Comparative Analysis of Sugarcane on Farm and Research Station in District Mardan

Raza Ullah, Qaisar Shah Safi, Jamal Shah and Kamran Haider Khan

Field of Agricultural Systems and Engineering
School of Environment, Resources and Development
Asian Institute of Technology, Thailand

Email: raza_khalil@yahoo.com

Abstract - The study was undertaken in district Mardan to compare the yield, total cost and net revenues of sugarcane production on farm and research station. For this purpose, 100 respondents were randomly selected from two villages, viz; Toru and Mayar, using purposive sampling technique. The data was collected during 2009 using a structured questionnaire. The empirical analysis using dummy variable approach indicates that the yield of sugarcane at research station was 9024 kg more than the farm level sugarcane. The reason for higher yield of sugarcane at research station is the use of improved management practices and use of optimum levels of inputs. The cost per acre incurred in the production of sugarcane at research station was Rs.11513.12 more than the cost incurred in the production of sugarcane on farm. Similarly the net revenue generated per acre from sugarcane production at Mardan research station was Rs.20245.984 more than the net revenues generated from sugarcane production on farm level in the study area. On the basis of research finding it was suggested that improved sugarcane varieties should be made available to the farmers and extension department should educate the farmers to improve their yield, production and net revenues from sugarcane production by adopting improved management practices.

1. Introduction

Sugarcane has got its unique importance in agricultural economy, because of its multipurpose usage. Sugarcane as a whole is largely grown in tropical and sub-tropical regions of the world. Conflicting claims are attributed to its origin but most historians believe that sugarcane originated in India about 300 B.C and subsequently spread through the trade routes to North Africa, the Mediterranean region, Spain and later on to Arabia, China and Persia, India, Brazil, Cuba, Australia, Pakistan, China and the United States are the leading countries in sugarcane production.

Sugarcane crop is the fifth largest in the world by area, and 10th or 11th by production (Qureshi, 1998). Sugarcane is an important industrial and cash crop in Pakistan and in many countries of the world. The sugar industry is the second largest industry in Pakistan. Pakistan is the 6th largest cane producing country in the world. It is an important source of income and employment for the farming community of the country. It also forms essential items for industries like sugar, chip board, paper, beverages, confectionery, uses in chemicals, plastics, paints, synthetics, fiber, insecticides and detergents (GoP, 2008-09).

The general situation of sugarcane production in Mardan is not satisfactory. The yield of sugarcane per acre is to an alarming extent below the potential yield of any particular variety. The general perceptions about low production are varied and multidimensional. There are certain commonalities and some differences in the views of farmers and scientist in research station. This pathetic scenario needs to be changed through the combined efforts of farmers, extension workers and research staff.

The domestic production of sugar can be increased by increasing the output of sugarcane through improving the productivity of land growing cultivars which have high sucrose contents, improving factory efficiency to increase sugar yield and minimizing the delay between cane harvesting and crushing (Niaz, 1990). By the combine use of several management practices (including planting date, row spacing, planting depth, optimum fertilizers rate, filling gaps in rows, application of farmyard manure, pest control, earthing up, harvesting techniques and irrigation) highest yields of cane can be obtain (Uddin and Murayama, 1993). The principal factors affecting sugarcane supply response are the official procurement price for sugarcane paid at the sugar mill gate, the scale of operation and the relative returns to alternative uses of sugarcane. The government price policies could have substantial impact on the quantity of sugarcane supplied to sugar mills (Bhatli and Yanagida, 1988). However, focusing on one commodity in isolation could lead to misleading conclusions about appropriate pricing policies since the effects on production and consumption of other commodities could have substantial efficiency and revenue implications (Rosegrant and Evenson, 1993). A higher price of sugar cane in relative to other upland crops price, a lower real paddy price, and higher investment in sugar cane research are important factors affecting the expansion of sugar cane supply (Isvilonda, 1999).

In past several reports were published on different process of sugar cane production which include chemical composting as well as agricultural reforms/steps to increase the recovery and percentage yield. The present study is conducted to find out the social and scientific causes of low yield of sugarcane...
in District Mardan. Moreover to compare the yield of farmers’ field with that of potential field in research station and their respective determining factors.

2. Research Methodology

2.1 Sampling technique and Sample Size

The present study was carried out in district Mardan, two villages; Toru and Mayar were selected for the data collection. After the selection of sample villages a total of 100 respondents were randomly selected, 50 respondents from each village, using purposive sampling technique. The research station data was collected from Mardan research station.

2.2 Data Collection

The study is based on primary data and the interview schedule/questionnaire was used as a research instrument for collection of data needed for the study. The data was collected from the respondents through face to face meetings in their fields or homes during 2009.

