

# Economic Assessment of Sugarcane Production and Its Marketing Constraints in Sindh, Pakistan

Moula Bux Peerzado<sup>1\*</sup> Altaf Ahmed Jalbani<sup>1</sup> Tehmina Mangan<sup>1</sup> Mumtaz Ali Joyo<sup>1</sup>

Luan Jingdong<sup>2</sup> Qurat Ul Ain Memon<sup>2</sup> Shoaib Ahmed Wagan<sup>2\*</sup>

1.Department Of Agriculture Economics, Sindh Agriculture University Tandojam

2.Collage of Economics and Management, Anhui Agricultural University China

## Abstract

Sugarcane is an important cash crop of Pakistan. It ranks at the 5<sup>th</sup> position in its acreage and production and almost 15<sup>th</sup> position in sugar production in the world. Sugarcane is mainly grown for manufacturing sugar and other sweeteners (Shakar and Gur) and its by-products are used in chipboard and paper industries. It is an important source of income and employment for the farming community. The research was carried out with the objectives to investigate the average per hectare cost of production, sugarcane yield, net-return; input output ratio and cost benefit ratio, market issues and production practice constraints by the sugarcane growers in study area. Primary data with convenient sampling method was used in this study. A sample of 60 sugarcane growers was selected by random sampling technique. The required information and data were collected on pre-tested questionnaire through personal interviews and observations. The results show that sugarcane grower faces economic, technical and social constraints.

**Keywords:** Sugarcane, Production and marketing, average per hectare cost, sugarcane yield

## 1. Introduction

In Pakistan about 70% population is directly or indirectly related with agriculture, and fulfills food needs and raw material for industrial Production. In Pakistan, Sindh and Punjab are the two leading provinces from the agricultural point of view. The major crops of Sindh province are wheat, rice, sugarcane, cotton and several horticultural crops especially banana and mango, besides all types of vegetables. Agriculture is central to economic growth and development in Pakistan. Being the dominant sector it contributes 21.4 percent to GDP, employs 45 percent of the country's labor force and contributes in the growth of other sectors of the economy. Sugarcane crop occupies an important position in national economy in order to drive the large sugar industry. It also provides raw materials to clip board, paper and ethanol. Its share in value added in agriculture and GDP is 3.2 and 0.7 percent respectively. Sugarcane crop was cultivated on an area of 1124 thousand hectares, 6.2 percent more than last year's area of 1058 thousand hectares. The production of sugarcane for the year 2012-13 is reported at 62.5 million tons, against the target 59 millions tones set for 2012-13 shows a healthy performance of 5.9 percent and to compare last year which was 58.4 million tones, show an increase of 7.0 percent. The main factors contributed to higher production where more area brought under cultivation due to economic returns received by the growers, good management of crops and application of balance doze of inputs (GOP 2013). Sugarcane is an important cash crop of Pakistan. It ranks at the 5<sup>th</sup> position in its acreage and production and almost 15<sup>th</sup> position in sugar production in the world. Sugarcane is mainly grown for manufacturing sugar and other sweeteners (*Shakar* and *Gur*) and its by-products are used in chipboard and paper industries. It is an important source of income and employment for the farming community also. The share of sugarcane in total agricultural value added and GDP are 4.5% and 0.9%, respectively. Although both the sugarcane area and production were increased in past two decades, but in a cyclical fashion (GOP, 2010). In sugarcane growing areas, about 64% of total area under this crop has been planted by farm sizes ranging from 1 to 10 hectares (Agricultural Census of Pakistan, 2000). Currently, there are 91 sugar mills in the country with a distribution of 48 mills in Punjab, 34 in Sindh and 9 in NWFP province. These mills crushed nearly 78% of total sugarcane produced in the country to produce 3.82 million tons of white sugar. In Pakistan sugarcane is widely planted in Sindh, Punjab and NWFP provinces. The highest sugarcane production was recorded in Punjab with the average yield of 1100 mounds/acre during the year 2010-11, while the lowest sugarcane yield was recorded for NWFP province with an average yield of 566mounds/acre during the same year. The average yield of sugarcane during the last few years ranges between 55 to 60 ton/hectare. It is one of the poorest among 16 sugarcane producing countries as a major crop. The yield of sugarcane is good, 1060-1209 mounds/acre, considerably less than the required yields. The gap between required and actual yield is wide due to poor management practices and post-harvest losses. It is also found that sugarcane production system has passed down from previous generations and is dominant among the growers. The traditional methods are commonly used in sugarcane management and labour is an important input in the sugarcane production process. Production process is not mechanized and is mostly labour intensive. Majority of the growers do not follow modern practices like proper use of FYM, inter-culturing, fertilizer application, sprays and timely irrigation. The problems of post harvest losses include improper handling, harvesting and inadequate transport facilities. Therefore, this study was conducted to

