

Paired Row Trench Plantation Technique in Ambala District

Introduction

Rice and Wheat are the major crops, while Sugarcane is the major cash crop of the Ambala. In Ambala, Sugarcane is grown on average area of 10,000 hectares. The average cultivated area (hectare) and average productivity of Sugarcane for the last 5 years is given in table (Table-1).

Table-1: Area & Productivity of Sugarcane during the last five year in Ambala

Sr. No.	Year	Area (ha)	Productivity (qtl/ha)
1.	2009-10	10,000	613.00
2.	2010-11	10,000	650.00
3.	2011-12	10,000	670.00
4.	2012-13	10,000	672.00
5.	2013-14	11,000	680.00

Sugarcane is planted generally in autumn/winter season and spring season. The time of planting during autumn is 20th September to 20th October. However spring planting is preferred by farmers, which is done after rice, Toria & Potato. But some farmers also plant the crop after wheat. Mid February to the end of the March is the optimum time of spring plantation

The farmers of Ambala are using single row trench plantation technique in which inter-row distance is 60-70 cm and due to this spacing about 90-95 trenches per acre are obtained. The trenches are dug by 3 or 5 row trench digger and seed setts of sugarcane are placed at the bottom of the trenches. Then the seed setts are covered by soil with planking. Planting is generally done at vattar position (a soil situation created after pre sowing irrigation) and no irrigation is given till the 50 to 60 percent germination takes place. For planting of Sugarcane 85-90 qtl seed sett is needed for one hectare and nearly 10-15 irrigations are given to the crop annually.

In autumn planting, the farmers are using CoJ-85, CoH-92 and CO-89003 varieties of sugarcane and for spring planting, they prefer CoS-8436 and CO-0238 varieties.

The major problems in single row trench planting are narrow row spacing, high seed rate, high labour input, high water consumption and difficult crop management operations such as propping up and weeding. The chances of insect and pest attack are higher due to poor wind circulation and poor sunlight penetration etc.

KVK Intervention

1. Technology Assessment

Keeping in view the above problems we have initiated interventions by purchasing the Paired Row Trench Digger and conducted the On-farm Trial during 2010-11. We have conducted the trial at three location i.e. KVK Farm, Khudda Kalan and Landha villages. Three treatments were as follows:-

T₁ – Single row trench plantation technique, in which inter row distance was 50cm.

T₂ – Paired row trench plantation technique, in which inter row distance was 90cm and intra row distance was 30cm.

T₃ – Paired row trench plantation technique, in which inter row distance was 90cm and intra row distance was 50cm.

The results of the OFT are given in (Table 2). OFT revealed that there was 16% less seed setts requirement, labour input was less, cost of cultivation was reduced, 20% water saving was noticed and 12% increase in yield was obtained.

Table-2: Comparative performance of different sugarcane planting techniques

Crop Season	Area (ha)	No. of Trials	Performance parameter				
			Water Saving				
			No. of Irrigation	Time Reqrd. for irrigate (hour/ha)	Total Time Reqrd. for irrigate (hour/ha)	Saving (%)	
1	2	3	4	5	6	7	
Spring 2011 (CoJ-8436)	3.6	3	T1	11	20	220	-
			T2	13	15	195	12
			T3	13	14	182	20

Contd....

Performance parameter						Cost of Cultivation (Rs/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	BCR
Seed Rate		Yield		Labour Input					
Quantity (qtl/ha)	Saving (%)	Qtl/ha	Saving (%)	Man-days/ha	Saving (%)				
8	9	10	11	12	13	14	15	16	17
87	-	775	-	48	-	76000	175150	99150	2.30
80	9	825	7	45	6	70000	186450	116450	2.66
75	16	862	12	41	17	69000	19812	125812	2.82

2. Technology Demonstration

After conducting the OFT on planting method in Sugarcane, we found that modified Paired Row Trench Planting Technique was better than existing narrow inter row spaced single row trench plantation technique and narrow intra row paired row trench plantation technique. Therefore in the next years we promoted the technology through frontline demonstration (FLD), & other extension activities such as trainings, exposure visits, method demonstrations, printing materials & media.

We conducted 15 FLDs during 2011-12 in 5 villages (Allahpur, Sapeda, Khanpur, Khudda & Tangail) on 6 ha area, while during the year 2012-13, 10 FLDs were conducted in two villages Goli & Khera on 4 ha area. The results of the FLD are given in (Table 3).

