

## **Success Story of CRIJAF Multi-Row Seed Drill**

**Background:** Jute is an important environment friendly fibre producing crop and it is mainly grown by small and marginal farmers as a rain-fed crop followed by paddy. Sowing of jute is the most important farm operation for getting healthy and dries less crop for higher fibre production. Traditionally jute farmers follow broadcast method of sowing to utilize the limited soil moisture availability due to summer rainfall. In this method, it is difficult to maintain the recommended seed rate due to small size seeds and low rate. In practice farmers use a higher seed rate (7-8 kg/ha) than recommended seed rate. To maintain optimum plant population of 5-6 lakh/ha in the field, the excess 75-80% of the emergent seedlings are removed during weeding and thinning operation. Further, due to uneven plant population and higher plant density, the overall fibre yield reduces about 10-15 per cent.

On the other hand **line sowing of small seeds using seed drill saves precious seed, ensures depth of placement, germination and reduced cost of sowing and weeding.** The socio-economic conditions of the jute farmers do not permit them to have seed drills. They are therefore bound to follow the traditional practice of broadcast sowing and face difficulty in intercultural operations and overall management of their crop. As the yield rate is low, farmers derive marginal benefit out of their produce. Considering the above aspects, a low cost manual driven seed sowing CRIJAF Multi-Row Seed Drill has been developed by ICAR-CRIJAF which facilitates in maintaining optimum plant population and thereby enhancing productivity and production with reduced cost.

**Technology:** CRIJAF Multi-Row Seed Drill is a low cost manual driven seed sowing machine for sowing of small seeds like jute, mustard and sesame etc. in line. Main parts of the seed drill are seed hopper or seed box, ground-cum-transportation wheels, frame, furrow openers and covering device. Conical frustum shaped seed hoppers or boxes made of tin sheet having average diameter 9.7 cm and length 9.3 cm are used in the seed drill. During operation seed falls directly through seed dispensing holes from the seed boxes to the furrow. The seed dispensing holes 14 nos. of 2.36 mm diameter are made on the periphery of the larger diameter of conical frustum shaped seed boxes at equal interval of 2.74 cm to achieve plant to plant distance 5-7 cm in the field. Shovel type furrow openers are fitted just ahead of the seed boxes and furrow covering device as chains made up of mild steel are attached besides the seed boxes. The spacing between furrow openers is 25 cm as per recommended spacing for Olitorious/tossa jute. Two nos. mild steel ground wheels of 22 cm diameter are

provided. To prevent wheels from slippage in the field, 8 nos. pegs of 4 cm long spikes welded at equal interval on periphery of each wheel. The technology is very promising as it reduces seed rate about 50 per cent i.e. 3-4 kg/ha, besides ensures uniform germination and proper crop stand, which help in reducing the cost of cultivation in terms reduction in labour cost for weeding and thinning operations. The Effective field capacity (EFC) of machine is about 0.2 ha/h, thus one hectare could be sown in 5 hours only.

**Economic benefits:**

- Reduction of seed rate by 50 % i.e. 3-4 kg/ha ( 6-7 kg/ha in broadcast sowing)
- Saves labour for weeding and thinning by 15 man-days
- Maintains uniform plant population of 5-6 lakh/ha
- Line sowing facilitates post-sowing operations, i.e. weeding, fertilizer application, plant protection measures, irrigation, inter-row cropping and harvesting.
- Increases fibre yield by 10-15 %
- Earn additional income of Rs. 6,500/ha

**Environmental/ occupational benefits:**

- No adverse effect on human as average power requirement is 42.35 W, which could be easily pulled by a man for 2-3 hours continuously.

**Other benefits:**

- The machine can also be used for sowing of other small seeds.
- No complexity involved in the application of technology.
- No skill is required to operate or adjust the machine.
- Cost effective and user friendly technology.
- Mechanical or chemical weed control measures can be adopted easily in line sown crop.
- The dependence on human labour for weeding and thinning can be minimized.

**Impact of the technology:**

The escalated cost of cultivation of jute in terms of seed and human labour have drastically reduced the profit of farmers' from jute cultivation and they are compelling to reduce the acreage of jute cultivation to accommodate the other profitable crops. The crop yield is affected by plant population, row spacing, plant to plant spacing, type and variety of

seed and their emergence. This technology is very ideal for sowing of jute in line for reduction in seed rate, labour and cost requirement for thinning and weeding in jute cultivation with increase in yield. The technology has been commercialized and demonstrated across the jute growing states during last 8-9 years with very positive feedback and acceptability. By using this technology, the farmers can save input cost of cultivation and earn profit for their produce.