investigate the major factors affecting sugarcane production in Pakistan. Total production of sugarcane in Sindh last five year is 13304.00 in 2009, 13831 in 2010, 14102 in 2011, 15220 in 2012 and 16520 in 2013 respectively. Total area in hectares of sugarcane in Sindh last five year is 264.00 in 2009, 244.80 in 2010, 256 in 2011, 270 in 2012 and 300 in 2013 (Azam and Khan, 2010 and Gulam Sarwar, 2012). An expanding population and a growing economy demand not only a more equitable distribution of water but also a more efficient use of it, which is particularly compelling in irrigation. For the agriculture sector, this would translate to an increase in the productivity of all inputs at the farm level, especially a scarce resource such as water. For water this translates to increased yields per unit consumed, as well as increased efficiency in the use of water that complements other inputs used in the production of crops. Scientists and researchers working at agricultural universities are generating a considerable amount of improved agricultural technologies and research institutes both at national and international levels. Information concerning these technologies must be disseminated to end users in ways which respond to their needs and which insure that the information transferred is not only better understood and accepted by the client group but will be properly and effectively utilized by them (Hassan, 1997). The above facts and figures show that the production of sugarcane crop and its marketing issues with related problem. Therefore the need of study have essential and present study was conducted in Taluka Mirpur Mathelo, District Ghotki Sindh province of Pakistan. The precise objectives remained below:

1. To review present status of sugarcane production in Sindh, province of Pakistan.
2. To determine the average per unit (acre/hectare 40kg/kg) cost of production and cost benefit ratio incurred by sugarcane growers in study area.
3. To identify marketing constraints of sugarcane crop in the study area.
4. To suggest the policy measures for sustainable sugarcane production.

## 2. Review Of Literature

Azam. et al. (2010) conducted study about the broad aims to know about area, production, and profitability of sugarcane crops with special reference to NWFP (i.e., Charsadda, Mardan, Nowshera and Peshawar districts). Cobb-Douglas production function has been used in order to identify the various factors (i.e., land, labour and capital) impact on sugarcane production in the study area and the method of least squares (OLS) has been applied as an analytical technique. The results revealed that innovation/technology has a positive influence on the dependent variable output. Further, results shows that the sum of the elasticity is greater than unity, this implies that the agricultural sector is producing in the stage of increasing return to scale, which means that the allocation of inputs in this sector is not optimal.

GOP (2007), the sugarcane production, efforts were made, and are continuing, also to evolve new high yielding sugarcane varieties and promote both vertical and horizontal development of sugarcane agriculture. To this end minimum price of sugarcane delivered to sugar mills were, as are also still, fixed annually. Sugarcane has been in cultivation in the areas constituting Pakistan since times immemorial. The same is true of production of sugar in raw form, popularly known as Shakkar (brown sugar) and Gurr (lump sugar). Production of refined (white) sugar started in the project area in the thirties of the current century. This industry started expanding in fifties, and the pace of development accelerated in the seventies as evidenced by the fact that most of the existing sugar mills were installed after 1970. There are 77 sugar mills with sugar production capacity of 7.1 million tons, basically obtained from 1 million hectares of sugar cane crop. The self sufficiency in sugar production has not been achieved because of fluctuating transactional mode between the sugar millers and the sugarcane producers. Despite increase in sugar demand substantial stocks remain with the sugar millers, whose production price according to them remains higher than the present value of wholesale price.

