

ISSN : 1812-5379 (Print)  
ISSN : 1812-5417 (Online)  
<http://ansijournals.com/ja>

JOURNAL OF  
**AGRONOMY**



**ANSI***net*

Asian Network for Scientific Information  
308 Lasani Town, Sargodha Road, Faisalabad - Pakistan

## Popularizing of Sugarcane Based Intercropping Systems in Non Millzone

M.A.K. Al Azad and M.J. Alam

Bangladesh Sugarcane Research Institute, Ishurdi-6620, Pabna, Bangladesh

**Abstract:** A field experiment was conducted to study the popularity of different intercrops with sugarcane at Nakla thana under Sherpur district of Bangladesh during cropping year 2000-2001. Five intercrops with sugarcane combination such as potato (*Solanum tuberosum*), onion (*Allium cepa*), coriander (*Coriandrum sativum*), mustard (*Brassica campestris*) and garlic (*Allium sativum*) were studied against sole sugarcane crop. In respect of agronomic performances, sugarcane with potato, sugarcane with onion and sugarcane with coriander were suitable though they produce lower cane yield than sole cane. In respect of economic profitability sugarcane with potato combination was the most profitable and sugarcane with onion and sugarcane with coriander combination were 2nd and 3rd profitable combinations, respectively. In respect of adjusted yield sugarcane with potato was the best combination and sugarcane with onion was the 2nd combination than the sole cane yield. Sugarcane with mustard and sugarcane with garlic combination was found to be inferior in respect of agronomic yield, economic profitability and adjusted cane yield. Hence, The study reveals that sugarcane with potato, sugarcane with onion and sugarcane with coriander combination may be suggested as intercropping with sugarcane for non mill zone area of Sherpur district (AEZ 8) to get interim benefit from the same piece of land.

**Key words:** Popularity study, intercrops, sugarcane

### INTRODUCTION

Sugarcane (*Saccharum officinarum*) is the second most important cash crop which is grown in all most all districts of Bangladesh. As a long duration crop farmers have to wait 10-14 months to get the return of their investment in sugarcane field. Sugarcane is planted by keeping adequate space in between two rows. This space remains vacant until full sugarcane canopy development and short duration crops can be grown in the vacant space without affecting much the yield of sugarcane. Intercropping is an excellent technique to increase total yield, higher monetary return, greater resource utilization and fulfil the diversified need of the farmers Sing *et al.*<sup>[1]</sup> and Rathi *et al.*<sup>[2]</sup> observed that all combination of mustard, potato, onion, fodder and sugar beet with sugarcane proved more profitable than growing autumn planted cane alone. Rahman *et al.*<sup>[3]</sup> conducted experiment with mustard, lentil, potato, onion, tomato, garlic, chickpea and coriander as intercrop with sugarcane and observed that economic performance of all intercrops shows much higher benefit than sugarcane sole cropping. Bangladesh sugarcane research institute (BSRI) has recommended several intercrop combinations with sugarcane after intensive studies at research station and at farmer's field (SRTI) annual report<sup>[4,5]</sup>. But much less effort has been

given to implement the recommendations of BSRI or even the most economically suitable intercrop combination (s) to be practiced by the farmers in particular agro climatic and edifice conditions. Hence the present study is an attempt to analyze the comparative economics of potato, mustard, onion, garlic, coriander as intercrops with sugarcane in non mill zone area under Nakla thana in Sherpur district, AEZ 8 (Brahmaputra flood plain soil) of Bangladesh.

### MATERIALS AND METHODS

The experiment was conducted in Nakla thana of Sherpur district for the cropping season 2000-2001. Five intercrops such as potato, mustard, onion, garlic, coriander were selected comprised with sole sugarcane. The experiment was laid out in a randomized complete block design (RCBD) with three replications. The unit plot size was 8×6 m<sup>2</sup>. Forty five days old two eyed soil bed settling of variety Isd 28 was used as test crop in the experiment. Row to row and plant to plant distance were 100 and 45 cm, respectively. Intercrops were planted between the vacant spaces of sugarcane. Potato tubers were planted in two rows following the spacing row to row 30 cm and plant to plant 20 cm, onion and garlic were shown in two rows following the spacing plant to plant

Table 1: Effect of different intercrops on yield and growth parameters of sugarcane in non mill zone area (Nakla-Sherpur)

Crops combinations	Tiller ( $\times 10^3 \text{ ha}^{-1}$ )	Millablecane ( $\times 10^3 \text{ ha}^{-1}$ )	Yield of cane ( $\text{t ha}^{-1}$ )	Yield of intercrop ( $\text{t ha}^{-1}$ )
Sole sugarcane	463.50	154.72	143.60	-
Sugarcane+potato	335.10	154.38	141.40	12.30
Sugarcane+onion	354.20	159.79	128.60	1.93
Sugarcane+coriander	275.40	140.42	131.00	0.35
Sugarcane+mustard	249.70	144.44	108.20	0.42
Sugarcane+garlic	410.50	156.31	126.60	0.39
Lsd(5%)	63.41	NS	10.25	0.23

