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STUDY OF IMPROVED IRRIGATION MANAGEMENT TECHNIQUE ON SUGAR CANE AT SHAH KOT AND NIAZ BIEG SUB-PROJECT

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Effect of a new planting technique i.e. planting sugarcanc 90 cm apart double row strips, on cane yield, intercropping and sowing of irrigation water was studied. Experiment was conducted at Shahkot and Lahore sites. Turnip, garlic and cauliflower were intercropped. After the harvest of intcrcrops 49 furrows of 88 cm width each were made. There was 20-28% saving in irrigation water and 14-60% increase in cane yield as compared with traditional method of planting sugarcane in 60 cm apart single rows. Intereropping of garlic in 90 cm apart double row strip gave the highest net income of Rs. 57854 ha".

INTRODUCTION

Sugareane *(Sacchnrium officinarum)* is one of major cash crops after cotton and rice in Pakistan. But our yields arc much lower than worlds averages. Shortage of irrigation water is one of the major constraints for sugarcane production in the country. It is estimated about 1.25-1.50 acre inches of water passes through the cane plant to produce one tonne of millable cane (Hurnbert, 1968).

Irrigation system in Pakistan operates to supply less than 70% crop water demand (Ministry of Food, Agriculture and Cooperatives, 1984). Only few tracts have the privilege of sweet ground water, where tubewells compensate the irrigation. Traditional irrigation methods (Flooding) results in poor water application effieiencies combined with inequity of water supply further aggravate the situation. Efficient utilization of available supplies is the only important way to bridge the gap of water deficiency. One way is to modify the existing conventional methods of planting crops in such a systematic way that it not only permit intercropping of short duration crops but saves a considerable amount of water.

Therefore demonstration of water saving techniques (planting sugarcanc in 90 cm strips) in comparison with traditional method of planting sugarcane 60 cm apart single row strip was tried at the selected farms at tails of Shahkot and Niaz Bieg distributries.

METHODOLOGY

The study was carried out in farmer's field during 1990-91. Sugarcane was planted in 90 cm apart double row strips in comparison with traditional 60 cm apart single row strip. Sugareane variety BF 162 was sown. Two budded double sets were placed in each furrow end to cnd. Fertilizer at the rate of 69, 46, 46 kg NPK was incorporated in furrows of double row strips and same quantity of NPK per acre was broadcasted in traditional 60 cm apart method. All other cultural practices were kept uniform and normal.. Garlic, cauliflower and turnip were intercropped in 90 cm apart double row strips. After harvesting the intercrop, 48

wide furrow/acre, 88 cm of width were constructed in between the strips. Data on crop yield, intercrop yield and water saving was collected to determine the water application efficiency, net economic return and feasibility of intercropping on small farmer's field at tail areas.

Table 1: Compatibility of Yield of Sug.cane planted alone and with Inter-cropping

Name of Farm	Village	Treatments	Yield inter-crop Kg/acre	Inter-Crop	Yield in tons/ha		No. of irigation
Mohammad Latif	100/R.B.	Single row, planting S.cane alone	Cane 28000	-	69.16	0.00	11
		Paired row, intercropped with Garlic	32000	24	79.04	2.37	
Rai Aurangzeb	104/R.B.	Single row, planting S. cane alone	16000	-	39.52	-	10
Asghr Ali	107/R.B.	Paired row, without intercropping	25600	-	63.23	-	
		Single row, planting S. cane alone	16000	-	39.52	-	9
Sabir Hussain	100/R.B.	paired row, intercroppped with turnip	16000	2000	39.52	-	
		Single row, planting S. cane alone	18000	-	44.46	-	12
Rana Ashraf	102/R.B.	Paired row, intercropped cauliflower	33200	4500	82 Rs.	4500	
		Single row, planting S. cane alone	18000	-	44.46	-	11
Akbar Ali	Lahore Bingina	paired intercropped turnip	26000	5000	64.22	Rs 5000	
		Single row, planting S. cane alone	52800		130.42	-	15
		paired row, intercropped cauliflower	69600	2000	173.9	Rs.2500	

RESULTS AND DISCUSSION

The data (Table I) revealed that the sugarcane yield in 90 cm double row planting increased at almost all locations except IO~R, Shahkot. Table II shows the number of irrigations, time taken by individual irrigation and total seasonal time of irrigation applied to flat and furrows in 90 cm double row planting. The estimated water saving in 90 cm double row furrows is presented in Table III ranging from 20% to 28% of time needed under flat (60 cm apart single row) irrigations. The results corroborate with those of Associates in rural Development (1990) and chaudhry and Qureshi (199 I). ReSults in Table HI further indicated that yields of sugarcane was improved from 14 to 60% in 90 cm apart double row planting as compared to 60 cm apart single row. These results are in accordance with the findings of Hag (J 985) and Nazir et al. (J 988). Randhawa et al. (J 993) also reported that sugarcane planted in 90 cm double row strips gave significantly higher cane yield. The perusal of Table I further indicates that in addition to intercropping, 90 cm apart double row strips gave highest yield of sugarcane about 1720 maunds at Lahore and 830 maunds at Shahkot tails area facing acute shortage of irrigation water.