Laghari et al (2003) reported that sugarcane cultivation in Sanghar area involved cost of production of Rs 220521.96 per acre, yield gross return of 599.62 mounds per acre. The sugar cane producer obtained net return at the rate of 118772.23 per acre of sugar cane. The cost benefit ratio for sugarcane crop was estimated to be 1:0.45

Mohammad et al. (2006) examined the economics of sugarcane production and its competitiveness in up-and-coming open trade economy. The study also analyzed the extent of policy bend and agricultural safeguard. The data on cost of production series of sugarcane crop were collected from the Agricultural Prices Commission (Acoma). Punjab and Sindh; the two major sugarcane producing provinces were the focus of the study. The Policy Analysis Matrix (PAM) was selected as analytical framework. The crop budgets were constructed both in financial and economic prices. The time series data from 1990-2002 on world prices of sugarcane and fertilizers (DAP and potash) were utilized to estimate the risk prices. These risk prices were later on utilized to estimate the risk prices. The Nominal Protection Coefficient for inputs (NPI) and output (NPC) and the Effective Protection Coefficient (EPC) was used to estimate the policy distortion. The Domestic resource Cost ratio (DRC) was applied to show comparative advantage. Sugarcane is an important cash crop and provides raw material to nearly 78 factories the excess supply and demand of sugar was cyclical in nature. Therefore, analysis was performed keeping in view both import and export parity prices. The analysis lead us to conclude

that Pakistan (Punjab and Sindh) has no comparative advantage in producing sugar at export parity prices (price risk scenario), however, crop can be grown as an import substitution crop to cater the needs of sugar industry.

(GOP 2011), Sugarcane is an important cash crop of Pakistan. It ranks at the 5th position in its acreage and production and almost 15th position in sugar production in the world. Sugarcane is mainly grown for manufacturing sugar and other sweeteners (Shakar and Gur) and its by-products are used in chipboard and paper industries. It is an important source of income and employment for the farming community also. The share of sugarcane in total agricultural value added and GDP are 4.5% and 0.9%, respectively. Although both the sugarcane area and production were increased in past two decades, but in a cyclical fashion. In sugarcane growing areas, about 64% of total area under this crop has been planted by farm sizes ranging from 1 to 10 hectares (Agricultural Census of Pakistan, 2000). Currently, there are 91 sugar mills in the country with a distribution of 48 mills in Punjab, 34 in Sindh and 9 in NWFP province. These mills crushed nearly 78% of total sugarcane produced in the country to produce 3.82 million tons of white sugar. In Pakistan sugarcane is widely planted in Sindh, Punjab and NWFP provinces. The highest sugarcane production was recorded in Punjab with the average yield of 1100 mounds/acre during the year 2010-11, while the lowest sugarcane yield was recorded for NWFP province with an average yield of 566 mounds/acre during the same year. The average yield of sugarcane during the last few years ranges between 55 to 60 ton/hectare. It is one of the poorest among 16 sugarcane producing countries as a major crop. The yield of sugarcane is good, 1060-1209 mounds/acre, considerably less than the required yields. The gap between required and actual yield is wide due to poor management practices and post-harvest losses. It is also found that sugarcane production system has passed down from previous generations and is dominant among the growers. The traditional methods are commonly used in sugarcane management and labour is an important input in the sugarcane production process. Production process is not mechanized and is mostly labour intensive. Majority of the growers do not follow modern practices like proper use of FYM, inter-culturing, fertilizer application, sprays and timely irrigation. The problems of post harvest losses include improper handling, harvesting and inadequate transport facilities. Therefore, this study was conducted to investigate the major factors affecting sugarcane production in Pakistan

Hussain et al, (2006) reported that the sugarcane production is encouraged by the policy incentives as export promotion while it is discouraged as import substitution. The analysis further revealed that land rent was the major cost item of cane production, indicating its scarcity and high opportunity cost.

