IMPACT OF SUGARCANE MILLS DEVELOPMENT ACTIVITIES ON CANE PRODUCTION IN PUNJAB

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ABSTRACT:-Despite of being a fifth largest producer of sugarcane, Pakistan has to import a sizeable sugar to meet the domestic requirements owing to lower cane yield and sugar recovery. Some of the sugar mills started development activities in their surrounding areas for promoting cultivation of high yielding and more sugar recovery varieties to overcome this problem. Present study was planned to estimate the profitability of sugarcane crop among both beneficiary and non-beneficiary farms of these development activities. Detailed data were collected from 100 randomly selected growers (50 beneficiaries and 50 non-beneficiaries) during April, 2010. The beneficiary farmers were operating significantly larger land holdings. Area under new high yielding, with more sugar recovery varieties was relatively higher at beneficiary farms as compared to non-beneficiary farms. The beneficiary farmers were getting higher returns from sugarcane production (fresh and ratoon crops) as compared to non-beneficiary farms. Inclusion of small and medium farmers in the sugar mills development activities is recommended to meet the sugar consumption requirements of the country by domestic production and ultimately reduction in sugar import.

Key Words: Sugarcane; Cultivation; Production; Profitability; Development Activities; Beneficiary Farmers; Yield; Pakistan.

INTRODUCTION

Sugarcane is one of the major and ranked third largest crop in terms of area among 13 crops being cultivated in Pakistan. Likewise, sugar industry belongs distinctly to 12 large-scale industries by now well established in Pakistan. It is the second largest after cotton textile within the large-scale agro-based manufacturing sub-sector in Pakistan (Qureshi, 2004). Being an important cash crop its share in value added agriculture and GDP is 3.4 % and 0.7 %, respectively (GoP, 2009).

Pakistan ranks at the fifth position in production of sugarcane with 5.47 million tonnes (mt) after Brazil (51.4 mt), India (35.5 mt), China (10.63 mt) and Thailand (6.43 mt) (FAO, 2009). The average per hectare yield of sugarcane in Pakistan is 46.0 t which is low as compared to other sugarcane prod-ucing countries like Egypt (105 t), Philippines (92.6t), Thailand (92.6t), China (77.1 t), Australia (75.5 t) and India (70.6 t) (Alam, 2007). However, the yield potential of sugarcane varieties released by the research institutes in Pakistan ranged from 125 to 150 t ha^{-1}.

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In sugar production, Pakistan stands at 15th position with recovery of sugar at 8.9%, which is considerably low as compared to other sugar producing countries of the world. Non-adoption of latest technology due to poor financial condition of farmers and planting of low sugar recovery varieties are the main causes of low sugar production (PSMA, 2010). The annual per capita consumption of sugar in Pakistan is about 25 kg. During 2009-10, refined sugar production about 3.1mt against the annual requirement of about 4.2 mt less to the import of 1.1 mt was to meet the gap (GoP, 2010).

Although Pakistan is one of the largest producers of sugarcane yet it has to import sugar from outside. To overcome the problem of low yield of cane and sugar recovery, the sugar mills have started development activities in their respective area (surrounding area) for promotion /cultivation of high yielding sugarcane varieties with good sugar recovery through providing certified seeds and necessary inputs. Field staff of these sugar mills is used for supply of cane seed and other inputs. The beneficiary farmers of Adventist Development and Relief Agency project got higher income from citrus as compared to non-beneficiary farmers (Tawiah, 2010). Similarly, the bene-ficiary of microcredit farmers got higher return as compared to non-beneficiary farmers (Omobolanle, 2010; Jehan and Muhammed, 2008; Rathore et al., 2011). The present study was planned to see the differ-ence in sugarcane production and profitability among beneficiaries and non-beneficiaries of this programme in the sugarcane producing area of Punjab with the objectives to: (i) compare the profitability of sugarcane production among beneficiaries and non-beneficiaries farmers and (ii) suggest policy implications for betterment in the development activities of sugar mills.

MATERIALS AND METHOD

Sugarcane growing area of the Punjab was the sample area where developing activities were carried out by sugar mills. Due to money and time constraints the sample size was limited to 100 farmers (50 beneficiary and 50 non-beneficiary farmers). The study was confined to Abdullah Sugar Mill Sargodha and Tandlianwala Sugar Mill Kanjwani, Faisalabad. Stratified sampling technique was used to select the sample farmers from Faisalabad and Sargodha districts of the irrigated Punjab. A list of beneficiary farmers was collected from these mills. Statistical and budgeting analysis techniques were used to interpret the data. In statistical analysis techniques, Chi-square and ANOVA F-test were used to interpret the data. The F value was computed using following formula

$$F = \frac{S_a^2}{S_a^2}$$

(Chaudhry and Kamal, 2008)

where S_a^2 and S_b^2 variance of the first and second group, respectively.

$$\chi^2 = \sum_{i=1}^{k}(Q_i - E_i)^2 / E_i$$

(Chaudhry and Kamal, 2008)

The value of chi-square (χ^2) is given by where, Qi is the observed frequency and Ei is the expected frequency.

