Retting of jute for quality fibre: constraints and solutions

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Abstract

This paper focuses on retting related constraints faced by farmers in the traditional method and on the improved method developed to address these constraints. The study revealed that more than 90 per cent of farmers were unaware about improved fibre extraction and retting technology of jute. Majority of them perceived that more labour was required for performing manual retting operation of jute with high wages of labour during the peak season followed by non-availability of good quality water and insufficient water bodies for retting. However, they did not care about getting quality jute fibre due to lack of grading systems in the markets, which resulted in less monetary gains. Promising retting technologies have been developed, which can address problems of jute growers by saving water, space, time, labour and ultimately the cost of production. Moreover, the farmers gave a positive response during the frontline demonstrations for implementation in their fields. There is an essential need to empower the farmers with the technological know-how through extension strategies such as conducting training and demonstrations for its wide adoption.

Introduction

Jute (*Corchorus olitorius*) is grown as a rainfed commercial crop in our country. In West Bengal, Assam, Orissa, Bihar and a few other states it is cultivated extensively as a fibre crop. Even in the face of artificial fibres, jute fibre, now-a-days, has a good world market. From gunny bags to carpets, it is being accepted all over the world due to the non-pollutant and bio-degradable characteristics of the fibre. Quality jute fibre, golden and lustrous, fetches high price to the farmers and provides an appropriate market. The Central Research Institute for Jute and Allied Fibres (CRIJAF), Barrackpore, West Bengal has played an important role in promoting jute production in India. Different high yielding varieties of jute and improved methods of jute cultivation evolved in this institute, have already been accepted by the farmers.

Jute cultivation is labour intensive, constituting 77.15 per cent cost towards human labour (Chapke *et. al.*, 2006). Retting by traditional means consumes at least 30% of total cost of cultivation of jute. Inadequate retting infrastructure, water and high cost of the labour for the retting process were among the major problems.

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The traditional method of extraction of fibre from jute plants is triple-disadvantaged in terms of time (2-3 weeks), cost of cultivation and production of poor quality of fibre (Borkar and Das, 2006). It may not be suitable for value-added goods apart from the low price obtained by the farmers. Such realization has led to develop a mechanical extractor of fibre, directly from the green plants, followed by improved retting method at CRIJAF. The retting related constraints faced by the farmers in the traditional method and details about the improved method developed by CRIJAF to address these constraints are focused in this manuscript.

Methodology

This study on constraint analysis of jute cultivation emphasizing on retting process of jute was conducted to find out problems or difficulties which limit the process of technology adoption and producing quality fibre. For this purpose, 144 farmers of different categories were selected randomly from eight villages i. e. thirty (30) jute farmers from two villages, namely, Manikpur (Block- Deganga) and Srikathi (Block- Bhaduria) of North 24-Parganas district; fifty two (52) farmers from three villages, namely, Sikorpur (Block-Chakdah), Doduabari (Block- Ranaghat-II) and Daksin Majdia (Block- Ranaghat-I) of Nadia district and sixty two (62) farmers from three villages, namely, Haripur (Block- Singur), Panisheola (Block- Haripal) and Gobindpur (Block-Jangipara) of Hooghly district, which are intensive jute growing areas of West Bengal. The data were collected through personal interviews, group discussion, field observations and empirical observations with the help of a pre-tested semi-structured interview schedule. Matrix ranking was done using tools of Participatory Rural Appraisal (PRA). Frontline demonstrations on fibre extraction by the jute fibre extractor were conducted on the farmers' fields at Kadambogachi village of North 24-Parganas district and Panchkahonia village of Nadia district of West Bengal during the crop year 2007.

Conventional Retting Method

Generally, after about 100-120 days of sowing, the jute plants are harvested. The plants are stacked in bundles and kept lying in the field for 4-5 days for shedding the leaves. The dropped leaves also act as manure to the field itself. Then the bundles of jute plants are dipped in the available nearby water bodies for retting. It takes about two to three weeks to complete the retting process and then fibres are stripped manually from plants under this traditional retting method.

Results and Discussion

The results are discussed under three aspects i. e. (i) operational constraints faced by the farmers in retting of jute, (ii) improved technologies available to address them and (iii) experiences of the demonstrations in the farmers' fields.

i. Constraints in Jute Retting

Constraints faced by the farmers of North 24-Parganas districts regarding retting of jute may be seen in Table 1. There was lack of awareness among 100 per cent of the farmers about latest fibre extraction and retting technology due to prevailing poor extension services, more labour was required for performing retting operation of jute (93%), high wages of labour during peak season (83%), non-availability of good quality water (80%) and insufficient water bodies at the time of retting (47%). The reasons for such a situation occurring, as per the farmers' view, were massive harvesting of jute, paddy planting during a certain period coupled with scarcity of rainfall being received. These apart, most of the labourers preferred to work at a brick-field due to higher wages than in agriculture (Anonymous, 2006). Though demand for quality fibre is increasing for preparation of diversified jute products, the farmers didn't care about getting quality jute fibre due to lack of grading systems in the markets (93%), which resulted in less monetary returns.