The institute had demonstrated CRIJAF Multi-Row Seed Drill not only at its extension centres situated at major jute growing districts like Nadia, Murshidabad, Hoogly, North 24 Parganas and Malda but also in jute growing areas of Bihar, Assam, Odisha and Meghalaya **through Jute-ICARE Project sponsored by National Jute Board, Ministry of Textiles (Govt. of India) where ICAR-CRIJAF is the technical partner along with Jute Corporation of India Ltd. The technology also included in the National Food Security mission (NFSM), Commercial Crops- Jute in the states of West Bengal, Bihar, Assam and Odisha.**

#### **Farmers' feedback:**

- **Mr Parimal Mondal**, a farmer from Kumra village under Habra-I block of North 24 Parganas district was at first hesitating to use this tool due to ignorance of this novel technology. After visiting the ICAR-CRIJAF demonstration plots and interaction with scientists of Agricultural Section, he requested to demonstrate this technology in his field. After seeing the demonstration results of first year, he adopted the line sowing method in 3 bigha area. He experienced reduced seed rate of 50 % compared to traditional broadcast sowing method. The seedlings were healthy, stout and uniformly grown compared to the seedlings raised from broadcast land. Labour requirement for thinning and weeding operation was reduced up to 50 % with less infestation of insect, pest and diseases attack. About 20 % less labour was required for harvesting and 8 % more yield was obtained. He got extra profit of Rs. 12,500/ha due to 10 % reduction in human labour and increased yield. Since then, he has been using this technology and motivated his neighbouring farmers to adopt this.
- **Mr Kenaram Ghosh**, a farmer from Panchkahunia village under Haringhata block of Nadia district is an innovative farmer and after visiting the Institute demonstration adopted this technology in his own field and motivated the other neighbouring farmers to adopt this since last 4-5 years.

- **The adoption of the technology is very fast**, since ICAR-CRIJAF could organise many farmer- led extension programmes in the nearby villages with the help of progressive farmers like Mr Mondal and Mr Ghosh. The demonstrations on this technology were conducted in an area of 11.56 ha across the villages of West Bengal. It helped in increasing the fibre yield by 1.38-2.28 q/ha and also saved the cost of human labour in jute cultivation by ₹ 5,234-5,590/ha over farmer's practice. The effect of this intervention was maximum at Gopalpur (₹10,954/ha) followed by Manikchak (₹8,747/ha), Gouribati (₹ 8,309/ha) and Goaldah (₹6,894/ha).
- In 2017, more than 40 farmers of Kumra village have adopted this technology and now altogether 20 ha area of jute have been sown by CRIJAF Multi-row seed drill. The farmers who had lost their hope in jute cultivation due to its increasing cost of cultivation, are able to find their interest back in jute cultivation and significantly increase the area of jute cultivation
- **Area coverage:** Twenty-three blocks covering West Bengal, Bihar, Assam, Odisha and Meghalaya have been covered.
- **Farmers benefited:** More than 1,00,000 farmres have been benefitted through this novel technology.
- **Total monetary advantages:** Monetary gain per farmer Rs. 6,500- Rs. 11,000/ ha
- **Royalty Earned by the Institute:** About Rs. 20,00,000/- have been earned by the institute as royalty from this technology.
- **Total quantity of CRIJAF Multi-Row Seed Drill marketed/ produced:** Approximately 8,000 machines have been produced and marketed since its commercialization.

#### **Economical evaluation of the technology for 1 ha area during 2013 -16**

<b>Particulars</b>	<b>Broadcasting Method</b>	<b>With CRIJAF Multi Row Seed Drill</b>
Input Cost ( Rs./ ha)	Rs. 9325	Rs. 9850
Human Labour Cost ( Rs./ ha)	Rs. 70,506	Rs. 64,904
Total Cost of Cultivation ( Rs./ ha)	Rs. 79,831	Rs. 74,754
Avg. Fibre Yield (q / ha)	30.02	31.57
Increase in fibre yield	-----	5 - 8 %
Gross Return (Rs. / ha)	Rs. 90,711	Rs. 97,291
Net Return (Rs. / ha)	Rs. 10,880	Rs. 22,537
<b>Net Profit over conventional method</b>	-----	<b>Rs. 11,657 /- ha</b>

### Advantages of Line Sowing with CRIJAF Multi Row Seed Drill (MRSD)

- Complete sowing of 1 ha in 2 man-days.
- Reduction in seed requirement by 50 %
- Saves labour requirement for thinning & weeding by 25 – 30 man-days
- Increase in fibre yield by 5 – 8 %
- Uniform and required plant population maintained.
- Easy in intercultural operations & harvesting.

Saving in seed cost for sowing (Rs. / ha)	Saving in cost for thinning and weeding (Rs. / ha)	Gain due to Yield advantage (Rs. / ha)	Gross Profit (Rs./ ha)
3 kg /ha x Rs. 180 = Rs. 540	25 man-days x Rs. 200 = Rs. 5,000	1.50 q/ha x Rs. 3000 /q = Rs. 4500	Rs. 10,040



- Commercial production & marketing by :
  - ❖ M/s Mettle Engineering Co., Howrah; 9433424266
  - ❖ M/s Joy Maa Tara Enterprise, Sodepur, Kolkata
  - ❖ M/s Krishi Udyog, Samabayapalli, Horah
- Unit price Rs. 4100 /-

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