Table 2: Economics of different intercrops with sugarcane in non mill zone area (Sherpur- Nakla)

Crops combinations	Gross return (TK.ha <sup>-1</sup> )			Total cost of cultivation (TK. ha <sup>-1</sup> )	Net benefit (TK. ha <sup>-1</sup> )	BCR
	Sugarcane	Intercrop	Total			
Sole sugarcane	1,61,550.00	-	1,61,550.00	49,594.00	1,11,956.00	3.26
Sugarcane+potato	1,59,075.00	6,76,500.00	2,26,725.00	71,815.00	15,49,100.00	3.16
Sugarcane+onion	1,44,675.00	34,740.00	1,79,415.00	72,458.00	1,06,957.00	2.48
Sugarcane+coriander	1,47,375.00	7,932.08	1,55,307.08	55,987.00	99,320.08	2.77
Sugarcane+mustard	1,21,725.00	7,976.98	1,29,701.98	56,854.00	72,847.98	2.28
Sugarcane+garlic	1,42,425.00	12,368.00	1,54,793.00	72,458.00	82,335.00	2.14

Table 3: Sale proceed from intercrops and adjusted cane yield in non mill zone area (Sherpur - Nakla)

Crops combinations	Sale proceed from intercrops (TK. ha <sup>-1</sup> )	Adjusted cane yield ( $\text{t ha}^{-1}$ )	Cane yield ( $\text{t ha}^{-1}$ )	Total adjusted cane yield ( $\text{t ha}^{-1}$ )	Rank
Sole sugarcane	-	-	143.60	143.60	3rd
Sugarcane+potato	67,650.00	60.13	141.40	201.53	1st
Sugarcane+onion	34,740.00	30.88	128.60	159.48	2nd
Sugarcane+coriander	7,932.08	7.05	131.00	138.05	4th
Sugarcane+mustard	7,976.98	7.09	108.20	115.29	6th
Sugarcane+garlic	12,368.00	10.99	126.60	137.59	5th

Market price of cane @ Tk.1125 t<sup>-1</sup>, Potato @ 5,500 t<sup>-1</sup>, Onion @ 18,000 t<sup>-1</sup>, Coriander @ Tk,22,892 t<sup>-1</sup>, Mustard @ Tk.19,070 t<sup>-1</sup>, Garlic @ Tk. 32000 t<sup>-1</sup>; Seed cost: (Tk Kg<sup>-1</sup>) Sugarcane- 1.13, Potato-12.00, Onion-18.00, Coriander 30.00, Mustard 25.00, Garlic-32.00. Fertilizer cost (Tk. Kg<sup>-1</sup>; Urea 6.00, TSP- 13.00, MP-10.00, Zypsum-4.00, Zinc sulphate-60.00, Cowdung-1.00, Cost of Pesticides (Tk Kg<sup>-1</sup>); Regent 3 GR-90, Furadan 5G-80, Dithane M 45-500, Nogos 100EC-Tk. 1300 L<sup>-1</sup>, Labour Cost: TK. 55 person<sup>-1</sup> Day<sup>-1</sup>.

10 cm, mustard and coriander were shown in 3 rows following row to row spacing 30 cm for each crop. Fertilizer were applied on the basis of fertilizer recommendation guide, 1997. All cultural and pest control measures were done when required. Data on yield and yield attributing parameters of cane and yield of intercrops were recorded and analyzed statistically at 5% level of probability using LSD test and presented in the Table 1. Cost of production was calculated on the basis of cost of land preparation, seed cost, fertilizer cost, pesticide cost, labor cost and interest on current capital and presented in the Table 2. Sale proceeds from intercrops and adjusted cane yields are presented in the Table 3.

## RESULTS AND DISCUSSION

Results revealed that tiller, yield of cane and yield of intercrop showed significant effect but number of millable cane showed non significant effect due to different crop combinations (Table 1). Tiller number in intercrop plots decreased significantly than sole cane plots which was in close conformity with the findings of Muhammad *et al.*<sup>[6]</sup> that might be possible due to competition of sugarcane with companion crops for nutrients and moisture, which

may cause low emergence of tiller in the inter crop plots. The highest millable cane was found in sugarcane with onion combination ( $159.79 \times 10^3 \text{ ha}^{-1}$ ) that was statistically similar with sugarcane with garlic, sole sugarcane and sugarcane with potato and sugarcane with mustard, respectively, The lowest millable cane was found in sugarcane with coriander combination ( $140.42 \times 10^3 \text{ ha}^{-1}$ ) which was also similar with sole sugarcane ( $154.72 \times 10^3 \text{ ha}^{-1}$ ). So the result showed non significant effect due to different intercrop combination in the millable cane production. Yield results showed that cane yield considerably decreased in the intercrops plots, which was in good agreement with the findings of Rahman *et al.*<sup>[3]</sup> and Misra<sup>[7]</sup> Highest cane yield was obtained from sole cane plot  $143.60 \text{ t ha}^{-1}$  followed by sugarcane with potato  $141.40 \text{ t ha}^{-1}$  combination. The second highest sugarcane yield was obtained from sugarcane with coriander  $131.00 \text{ t ha}^{-1}$  which was followed by sugarcane with onion  $128.60 \text{ t ha}^{-1}$  and sugarcane with garlic  $126.60 \text{ t ha}^{-1}$  combination. The lowest cane yield was found from the sugarcane with mustard  $108.20 \text{ t ha}^{-1}$  combination. So the combination of sugarcane with potato, sugarcane with coriander, sugarcane with onion, sugarcane with garlic are the good combination for higher cane yield production. The yield