Table 1. Retting related Constraints in Jute Cultivation

(N=144)

S. No.	Constraint	District-wise frequency			Pooled
		North 24-Parganas (N=30)	Nadia (N=52)	Hooghly (N=62)	
1.	Lack of awareness about fibre extraction machine and improved retting technology	30 (100)	48 (92)	57 (92)	135 (94)
2.	No grading system is available in market	28 (93)	-	-	28 (93)
3.	More labour required for conducting retting process of jute as compared to others	28 (93)	28 (54)	60 (96)	116 (81)
4.	High wages of labour during peak season i.e. at the time of weeding and harvesting	25 (83)	30 (57)	59 (95)	114 (79)
5.	Good quality water not available for retting	24 (80)	22 (42)	15 (24)	61 (42)
6.	Non-availability of sufficient water ponds for retting of jute	14 (47)	-	27 (44)	41 (28)

Figures in the parentheses indicate percentage.

Similarly in Nadia district, majority of the farmers (92%) were unaware about the latest fibre extraction and retting technology, they realized high wages of labour during peak season (57%), while 54 per cent of the farmers expressed that more

labour was required for performing retting operations especially, from harvesting to extraction of jute fibre (54%). Non-availability of sufficient water ponds for retting of jute was also a constraint faced by 42 per cent of the farmers (Table 1). The problem was aggravated in a year of low monsoon rains. Reasons behind the constraints were almost the same as discussed earlier (Anonymous, 2007).

In Hooghly district, lack of unawareness about latest fibre extraction and retting technology (92%), more labour requirement for performing retting operation of jute (96%) and high wages of labour during peak season (95%), were the major constraints perceived by the farmers in retting process of jute. This was followed by insufficient water bodies available at the time of retting (44%) and non-availability of good quality water (24%). Besides, farmers experienced shortage of labour during the peak season. Reasons behind the constraints of high wages and scarcity of labour were; harvesting of jute and rice planting operations were being done during a certain period and due to scarcity of rainfall being received.

Overall, it is observed that there is lack of awareness about latest fibre extraction and retting technology (94%). Their lack of awareness was due to poor extension services provided to the farmers. The farmers were taking the advice for jute cultivation or getting solutions to suddenly occurring problems from the village farmers (52%) followed by local agro-centres (32%) and their relatives (25%). These information sources were not technically credible. Requirement of more labourers (81%) and high wages during the peak season (79%) were the top constraints in retting of jute. Lack of quality water (42%) and retting infrastructure (28%) were also major concerns (Table 1). These constraints resulted in inferior quality fibre and low price benefits, as there was no grading system available in the market (93%).

It appears that jute retting process is very tedious and laborious and consumes a major portion of the cost of cultivation. There is a need felt for introduction of mechanization in extraction and retting system, wherever possible. Concerted efforts were made by CRIJAF to develop a viable machinery to extract fibre from fibre crops and an eco-friendly retting method keeping in view the cost involved in extraction of the fibre manually and considering the dwindling water resources required under the conventional method.

ii. Improved Fibre Extraction and Retting Method

This process involves extracting the jute fibres in green condition after harvesting, and retting the same in a very small volume of water under the farmer's own control. Now, with the aim of producing quality jute fibres through practically feasible technology, CRIJAF has developed a simple mechanical device with two

options viz., (a) power operated - CRIJAF Bast Fibre Extractor (b) manual - CRIJAF Jute Extractor and (c) improved retting technology.

a. CRIJAF Bast Fibre Extractor

The function of the machine is to remove ribbons containing fibre from the harvested jute plants in green condition (Table 2). The machine is simple and being portable it is easy to carry to the field site. It extracts about 25 kg of dry jute fibres, whereas under traditional practice, a labour can extract only about 5 kg of fibres per hour. The machine has multi-purpose use round the year. However, jute sticks are broken to pieces while removing ribbons coupled with requirement of power which was the major disadvantage of this machine. The broken sticks can be used to prepare compost or domestic fuel by mixing with cow dung. It can be used efficiently in the areas where, water for retting is an acute problem and farmers don't require much unbroken or long jute sticks for their use. However the farmers desired intact jute sticks from jute cultivation, for various domestic purposes especially as fuel, fencing which is more important to them than jute fibres. Keeping this in view, CRIJAF Jute Extractor was developed.

b. CRIJAF Jute Extractor

A manually operated device, called CRIJAF Jute Extractor (Table 2) was developed considering the different circumstances, where availability of electric or kerosene oil was a constraint and or more importantly, the farmers desired to get unbroken sticks for their domestic use. Small and marginal farmers may find the cost of the machine prohibitive to own them individually. Under such a situation, utilization of the machine in custom hire service mode may be the best alternative. The distinguishing characteristics of the extractors are highlighted in Table 2.

