

Profitability of Intercropping with Sugarcane in Some Selected Mills Zones

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ABSTRACT

The study was conducted to estimate the profitability of intercropping with sugarcane and also to determine area under intercropping in Rajshahi, Pabna and Joypurhat sugar mills during 2005-06 cropping season. Result showed that yield of sole sugarcane was 48.16 t ha⁻¹ whereas for different crop combination with sugarcane as sugarcane plus potato, sugarcane plus onion, sugarcane plus mustard and sugarcane plus lentil the adjusted sugarcane yield were 105.23, 98.86, 82.78 and 81.13 t ha⁻¹ respectively. Maximum gross return of Tk. 131538 ha⁻¹ and net return of Tk. 66271 ha⁻¹ came from sugarcane plus potato followed by sugarcane plus onion, sugarcane plus mustard and sugarcane plus lentil. For sole sugarcane gross return and net return were Tk. 60200 and Tk. 23375 ha⁻¹ respectively which was significantly less than all intercropping combinations. Highest benefit cost ratio (2.02) (undiscounted) came from sugarcane with potato combination and the lowest from sole sugarcane (1.63). The result of co-efficient of output elasticity of cost showed that one per cent change in total cost of sugarcane with intercrops would increase gross return by 1.13, 1.19, 1.22 and 1.27 in case of sugarcane with potato, sugarcane with onion, sugarcane with mustard and sugarcane with lentil respectively. The sample farmers (90) allocated only 26 per cent of their cultivated land for sugarcane cultivation of which only 22 per cent land was under intercropping practices. Financial support as subsidies would increase interest of farmers to accelerate area of intercropping with sugarcane.

Key words: Intercropping, sugarcane, potato, onion, mustard, lentil, yield, profitability.

INTRODUCTION

Due to increased demand/production of cereal and vegetables sugarcane cultivation is now gradually being pushed to low-lying marginal lands prone to water-logging, flooding, drought and salinity stresses. The sustainability of long duration sugarcane crop is now at threat. Farmers of Bangladesh are now showing almost rational attitude towards selecting enterprise. Every farmer wants to get return from their investment within shortest possible time. Sugarcane is a long duration crop and requires 12-16 months to mature. So, it is difficult for the growers especially poor growers to wait such a long time to get economic return from sugarcane. Intercropping one or more crops with sugarcane is an appropriate approach of getting additional farm income besides the principle sugarcane crop. As sugarcane is planted at adequate row spacing and this inter-rows space practically remains vacant in early growth stage which extends nearly four months where suitable short duration winter crops may be grown as intercrop that increase total yield, higher monetary return, and greater resource utilization and fulfils the diversified need of the farmers (Singh *et al.*, 1986). Intercropping in sugarcane with various short duration crops like cabbage, potato, mungbean etc. has been proven profitable in comparison to growing sugarcane as sole crop (Yadva and Verma; 1984, Kabir, 1988; Alam *et al.*, 2000 and Goni and Paul, 2004-2005). It is reported that 50 to 80 per cent of rainfed crops are planted as intercrops with sugarcane in many developing countries (Norman, 1974).

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In Bangladesh, intercropping in sugarcane was introduced in 1973. The methodical intercropping, paired row intercropping and high value crops intercropping were developed by Agronomy and Farming Systems Division of BSRI and introduced in the early 1980s, 1990s and 2000s respectively. But the adoption rate of intercropping with sugarcane is still low, it ranges 13-15% of the total sugarcane land (Imam *et al.*, 1990). The present study was undertaken to estimate the profitability of intercropping with sugarcane and also to determine area under intercropping.

METHODOLOGY

The study was conducted during 2005-06 cropping season in Rajshahi, Pabna and Joypurhat sugar mills area considering the intensity of intercropping with sugarcane. Data were collected randomly from a total of 90 sample farmers through a pre-tested questionnaire taking 30 farmers from each location. Descriptive statistics were employed to analyse the data of the study. Co-efficient of output elasticity of cost was calculated with a view to determine the responsiveness of returns to changes in the costs involved by using the following formula (Handerson and Quandt, 1980).

$$EC = \frac{\partial R}{\partial C} \times \frac{C_1 + C_2}{R_1 + R_2}$$

Where,

- EC = Co-efficient of output elasticity of cost
- C = Total cost
- R = Gross return
- ∂ = Partial change
- C1 = Total cost of sugarcane as sole crop
- C2 = Total cost of sugarcane plus intercrop
- R1 = Total return from sugarcane as sole crop
- R2 = Total return from sugarcane plus intercrop

RESULTS AND DISCUSSION

It was observed from the study that from sole sugarcane per hectare yield was 48.16 ton whereas for different crop combination with sugarcane as sugarcane plus potato, sugarcane plus onion, sugarcane plus mustard and sugarcane plus lentil, the adjusted sugarcane yield were 105.23, 98.86, 82.78 and 81.13 t ha⁻¹ respectively (Table 1). Highest gross return came from sugarcane with potato combination followed by sugarcane plus onion, sugarcane plus mustard and sugarcane plus lentil that were Tk. 131538, 123575, 103475 and Tk.101413 per hectare respectively. For sole sugarcane gross return was only Tk. 23375 ha⁻¹ considerably less than all intercropping combination with sugarcane. From the same table it can be seen that the highest benefit cost ratio (undiscounted) were from sugarcane with potato combination followed by sugarcane plus onion, sugarcane plus lentil and sugarcane plus mustard that were 2.02, 1.99, 1.96 and 1.94 respectively much more higher than sole sugarcane which was only 1.63.