of intercrops viz., potato, onion, coriander, mustard and garlic were 12.30, 1.93, 0.35, 0.42 and 0.39 t ha<sup>-1</sup>, respectively. The highest intercrop yield was found from sugarcane with potato combination 12.30 t ha<sup>-1</sup> which was followed by sugarcane with onion 1.93 t ha<sup>-1</sup>. The lowest intercrop yield was sugarcane with coriander combination 0.35 t ha<sup>-1</sup>. The yield of sugarcane with mustard and sugarcane with garlic combination was 0.42 and 0.39 t ha<sup>-1</sup>, respectively.

Economics of different intercrop combination showed (Table 2) that sugarcane with potato combination was the most profitable which gave net profit if taka 1,54,910.00 t ha<sup>-1</sup> and which was partially fulfilled with the findings of Kabir<sup>[8]</sup> followed by sugarcane with onion taka 1,06,957.00 ha<sup>-1</sup>. Sugarcane with coriander, sugarcane with garlic and sugarcane with mustard produced less net return taka 99,320.08 ha<sup>-1</sup>, 82,335.00 ha<sup>-1</sup> and taka 72,847.98 ha<sup>-1</sup>, respectively. Sugarcane with potato combination produced highest net benefit followed by sole sugarcane. All the combination produced less benefit cost ratio (BCR) than sole sugarcane crop. Data on sale proceed from intercrops and adjusted yield was revealed that the highest adjusted cane yield was 201.53 and 159.48 t ha<sup>-1</sup> from the sugarcane with potato and sugarcane with onion combination respectively than the sole sugarcane crop yield 143.60 t ha<sup>-1</sup> (Table 3). All other adjusted cane yield less than the sole sugarcane crop yield.

So from the above discussion it may be concluded in respect of agronomic performance that sugarcane with potato, sugarcane with onion and sugarcane with coriander were popularized though they produced lower yield than sole cane. In respect of economic benefit cultivation sugarcane with potato was the most profitable in the Sherpur region. Sugarcane with onion and sugarcane with coriander was the 2nd and 3rd profitable combination, respectively for that region. The profitability of different crops with sugarcane also reported elsewhere<sup>[9-11]</sup>. In case of adjusted cane yield it was concluded that the highest adjusted cane yield was found from the sugarcane with potato and the 2nd highest adjusted cane yield was found from the sugarcane

with onion than the sole sugarcane yield. Hence, sugarcane with potato and sugarcane with onion and sugarcane with coriander combinations may be popularized as intercropping combination for the non mill zone area of Sherpur district (AEZ 8) to get interim benefit from the same piece of land.

## REFERENCES

1. Singh, V.S., K. Kothari and H.N. Tripathi, 1986. Studies on intercropping in sugarcane in central Uttar Pradesh. *Indian Sug. J.*, 35: 559-562.
2. Rathi, K.S., H.N. Tripathi and D. Singh, 1974. Studies on intercropping Rabi crop in autumn planted sugarcane. *Indian Sugar*, 24: 201-205.
3. Rahman, M.S., M.F. Haq, M.S. Islam, M.K. Bashar, N. Ara and P.K. Sardar, 1994. Sugarcane based intercropping in selected areas of Rajshahi sugar mills zone. *Bangladesh J. Sugarcane*, 16: 44-48.
4. SRTI Annual Report, 1979. Sugarcane research and Training institute, Ishardi, Pabna, pp: 33-48.
5. SRTI Annual Report, 1983. Sugarcane research and training institute. Ishardi, Pabna, pp: 17-33.
6. Muhammad, I.S., I.M. Ayaz and I. Ahmad, 2000. A glance at the agronomic study of sugarcane intercropping with three other crops. *Pak. Sugar. J.*, 15: 18-22.
7. Misra, G.N., 1964. Mixed cropping effect of certain intercrops on yield and juice quality of sugarcane. *Indian Sugar*, 1, 9: 11-17.
8. Kabir, M.H., 1988. Economics of intercropping with sugarcane in selected areas of north Bengal sugar mills zone. *Bangladesh J. Sugarcane*, 10: 81-86.
9. Imam, S.A., A. Ali and M.A. Razzaque, 1982. Performance of intercropping with sugarcane under several crop combinations. *Bangladesh J. Sugarcane*, 4: 32-41.
10. Kanwar, R.S., 1975. Scope of intercropping in sugarcane in North India. *Sugar News*, 7: 5-8.
11. Raheja, P.C., 1976. Possibility of taking potato as intercrop in sugarcane. *Indian Sug. J.*, 9: 69-70.