In budgeting analysis techniques, gross margin, net return and benefit cost ratio were calculated by using following formulas.

Gross Margin (GM) = TR- VC (where
TR = Total Revenue;
VC = Variable Cost
Net Return: (NR) =TR-TC
TC = Total Cost
Benefit Cost Ratio: (BCR) =TR/TC
(Ahmad et al., 1993)

RESULTS AND DISCUSSION

In ANOVA analysis, F value was used to see whether there is statistically significant difference between group means. The average age of farmers in the study area was more than 40 years (Table 1). The beneficiary farmers were having more age as compared to non-beneficiary farmers. However, the difference in average had no statistical significance. Similar is for farming experience. The average education level of both category farmers was almost same. The beneficiary farmers were operating significantly higher acreage as compared to non-beneficiary farmers. Similarly, average area planted under sugarcane was significantly higher at beneficiary farms as compared to non-beneficiary farms. The reason may be that the large farmers are having more resources to test new venture/technology as compared to other category farmers.

Chi-square test was used to confirm the relationship between independent and dependent variables whether the observed relationship between two variables has arisen by chance or it is real. Overall 59% of farmers were owner operator and 35% farmers were cultivating owned and rented land. The pure tenant operated farms were only 6% (Table 2). The owner operated farms were more in non-beneficiary farmers in the area. The ownership of tubewell was significantly higher among beneficiary farmers as compared to non-beneficiary farmers. Overall, 79% farmers were having their own tractor for cultivation in the study area. The ownership of tractor was higher in beneficiary but statistically non-significant.

Table 1. Socio-economic characteristics of sample farmers

Characteristic	Beneficiary farmers	Non -beneficiary farmers	All	F - Value
Age	42.34	40.76	41.55	0.563
Farming experience	20.02	19.00	19.55	0.169
Schooling years	9.00	8.70	8.88	0.175
Operation land holding (ha)	60.44	32.94	46.48	5.022*
Sugarcane area (ha)	21.46	11.90	16.68	4.027*

Significant at 5 percent level of probability

Table 2. Socio-economic characteristics of sample farmers

Characteristic	Beneficiary farmers	Non-beneficiary farmers	All	^{2}
Tenancy (%)				
Owner	54.00	63.30	59.00	
Owner-cum-Tenant	40.00	30.60	35.00	1.138
Tenant	6.00	6.10	6.00	
Tubewell ownership				4.058*
Owned (%)	66.00	46.00	56.00	
Hired (%)	34.00	54.00	44.00	
Power source				
Tractor	84.00	74.00	79.00	1.507
Rented tractor	16.00	26.00	21.00	

Significant at 5 percent level of probability

Sugarcane Varieties Grown by the Sample Farmers

Sugar mills introduced newly released sugarcane varieties (HSF-240, HSF-242 and SPF-213) with high yield potential and good sugar recovery as compared to field varieties already grown by farmers. The results revealed that sugarcane area under HSF-240 and HSF-242 varieties was relatively higher on beneficiary farms in both the years (2008 and 2009). However, ratio of area allocated to sugarcane varieties SPF-213 was almost same in the study area (Table 3). The area under non-recommended sugarcane variety (SPF-238) having low sugar recovery was more on non-beneficiary farms in the area. The results shows positive impact of mill development activities as more than 60% area on beneficiary and more than 50 % area on non-beneficiary farms was under new varieties.

Table 3. Sugarcane varieties grown by beneficiary and non-beneficiary farmer

Variety	Beneficiary farmers		Non-beneficiary farmers		All farms	
	2008	2009	2008	2009	2008	2009
HSF-240	50.99	50.06	26.74	16.81	43.64	38.35
HSF-242	7.72	9.50	6.68	8.02	7.41	8.98
SPF-213	2.38	7.32	2.67	7.85	2.47	7.51
SPF-238	14.75	3.89	29.41	25.60	19.19	11.53
SPF-234	7.08	8.95	23.26	17.32	11.98	11.89
CP-77-400	6.85	8.53	5.08	8.53	6.32	8.53
Others*	10.23	11.75	6.16	15.87	8.99	13.21
Total	100.00	100.00	100.00	100.00	100.00	100.00

* S98, SP-246, CPF-247, CPF-237, CP-43-33

Profitability of Sugarcane Crop (Fresh and Ratoon)

Sugarcane crop requires adequate quantity of inputs at proper time for good yield and sugar recovery. The expenditure incurred from land preparation to harvesting and transportation was considered for estimating cost of production for beneficiary and non-beneficiary farmers. In cost calculation per acre for land rent, tractor cost, tubewell water, farmyard manure and family labour opportunity cost was considered in the budget i.e., per acre. Village prevailing rates were used instead of ownership or non-payment. Actual prices paid for fertilizer including transport cost by the sugarcane growers were used (Table 4). Actual price of the chemical and application cost paid by the farmer was used. Abiana rates paid by the farmers annually on the basis of per acre were used for canal irrigation. Mark-Up @ 10% on the relevant cost has been incorporated for the period equal to crop duration. Actual price at the sugar mill gate or sugarcane procurement center was used for computing gross revenue of the output.