Gauri (2006) reported that the stochastic production frontier is employed to estimate technical efficiency at the plot level by ownership types of water amongst a cross section of sugar cane growing farmers using primary survey data. Inefficiency effects are modeled as a function of farmer specific explanatory variables. Tests reveal that the null hypothesis of no inefficiency and no influence of farmer specific variables on inefficiency can be rejected. Education, land area, discharge of tube well and distance of plots from the water source are the causes identified in explaining inefficiency. Estimated technical efficiency scores are highest on plots where water is sourced from a privately owned tube well, followed by plots serviced by partnered tube wells and lowest on plots where water is bought. Income gains from improved efficiency follow the reverse patterns with the largest gains of Rs. 1082 per bigha estimated for buyers' plots and Rs. 649 per bigha for plots with their own tube well with the average of Rs. 867 for all plots.

Alam et al, (2005) sugar industry plays an important role to develop infrastructure in rural areas, rural employment, and income of the farm families, contribute to national exchequer, foreign exchange savings, poverty reduction and value addition to the sugar as well as by product industries.

Masood et al. (2004) reported that one yield model was developed for Pakistan. Production was estimated by multiplying area and yield forecasts. The explanatory variables included in the area models were lagged area under sugarcane lagged by one year and sugarcane procurement price. The explanatory variables used in the yield models were fertilizer consumption of sugarcane (kgs/ha), total water availability at farm gate during the crop growth period. Then analysis revealed that highly significant results for procurement price, lagged sugarcane area and water availability at farm gate during the crop growth period. Sugarcane area and yield forecast models are very efficient and can be used to predict future area and yield estimates with reasonable level of accuracy a couple of months before sowing and harvesting of sugarcane crop.

### 3. Methodology

Primary data was used in the present study, and the study was carried out through survey method. A questionnaire was designed, pre-tested, and used for interview of 60 sugarcane growers, data was collected through personal interviews. The collected data will be tabulated, analyzed, and interpreted to meet the objectives of this study.

#### 3.1 Source of data

Data used for the study were obtained from cross-sectional survey of sugarcane growers in district Ghotki of Sindh province that jointly accounted for a considerable quantity of the total sugarcane produced in Sindh

province with upland ecology. A multi stage random sampling technique was adopted in selecting a total of 60 farmers. Information obtained with of well structured interview schedule include resource inputs and output sugarcane production; cultural practices of the farmers and their socioeconomic characteristics like age, education, household size etc.

### 3.2 Sampling

Taluka Mirpur Mathelo was selected as the representative areas for sugarcane production in the study area. Analysis is carried out by using primary data on input-output quantities and prices from 60 farm households' belongings to Taluka Mirpur Mathelo.

### 3.3 The Questionnaire

The questionnaire for the survey was designed to select for details about field operations for rice cultivation on the farms in the study area. Information concerning, farms size (hectares), source of irrigation, age, education etc. were collected. The output and input data were obtained on per farms and per hector basis in the survey.

Percentage was derived from sample size as below.

Total observed no /total no \*100

Total revenue = Price \* Physical Productivity

Total cost is sum of the fix cost and total variable costs for any given level of production.

