

Field Performance of Spaced Transplanting Technique of Sugarcane cultivation in Three Northern Districts of Bangladesh

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ABSTRACT

A field survey was conducted to study the relationship between the STP technique of sugarcane cultivation and some selected agronomic factors namely, selection of variety, nature of preceding crops, irrigation and time of transplanting during the 1991-92 cropping season. A total of 110 STP cane growers from three sugar mills zone areas (Panchagar sugar mills, Thakurgaon sugar mills and Setabganj sugar mills) were interviewed for this study. Among varieties, Isd 16 gave the highest mean yield of 97.76 tons ha⁻¹ followed by the Isd 18 variety (89.4 tons ha⁻¹) with the lowest mean yield of 82.0 tons ha⁻¹ from the Isd 2/54 variety. STP cane grown after fallow or harvesting of BR-11 paddy variety produced the maximum yield compared with other preceding crops. The level of irrigation applied to STP cane field failed to show any difference between the mean yield values of low and high irrigation levels. Early transplanting (September) of STP cane gave the highest mean yield of 116.4 tons ha⁻¹ while the other late transplanting canes gave the lowest cane yield ranging from 82.4 to 89.9 tons ha⁻¹. Furthermore, a significant association between the yield of STP cane and the above mentioned agronomic factors was observed at 0.001 level.

INTRODUCTION

Spaced transplanting (STP), a new technique of sugarcane planting system has been developed to minimize the seedcane requirement and to ensure higher cane yield through optimum plant population. The major problems of conventional planting method are irregular germination, poor plant population and ultimately lower yield (Ali *et. al.* 1989). A number of scientific reports on the advantages of STP method of sugarcane under research condition have been published, which stated STP as an excellent planting technique. But no or few works on the performance of STP technique of cane cultivation under farmers condition have been done. Basher *et. al.* (1993) reported that yield of sugarcane obtained from the STP technique was much higher than the conventionally planted cane in the farmers condition of Joypurhat sugar mills areas. The previous investigation on the yield performance was mainly studied relating to social, personal and economic factors. Inspite of those factors, yield of STP cane have also been found to be influenced by many agronomic factors such as selection of variety, time of transplanting, nature of the preceding crops and irrigation. Hence, the present study was undertaken to

find out (a) the yield performance of STP cane and (b) the relationship between some important agronomic factors with yield of STP cane in farmers conditions. The selected agronomic factors were i) selection of variety, ii) time of transplanting, iii) nature of the preceding crops, and iv) irrigation.

MATERIALS AND METHODS

The study was conducted through a field survey in mill zone sugarcane growing areas of the three northern districts during 1991-92 cropping season. Data were collected through a specially prepared and pre-tested questionnaire. Purposive sampling was done from the STP cane growers of three sugar mills (namely), Panchagarh sugar mills (PSM), Thakurgaon sugar mills (TSM) and Setabganj sugar mills (STSM). Thus, 110 STP cane growers were interviewed during November, 1993 to February, 1994. Data were also collected for the crop in the previous cropping year (1991-92). After collection of data, those were arranged systematically and analyzed statistically for the purpose of the study.

Statistical treatments

Data were compiled categorically on the basis of the factors. Range, mean and standard deviation were calculated to explain the categories and chi-square test was used to explain the null hypothesis for the relationship between the STP cane yield and the selected agronomic factors viz. selection of variety, time of transplanting, nature of the preceding crops, and irrigation.

RESULTS AND DISCUSSION

The results obtained were computed and arranged systematically according to the factors under study and presented in the Tables 1, 2, 3, 4 and 5. It is evident from the Table 1 that most of the farmers (62) under study prefer L.J.C. variety of cane followed by Isd 16 (26). On the other hand, Isd 16 produced the highest average yield of cane (97.59 tons ha⁻¹) with a range of 150.55 to 66.47 tons ha⁻¹ and a standard deviation of 28.63. Variety Isd 18 produced the second highest cane yield (89.39 tons ha⁻¹) with a range of 103.74 to 72.37 tons ha⁻¹ and standard deviation of 9.34. An average yield of 88.35 tons ha⁻¹ of L.J.C. variety was also found in third position with a range of 119.94 to 59.50 tons ha⁻¹ and a standard deviation of 13.54. Average yield of Isd 20 and Isd 2/54 were 83.66 and 82.03 tons ha⁻¹, respectively. Variety Isd 20 produced the lowest cane yield with a yield range of 86.13 to 78.57 tons ha⁻¹ and a standard deviation of 4.32. Similarly, the yield range of Isd 2/54 was 92.82 to 73.26 tons ha⁻¹ with a standard deviation of 9.88. Therefore, from the above results it was seen that the performance of Isd 16 was the best in STP method of cane plantation under farmers condition. Rahman *et al.* (1993) and Basher *et al.* (1993) also observed the higher cane yield in STP technique of sugarcane plantation. It is also seen from the Table 1 that most of the farmers cultivate L.J.C. variety although the yield was not satisfactory. So, there is possibility of increasing cane areas with Isd 16 which could give the highest cane yield. The yield variation among the five varieties with its number of adopter was found statistically significant (Table 5).