Table 2. Difference between Bast Fibre Extractor and CRIJAF Jute Extractor

S. No.	Parameter	CRIJAF Bast Fibre Extractor	CRIJAF Jute Extractor
1	Operating system	Power operated	Manual operated
2	Power consumption	0.5 unit of electricity /hr or 0.4 liter kerosene /hr	Human power
3	Output capacity	400-500 jute plants (25 kg of dry fibres)	400-500 jute plants (25 kg of dry fibres)
4	Weight of the machine (kg /unit)	125	75
5	Condition of sticks after fibre extraction	Sticks are broken to pieces	Sticks do not break
6	Cost of the machine (Rupees)	Cost about Rs. 16,000/- per machine	Cost about Rs. 8,000/- per machine
7	Utility crops	Used for jute, mesta, ramie and sunhemp	Used for jute and mesta

Source: *Borkar and Das, 2006*

c. Improved Retting Method

The green ribbons containing fibre extracted from the above extractors, are retted by dipping tham vertically, by arranging on bamboo-gratings, into a small pool of water (Table 3). It may be said that a pit of 2 meter x 1meter x 1meter size is enough to hold ribbons yielding about 50 kg of dry fibre for retting. A farmer may have it excavated in one corner of his field and if he has a shallow tubewell, it is well and good. He may recharge the pit with water whenever necessary, particularly when it is dried or it becomes black or polluted. In such a pit, polythene lining would be more helpful to prevent seepage of water and soil marking on fibres. Significantly, the process results in improved quality of fibre, which the variety is capable of as per its genetic make up. Moreover, the slim jute plants, which are thrown away by the farmers, can also be extracted in this machine and in that way an increase of production by 15% was found. Farmers, as a result, could fetch much better price by reducing the cost of fibre production. The relative advantages of this method over the traditional one have been outlined in Table 3.

Table 3. Comparison between Traditional and Improved Retting Method of Jute

S. No.	Parameter	Traditional method	Improved method
1	Material steeped	Whole canes (Harvested jute plants)	Ribbons
2	Method of steeping	Horizontal	Vertical on bamboo frame
3	Steeping practice	Weight with stones or clay or pseudo-stem of banana is required to keep the canes in touch with water	No weight is required
4	Water requirement for retting	Large volume (500 liter /kg dry fibre)	Small volume (100 liter /kg dry fibre)
5	Water condition	Usually stagnated, polluted and health hazardous	Fresh water
6	Time taken for retting	15-20 days	6-8 days
7	Quality of fibre (Grade)	Submissive luster with root content (1-8)	Bright, clean, uniform, rootless or with little root (1-4)
8	Cost of fibre extraction (Rs. /100 kg dry fibre)	300	150

The merits of the improved process of retting over the traditional method are:

1. About 80 per cent less water and space is required in this process.
2. Less physical labour, less time and less cost thereby.
3. The total process remains within the farmer's own control.
4. Better quality fibre is produced with higher yield.
5. After seven days those retted fibres are washed in the same pit of water and dried on bamboo scaffold before taking to the godown.
6. In the off season, the same pit may be used for preparation of organic compost manure for other agricultural use.

iii. Evaluation of the Technology

Demonstrations on fibre extraction, manually, by the jute fibre extractor were conducted on the farmers' fields at intensive jute growing areas namely, Kadambogachi village of North 24-Parganas district and Panchkahonia village of Nadia district during the crop year 2007. Initially, farmers found it difficult to extract fibre from harvested jute sticks by the manual jute extractor consequently requiring more manual force. This was due to the machine being operated by untrained farmers. However, the period required for the retting of the ribbons extracted by the extractor was reduced to 8 days instead of 18 to 20 days for the farmers' practice. The place required for ribbon retting was very small as compared to the traditional method. Easy availability of water for retting in this area during this year 2007 was a reason for their hesitation to use this method for retting in a small pit. For easy handling of these extractors, hands-on training is required to work efficiently. It has good scope in jute areas, where the water and retting infrastructure are acute constraints and there is requirement of unbroken jute sticks (Chapke, 2007).

Conclusion

The traditional method of fibre extraction of jute and its retting resulted in poor quality fibre, which was not suitable for making value-added products and yielded low price. CRIJAF has opened a new avenue for betterment of jute production in the country. The mechanical and manual jute retting process was found convenient and beneficial in all respects. It saved water, space, time, labour, cost of production and provided hands-on training producing better quality of fibre as well. Thus the farmers could earn more profit by adopting this technology and would certainly be inclined to accept it. The technology needs strategic efforts of the Extension agency and policy makers for its wide adoption.

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