Table-3: Results of the FLDs conducted during 2011-12 & 2012-13

Crop Season	Sugarcane Variety	Area (ha)	No. of Demo		Seed Rate (qtl/ha)	Saving (%)	Labour (Man-days/ha)	Saving (%)	Cost of Production (Rs/ha)	Yield (qtl/ha)	Gross return (Rs/ha)	Net return (Rs/ha)	BCR
Spring 2012	CO-0238	6	15	Dem o	76	16	40	11	70000	760	210000	140000	3.0
				Loca l	88		45		75000	690	190000	115000	2.6
Spring 2013	CO-0238	4	10	Dem o	75	17	38	17	72000	725	218225	146225	3.03
				Loca l	87.5		45		80000	670	201670	121670	2.52

3. Trainings

P.F. Training

We have conducted the practicing farmers training for the farmers at village level as well as at KVK Campus. They were motivated for 'learning by doing' and they were trained & familiarized with trench depth adjustment, direction of planting, seed rate, irrigation management, mechanical weeding and nutrient management aspects in Sugarcane.

Table-4: Farmers training conducted on Sugarcane trench plantation technique

Sr. No.	Title	Number	Year	Participants
1	Benefits of Paired Row Trench Plantation and maintenance of Trench Digger	6	2010 to 2013	87

In-service Training

For the horizontal expansion of the sugarcane planting method, we also organized one In-service training in each year since 2011. The field staffs of the Agriculture Department Ambala, Assistant Agricultural Engineering Department, Ambala and IFFCO Company participated in the in-service trainings. During the training we have highlighted the benefits of modified paired row trench planting technique such as ease in mechanical weeding, seed & water saving, increase in yield and decrease in labour input etc.

Table-5: Details of In-service Training

Sr. No.	Title	Year	Participants
1	Recent Agricultural Machinery for major crops in Ambala	2	67
2	Scope of Agricultural Mechanization in Ambala	1	12

In addition to trainings, the technology was popularized by other extension activities such as field days, method demonstrations and display of technology in exhibitions during the Technology Week Programmes through posters in national & regional agricultural exhibitions etc.

Output

By the Paired row trench plantation technique, following benefits were noticed:-

- Less cost of cultivation up to Rs. 6000 to 7000 per hectare, which is attributed to seed saving, less irrigation, ease in weeding and reduced insect-pest attack and disease infestation.
- Rs 25000 higher net return per hectare due to less cost of cultivation and higher yields.
- As irrigation is given in trenches therefore on an average 16-18% water can be saved.
- 15% seed can be saved, as 12-14 less rows in paired row method as compared to traditional method.
- 10-15% yield can be increased despite less rows of sugarcane per acre.
- Ease in mechanical weeding either with power tiller or with tractor operated high tyne cultivator and thus labor can be saved.
- Because of wider space available in between set of rows, the intercropping of garlic or onion can be done by which system productivity can also be increased.
- The wider space between two sets of cane allows easy transportation of harvested cane and no damage to roots.
- Intercropping with onion in sugarcane helps in prevention of disease and insect-pest.

Outcome

Because of various interventions launched by KVK and parallel efforts by concerned authorities i.e. Shahbad Sugarmill, Shahzadpur Sugarmill and Agriculture Department Ambala, the area under paired row trench plantation technique is increasing every year. The productivity of Sugarcane is also increasing. However, this achievement is not only because of planting method, but also because of Integrated Crop Management practices followed for the farmers.

Table-6: Sugarcane trench plantation technique promoted in Ambala district

Sr. No.	Year	Area (ha)
1	2010-11	5
2	2011-12	50
3	2012-13	200
4	2013-14	500

Impact

Due to continuous efforts of KVK, the area under demonstrated technology is slowly increasing as given in Table 6. Due to less number of rows in new method of planting and higher yields, the farmers have understood the key of success and ready to adopt the new method of Sugarcane planting. Many farmers have adopted the method such as Gola Singh, Harvinder Singh, Sukhminder Singh and Baljinder Singh from Sapeda. Kanwarjeet from Allapur, Beant Singh from Goli, Iqbal Singh from Khanpur, Vinod Kumar from Khudda Kalan, Surinder from Chappra and Mandeep Singh from Pasiala. Due to ease in mechanical weeding because wide of inter row spacing some of the farmers have also purchased the mechanical weeding implements such as adjustable high tye cultivator and power tiller. These implement will reduce labour input for weeding and increases the mechanization through other tractor operated cultivator or through power tiller.

Future Scope

Intercropping on the wider space left between the inter rows can also be done. Some of innovative farmers, who adopted the Paired row trench plantation technique, are thinking upon it. The KVK is also emphasizing the benefits of intercropping to increase the net income from the same piece of land.



Glimpse of water saving in demonstrated paired row trench plantation



Inter cropping of Garlic in Sugarcane: Planting & Standing Crop



Live training and seed sets placement in trenches