Table 1. Description statistics (range, mean and standard deviation) of STP cane yield according to the varietal categories.

Observed varieties	Number of population(N)	Cane yield (tons ha ⁻¹)			Standard deviation
		Maximum	Minimum	Mean	
Isd 16	26	150.55	66.47	97.59	28.63
Isd 18	16	103.74	72.37	89.39	9.39
Isd 20	3	86.13	78.57	83.66	4.32
L.J.C.	62	119.94	59.50	88.35	13.54
Isd 2/54	3	92.82	73.26	82.03	9.88

Data presented in the Table 2 showed that maximum cane growers cultivated cane after a long fallow. It is their conventional practice to keep the land fallow for early plantation of sugarcane. This practice of earlier cane plantation after a long fallow decreases the total income of the farmers from a single piece of land. The STP technique of cane plantation has successfully removed this problem. In this study, average yield of cane was found almost similar (92.18 and 92.50 tons ha⁻¹) on land where preceding crop was BR-11 and the land which was kept fallow during transplant aman season. Although maximum cane yield (150.55 tons ha⁻¹) was obtained from the preceding fallow land. The average yield of cane (92.50 tons ha⁻¹) was obtained from the preceding fallow land. The average yield of cane (92.18 tons ha⁻¹) after BR-11 was obtained from a limited population mean (13), and results was closely related with Ali *et al.* (1989). Yield of cane was found slightly lower (8.12-16.28 tons ha⁻¹) in case of other paddy varieties like 'Challisha' (84.38 tons ha⁻¹) and others (76.22 tons ha⁻¹) compared with that obtained after fallow (92.50 tons ha⁻¹). Furthermore, cane yields affected by preceding crops with its population was found statistically significant (Table 5).

Table 2. Description statistics (range, mean and standard deviation) of STP cane yield according to the preceding crops.

Preceding crops	Number of population(N)	Cane yield (tons ha ⁻¹)			Standard deviation (±)
		Maximum	Minimum	Mean	
Fallow	81	150.55	66.12	92.50	17.66
Paddy variety BR-11	13	127.20	71.43	92.18	17.51
Paddy variety Challisa	6	100.89	77.73	84.38	8.69
Other local Paddy	3	102.78	72.37	76.22	2.82

The Table 3 showed that irrigation plays a major role in STP cane establishment. In this study, it was observed that all the farmers irrigated their STP cane. Maximum farmers (95) gave 4-6 irrigation but the average yield of cane was found almost similar to that of low irrigation. This might be due to sufficient rainfall during this study. However, the yield variation was also found statistically significant as shown the Table 5.

Table 3. Description statistical (range, mean and standard deviation) of STP cane yield according to irrigation.

Irrigation levels	Number of population(N)	Cane yield (tons ha ⁻¹)			Standard deviation (±)
		Maximum	Minimum	Mean	
Low irrigation	12	112.93	76.49	91.57	10.57
High irrigation	95	150.55	66.12	91.19	17.93

Yield variations due to time of transplantation has been shown in the Table 4. It is evident from the table that the highest mean cane yield was obtained from September transplanted group followed by October, November and December transplantation. However, maximum farmers prefer to transplant STP cane in the month of October and November after harvesting the preceding crops. This study revealed that cane farmers should be encouraged for early sugarcane plantation to get higher cane yield. Time of settling transplantation was also found statistically significant (Table 5).

Table 4. Description statistical (range, mean and standard deviation) of STP cane yield according to the time of transplanting.

Time of transplantation	Number of population(N)	Cane yield (tons ha ⁻¹)			Standard deviation (±)
		Maximum	Minimum	Mean	
September	8	150.55	92.82	116.41	18.55
October	36	146.12	66.44	89.86	16.03
November	58	133.60	59.50	88.82	15.49
December	4	93.54	73.26	82.42	8.67

In respect of all the growers (110), average yield of STP cane was found 89.39 tons ha⁻¹. The highest cane yield was found 150.55 tons ha⁻¹ and the lowest was 59.5 tons ha⁻¹ with the standard deviation of 15.39. The yield level of the STP cane was always higher than that of national average of 46.33 tons ha⁻¹.

Table 5. Chi-square analysis results.

Factors under study	Observed Chi-square
Selection of variety	55.53 ***
Preceding crops	66.39 ***
Irrigation	32.96 ***
Time of transplantation	65.24 ***

*** Significant at .001 level.

Therefore, from the over all results it is evident that a significant relationship exists between the yield of transplanted cane and selected agronomic characters like variety, preceding crop, irrigation and time of planting.

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