was lesser due to the proper implementation of jute production technologies under demonstrations. It is noted that the additional inputs used under FLDs over the farmers' practice was Rs. 868 only in total cost of cultivation. It is opined that the benefit from jute cultivation could be increased by following timely and systematic crop management.

Cost of human labour

The operation-wise analysis of the human labour required for cultivation of jute was also done. The data obtained are illustrated in the Table 5.

Table 5. Operations-wise cost of human labour

Operation		Cost of human labour (Rs. ha^{-1})		
		FLD	Farmers' practice	Additional under FLD
a)	Land preparation	434	427	07
b)	Fertilizer application	390	271	119
c)	Sowing	701	256	445
d)	Weeding & thinning	4165	4664	(-) 499
e)	Insecticide application	112	303	(-) 191
f)	Irrigation	592	546	46
g)	Harvesting bundling, carrying, steeping	5572	4482	1090
h)	Extraction	3994	3716	278
i)	Drying & baling	850	1077	(-) 227
j)	Marketing	218	204	14
	Total	17028	15946	1082

It is observed that additional cost of labour was required for sowing (Rs. 445 ha^{-1}) and fertilizer application (Rs. 119 ha^{-1}). Under FLDs the crop was sown in line manually and recommended fertilizer doze was (N : 60, P_2O_5: 30, K_2O: 30 Kg. ha^{-1}) maintained, which involved more cost over the farmers' practice. Line sowing recovered the cost in weeding and thinning operation by reducing the cost by Rs. 499 ha^{-1}. However, it was not maintained in farmers' practice. The additional cost spent for post harvest operations attributed to higher fibre yield (2.43 q ha^{-1}) as well as stick yield (6.92 q ha^{-1}) under FLDs over farmers' practice (Table 5). The additional cost required for overall field operations (Rs. 1082) was required for implementation of improved package of practices, which can further be minimized by introduction of mechanization wherever possible, and chemical weed control.

Comparative return and cost analysis of jute cultivation

To evaluate the economical viability of the improved jute cultivation in the farmers' field, the analysis of returns

and cost analysis were done. The data are presented in Table 6.

It was observed that fibre yield increased by 2.49 q ha^{-1} over the farmers' practices by adopting improved jute technology practices, which gave additional return of Rs. 3605 ha^{-1} on the cost of Rs. 868 ha^{-1} that gave an additional benefit cost ratio of 1:0.13. With such encouraging results farmers were convinced and imotivated to adopt the improved jute production technologies.

Table 6. Return and cost analysis of jute cultivation

Sl. No.	Farm produce	FLD	Farmers practice	Additional gain
1.	Fibre yield (q/ha)	28.73	26.30	2.43
2.	Jute stick (q/ha)	48.90	41.98	6.92
3.	Avg. fibre price in market (Rs./q)	1201	1200	.....
4.	Gross Return (Rs./ha)	39765	35285	4480
5.	Cost of cultivation (Rs./ha)	23493	22625	868
6.	Net Return (Rs./ha)	16272	12667	3605
7.	B:C Ratio	1:1.69	1:1.56	1:0.13

CONCLUSION

The participating farmers opined their preferences for two particular varieties, JRO-524 for higher yield and energized seed (JRO-524E) for less involvement in cost of cultivation. Besides that, timely and systematic implementation of the improved jute technologies enhanced benefit up to Rs. 3605 ha^{-1}. It is also ascertained that the introduction of mechanization, wherever possible and chemical weed control could reduce the cost of cultivation and labour requirement. Thus, the agricultural technology can be transferred more effectively by building confidence of the participating farmers through results of frontline demonstrations on their field with their own observations and practices.

It is empirically observed that the performance of improved jute technology with practical experience has developed confidence in the participating farmers.

ACKNOWLEDGEMENT

Authors are grateful to Dr. H.S. Sen, Director, CRIJAF for providing guidance and encouragement in conducting the study.

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