Table 1. Cost and return of sole sugarcane and sugarcane with different intercrop combinations.

Technology/ Crops	Yield t ha ⁻¹	Cost t ha ⁻¹	Gross income t ha ⁻¹	BCR (Undiscounted)
Sole sugarcane	48.16	36825	60200	1.63
Sugarcane + potato	105.23	65267	131538	2.02
Sugarcane + onion	98.86	62178	123575	1.99
Sugarcane + mustard	82.78	53205	103475	1.94
Sugarcane + lentil	81.13	51762	101413	1.96

Source: Field Survey, 2005-06

Figure 1 shows that the highest net return also came from sugarcane with potato (Tk. 66271 ha⁻¹). On the other hand, from sole sugarcane it was only Tk. 23375 ha⁻¹ that was significantly less than sugarcane plus onion (Tk. 61397 ha⁻¹), sugarcane plus mustard (Tk. 50270 ha⁻¹) and sugarcane plus lentil (Tk. 49651 ha⁻¹).

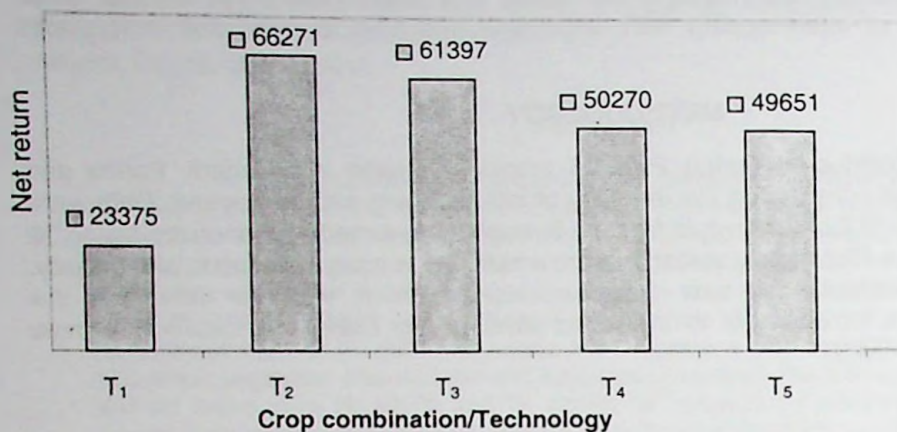


Figure 1. Difference in net return for sole sugarcane and intercropping with sugarcane.
Where, T₁ = Sole sugarcane; T₂ = Sugarcane + potato; T₃ = Sugarcane + onion
T₄ = Sugarcane + mustard; T₅ = Sugarcane + lentil.

Table 2. Output elasticity of cost for different intercrop combination with sugarcane.

Crop combinations	Co-efficient of output elasticity of cost
Sugarcane + potato	1.13
Sugarcane + onion	1.19
Sugarcane + mustard	1.22
Sugarcane + lentil	1.27

Source: Field Survey, 2005-06

The co-efficient of output elasticity of cost for different crop combination with sugarcane (Table 2) indicating there were scope to increase gross return by using more input as farmers were applying less input than required. The result shows that one per cent change in total cost of sugarcane with intercrops would change gross return by 1.13, 1.19, 1.22 and 1.27 in case of sugarcane with potato, sugarcane with onion, sugarcane with mustard and sugarcane with lentil respectively.

Table 3. Area under sole sugarcane and intercropping with sugarcane.

Locations	No. of farmers	Average cultivated land (ha)	Area under sugarcane (ha)	Percentage (%)	Intercropping with sugarcane	Percentage (%)
Rajshahi	30	2.12	0.53	24	0.11	20
Pabna	30	1.89	0.42	22	0.09	21
Joypurhat	30	2.03	0.63	31	0.16	25
Mean	30	2.01	0.53	26	0.36	22

Source: Field Survey, 2005-06

It is revealed from the study that intercropping with sugarcane was highly profitable than sole sugarcane production. However, farmers were not practicing intercropping with sugarcane in a large scale in the study area. It can be shown from Table 3 that only 20, 21 and 25 per cent of total sugarcane land were under intercropping with sugarcane in Rajshahi, Pabna and Joypurhat sugar mills area respectively. On the other hand, only 24, 22 and 31 per cent of total cultivated land were brought under sugarcane cultivation in Rajshahi, Pabna and Joypurhat sugar mills area respectively. The interviewed farmers brought only 26 per cent of their cultivated land for sugarcane cultivation of which only 22 per cent land was under intercropping practices.

Nevertheless, our previous results showed that intercropping with sugarcane were more profitable than sole sugarcane cultivation. It is very rational that farmers will always go for profitable enterprises. But Table 3 shows contradictory result that although intercropping with sugarcane was profitable but farmers in the study area were not increasing their land (only 22 per cent of sugarcane land under intercropping) for intercropping practice in a large scale. Proper steps should be taken in this regard to find out the reasons and to make proper solutions of it with a view to increase the area under intercropping practices. Financial support as subsidies could be given to farmers who are interested for intercropping practices. It might increase interest of farmers to go for intercropping practices in a large scale. Increasing area of intercropping especially vegetables, pulses, oil-seed and spices crops with sugarcane will meet not only the growing demand of said crops but also to increase income and benefit of farmers per unit area and time and thus help to retain farmers in sugarcane production.

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