The economic analysis (Table IV) indicated that sugarcane planted in 90 cm apart double row strips gave sUbstantially higher net income than traditional single row 60 cm apart. The economic analysis further revealed that sugarcane intercropped with garlic gave the

Table II Comparison of Irrigation Water applied under Flat and Paired Row

Irrigation Numbers	Site Numbers											
	I		2		3		4		5		6	
I	115	115	119	120	119	120	105	104	106	107	90	90
2	90	90	90	90	100	105	90	92	98	100	80	81
3	80	80	84	45	102	104	85	87	90	91	85	80
Earthing up 4 after harvesting	80	81	82	60	lOO	81	90	75	85	70	75	59
intercrop 5	85	75	90	50	107	75	70	45	89	50	80	50
6	90	50	80	60			70	71	90	45	82	60
7	80	40	85	45	95	69	75	40	80	50	75	45
8	88	49	80	49	lOO	50	70	48	75	46	80	50
9	75	45	90	50	95	48	75	40	80	50	75	45
10	85	50	89	49			80	50	80	60	78	46
11	90	45					80	41	90	45	80	50
12							78	40			NA	NA
13											82	50
14											80	42
15											80	45
Total Time: (Min)	958	no	889	617	652	818	968	739	969	712	1127	792
Mins/Irrigations /Acre	87.09	65..45	88.9	61..7	90.89	72..44	30.67	61..58	88.09	64.72	75.13	52.8

FLA T : Tradition 60 cm apart single row Paired row: 90 cm apart double row (Furrows)

Table III Comparison of Irrigation Technique and yield as affected by Irrigation technique

Irrigation Treatments	SI		52		53		54		S5		56	
	Flat	Furrow	Flat	Furrow	Flat	Furrow	Flat	furrow	flat	Furrow	Flat	FU1TOW
Time Applied (Min/Irr./Acre)	87	65	88	65	102	81..5	80	59	88	64	80	57
Saving (% over Flat)	0.0	25.2	0.0	26.1	0.0	20.5	0.0	26.0	0.0	27.2	0.0	28.0
Yield												
Yield/Acre	700	800	400	640	400	400	450	830	450	650	132 0	1740
Yield increase (percentage of Flat)	0.0	14.28	0.00	60.00	0.00	0.00	00	84..40	0.0	44..40	0.0	31..80

Flat: 60 cm apart single row strip

Furrow: 90 Cq1 apart double row strips

Table IV Economic Analysis of Single and Paired row Planting in Sugarcane

Name of Farm	Treatments	Yield in tons/ha		Income in Rs./ha		Gross Income	Cost Rs/ha			
		Sugar cane	inter-crop	S. cane	intercrop		S. cane	intercrop	Total cost	Net Income
M. Latif	Single row planting	69.16	-	293930	-	29393.0	96940)	-	9694.05	19698.9)
	Paired row planting	79.04	2.37	33)!)200	37920.00	71920.00	%940)	3963.00	136)705	578)49)
Rai Aurang zeb	Single row planting	39)2	-	1679600	-	1679600	16940)	-	1(,94.0)	91(19)
	Paired row planting	6323	-	26872.7)	-	26872.7)	7694.0)	-	-	1917870
Asghar AIi	Single row planting	3952	-	16796.00	-	16796.00	6940.0	-	6940.00	985600
	Paired row planting	3952	1.UR	16796.00	9405.00	2620100	694000	2000.00	694000	1726100
Sabi r Hussain	Single row planting	44,46	-	188950	-	18895.50	890100	-	890100	999451
	Paired row planting	82.00	4)00.0	34850.00	4500.00	39350.00	890100	209500	10996.00	283)400
Runa Ashraf	Single row planting	44,46	-	18895.50	-	18895,50	9895.00	-	989500	900030
	Paired row planting	64.22	5000.0	2729350	)000.00	3229350	989500	240000	12295.00	19998.50
Akhar Ali	Single row planting	130,42	-	55428.50	-	55428,50	1099500	-	10995.00	4443.1.)0
	Paired row planting	17191	25000	73(617)7	250000	10995.00	210000	2100.00	1309500	6246675

highest net return (Rs. 57854) per hectare at tail area followed by sugarcane intercropped with caulitlower (Rs. 28354). The highest net return of Rs. 62466 at Niaz Bieg indicates the highest potential of crop can be harvested by planting crop in 90 cm apart paired row strips if water resources are not limited. It may therefore be concluded from the results presented above.

1) That planting sugarcane at 90 cm apart double row strips is most suitable for small farmers having limited soil and water resources.
2) It permits systematic planting and handling of intercrop and thus gave higher net income per unit.

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