2.3 Data Analysis

Dummy variable approach (DVA) is mostly used for comparison of two or more than two means. For the present study dummy variable approach was used for the comparison of crop yield, total cost and net revenue of sugarcane production at farm and research station using SPSS (Statistical Package for Social Sciences) computer software. The following econometric model was estimated empirically.

\[ Y = \beta_0 + \beta_1 D + e_i \]

Where

- \( \beta_0 \) = constant/intercept
- \( \beta_1 \) = co-efficient of dummy variable
- \( D = 1 \) if Research Station Data and 0 Otherwise
- \( e_i \) = Error term

3. Results and Discussion

The results of partial budgeting indicate that the average yield of farm level sugarcane in the study area was 22976 kg per acre, the average cost incurred in the production of sugarcane was Rs.30536.88 per acre and the average net revenue generated per acre from farm level sugarcane production was Rs.33704.01 while the sugarcane yield at Mardan research station was 3200 kg per acre, total cost of production of sugarcane at research station was Rs.42050 and the net revenue generated per acre of sugarcane at research station was Rs.513.12. The reason for higher yield of research station is the use of optimal and recommended levels of inputs that is why the cost of production was lower than the cost of production at research station.

The results indicate that the average sugarcane production on farm level is 22976 kg per acre in the study area while the production of sugarcane per acre at research station is 3200Kgs (22976 + 9024). The reason for higher yield of research station is the use of optimal and recommended levels of inputs.

3.1 Yield Comparison

\[ Y = 22976 + 9024D \]

(185.37) (1323.84)

(123.94) (6.81)

\[ R^2 = 0.48 \quad F = 46.46 \]

The t-statistic shows the individual significance of the parameters in the model. As evident by the t-value both the parameters are statistically significant at 5% level of significance. The value of the coefficient of determination i.e. \( R^2 \) indicates that 48% of variation in the dependent variable is explained by the independent variables. The F-value (46.46) indicates that the overall model is good to fit.

3.2 Comparison of Total Cost of Production

\[ TC = 30536.88 + 11513.12D \]

(284.68) (2033.01)

(106.95) (5.71)

\[ R^2 = 0.40 \quad F = 32.58 \]

The results show that the average cost of production of sugarcane on farm level is Rs.30536.88 per acre while the cost of production of sugarcane on research station is Rs.42050 (30536.88 +11513.12) per acre. The farm operators were using less than optimal and recommended levels of inputs that is why their cost of production was lower than the cost of production at research station.

3.3 Comparison of Net Revenue

\[ NR = 33704.01 + 20245.98D \]

(598.58) (4274.73)

(56.29) (4.74)

\[ R^2 = 0.31 \quad F = 22.45 \]

The results show that the average net revenue of farm level sugarcane is Rs. 33704.016 per acre while the net revenue generated from sugarcane production
at station is Rs.53950 (33704.016 + 20245.984) per acre. Due to higher per acre production at research station the net revenues generated per acre from sugarcane are higher than farm level.

3.4 Problems Faced by Sugarcane Growers

In this study an effort has been made to investigate the problems and hurdles faced by sugarcane growers in the study area. The problems confronted by sugarcane growers, investigated through direct interview, are summarized in the table below:

Table 1- Problems Faced by Sugarcane Growers

<table>
<thead>
<tr>
<th>S.No</th>
<th>Problems</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>High prices of inputs</td>
<td>90%</td>
</tr>
<tr>
<td>2</td>
<td>Low water availability</td>
<td>60%</td>
</tr>
<tr>
<td>3</td>
<td>Low market prices</td>
<td>80%</td>
</tr>
<tr>
<td>4</td>
<td>Lack of extension services</td>
<td>60%</td>
</tr>
<tr>
<td>5</td>
<td>Low availability of improved seeds</td>
<td>40%</td>
</tr>
</tbody>
</table>

Most of the sugarcane growers in the study area reported the problem of high prices of inputs. Higher prices of DAP discouraged farmers to use more phosphatic fertilizers. The farmers also reported problems of low availability of irrigation water. The respondents also reported the problems of market prices; they urged the government to stabilize input and output prices of sugarcane for preservation of farmers incentives for higher production of sugarcane. Lack of extension services is another limiting factor that comes in the way of higher productivity. The respondents in the study area reported that the extension worker should provide basic information regarding various farm operations to enhance the productivity of sugarcane. Low availability of improved seed varieties of sugarcane was also a basic problem faced by the sugarcane growers in the study area.

4. Conclusions

There is substantial scope for increasing per acre yield of sugarcane to use of inputs and following improved management practices. Farmers in the study area are using lower than optimum/recommended levels of inputs because they were unaware of the optimum use of resources. The use of required levels of inputs and other improved farm practices can increase the yield of sugarcane up to the desired levels. Extension workers can play pivotal role by educating the growers in the study area about the use of various inputs and other improved farm practices for higher production. Due to financial constraints the farmers are not using the required levels of various inputs and other improved farm practices, there is a need of micro credit for the farmers to carry out improved and recommended farms practices to narrow the gap between the actual and desired levels of production. Net revenue of the farmers can be increased by increasing sugarcane productivity and adopting least cost production techniques. There is a role of extension workers to educate sugarcane growers for achieving higher production and also to adopt cost minimizing production techniques.

References