The results show that the average yield of beneficiary and non-beneficiary for fresh crop was 982.84 and 917.53 md acre^{-1}. Jehan and Muhammed (2008) reported higher yield of wheat, maize and peaches on Zarai Taraqiati Bank Ltd. credit beneficiary farms as compared to non-beneficiary farms in Khyber Pakhtun Khwa province. The variable cost for growing an acre of fresh sugarcane crop was Rs. 53973.21 and Rs. 49018.28 for beneficiary and non-beneficiary growers, respectively. The total cost for producing of an acre of fresh sugarcane was Rs. 74073.21

Table 4. Profitability of sugarcane (fresh and ratoon) by beneficiary and non-beneficiary farmers in the Punjab

(Rs.)

Activity	Beneficiary farmers		Non-beneficiary farmers	
	Fresh crop	Ratoon crop	Fresh crop	Ratoon crop
Land preparation	5988.60	-	5269.35	-
Seed cost	9745.90	-	9958.59	-
Sowing cost	2248.84	-	2248.84	-
Fertilizer cost	9394.44	7920.39	8255.85	8429.27
Intercultural cost	1149.51	1079.44	856.44	1130.41
Weeds control	357.13	254.67	200.46	260.66
Plant protection	1308.54	1133.72	1205.02	1397.30
Irrigation	9442.80	8911.40	8443.26	10793.34
Transportation cost	10373.88	10103.36	8936.71	9486.70
Variable cost	53973.21	31332.94	49018.28	33698.77
Land rent	20000.00	20000.00	20000.00	20000.00
Total cost	74073.21	51432.94	69118.28	53798.77
Gross revenue	172599.64	139452.75	155351.59	135630.43
Gross margin	118626.42	108119.81	106333.31	101931.66
Net return	98526.42	88019.81	86233.31	81831.66
BCR	2.33:1.00	2.71:1.00	2.25:1.00	2.52:1.00

and Rs. 69118.28 for beneficiary and non-beneficiary, respectively (Table 4). The gross margin for growing an acre of fresh sugarcane was Rs. 118626.42 acre^{-1} for beneficiary farmers which are Rs. 12293.11 higher as compare to non beneficiary farmers. Similar results (higher gross margin of beneficiary farms) were achieved in tomato production in Turkey (Tatlidi and Aktürk, 2002). Rathore et al. (2011) in their study reported higher income (Rs. 78485) among beneficiary group as compared to non-beneficiary groups income (Rs. 42348).

In sugarcane (ratoon crop), the average yield of beneficiary and non-beneficiary was 825.78 and 813.82 md acre^{-1} respectively. The variable cost for growing an acre of ratoon sugarcane crop was Rs. 31332.94 and Rs. 33698.77 for beneficiary and non-beneficiary growers, respectively. The total cost for producing of an acre of ratoon sugarcane was Rs. 51432.94 and Rs. 53798.77 for beneficiary and non beneficiary, respectively. The gross margin for growing an acre of ratoon sugarcane was Rs. 108119.81 acre^{-1} for beneficiary farmers which are Rs. 6188.15 higher as compare to non beneficiary farmers. The results are similar with Simmons et al. (2005) who concluded that beneficiary farmers of maize seed and poultry contract got higher returns as compared to independent farmers.

The positive impact of sugar mills development activities was observed in the study area as the percent area under high yielding sugarcane varieties with good sugar recovery is increasing day by day. Moreover, as a result of provision of critical inputs on deferred payment, the input level has increased that resulted in yield increase. Similarly, the output level also increased at beneficiary farms as a result of development activities. The beneficiary farmers also got higher prices of cane as compared to non-beneficiary farmers. Supply of good sugar recovery cane was the main reason of higher rates.

The cost and revenue statistics of sugarcane production (fresh and ratoon crop) shows higher returns on beneficiary farms as compared to non-beneficiary farms. The timely availability of critical input supplied by mills at beneficiary farms was the main cause of higher cane yield. These results show positive contribution of mill development activities in the Punjab for increasing sugarcane profitability.

Recommendations

Development activities of mills be spread to the ordinary farmers.

Motivate the small and medium farmers for cultivating new varieties. The seed of new varieties may be provided to them on easy payment or on deferred payment through beneficiary farmers.

Ordinary farmers may be motivated to grow new varieties for price premium.

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