Total cost (TC) = Fixed cost (FC) +Variable cost (VC)

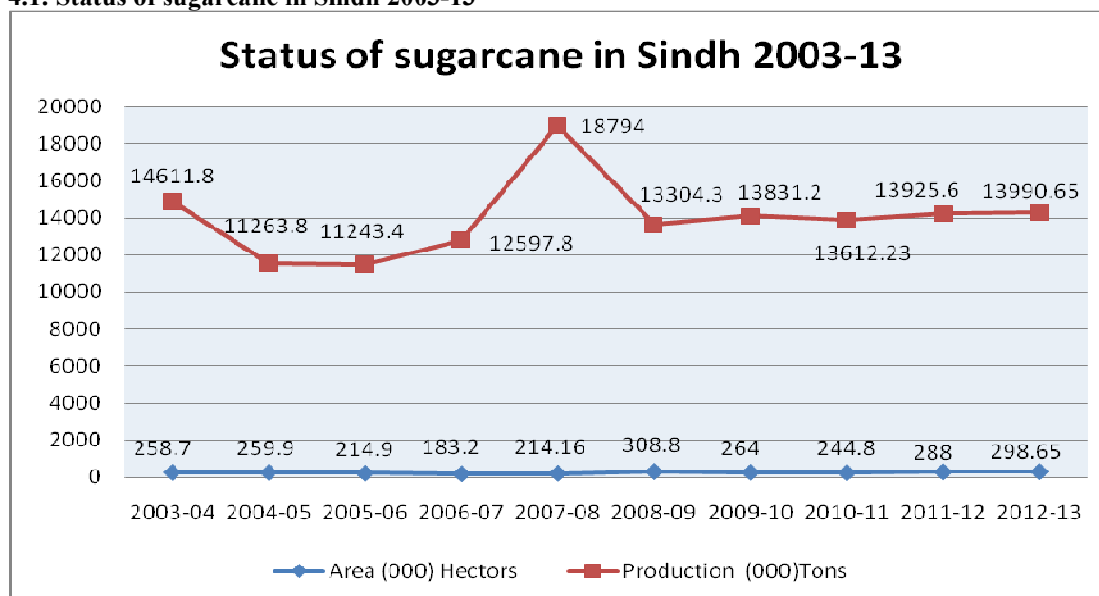
Profit (P) = Gross Income (GI) – Expensive (E)

Net return (NR) = Total revenue (TR) – Total cost (TC)

## 4. Results

Production is a process whereby some goods and services called inputs are transformed into other goods and services called outputs. Production of agriculture commodities not only results through the transformation of various inputs into outputs but it is also subject to the physical, natural and socio economic condition of the area. It is therefore necessary to have a brief account of the socio-economic indicators like family size, educational level etc. as prevailing in the study area, and to account the production practices as well returns in physical and revenue terms.

### 4.1. Status of sugarcane in Sindh 2003-13



The table shows the status of sugar cane crop in Sindh province of Pakistan.. According to the table the area under sugarcane cultivation in Sindh during year 2003-04,2004-05, 2005-06, 2006-07, 2007-08, 2008-09, 2009-10, 2010-11, 2011-12 and2012-13 was 258.70, 259.90, 183.20, 214.16, 308.80, 2644.00, 244.80, 288.00 and 298.65 thousand tonnes respectively.

#### 4.2. Table: Cropping Pattern:

Rabi Crop (hectares)			Kharif Crop (hectares)		
	No	%		No	%
Wheat	20	27	Cotton	19	25
Sugarcane	19	25	Sugarcane	20	27
Mustard	5	7	Jowar	4	5
Fodder	3	4	Fodder	5	7
Vegetable	4	5	Vegetables	4	5
Other	24	32	Other	23	31

mustard, fodder and vegetables are cultivated in the study

There are two distinct cropping seasons i.e. Rabi and Kharif in Sindh. Rabi season starts from November and ends of April and crops grown in this season are called rabbi crops. While Kharif season starts from May to October and crops grown in this season are called Kharif crops. Cropping pattern of the selected growers are presented respectively. It was found that in kharif season, cotton, sugarcane, jowar, fodder and others crops and vegetables. In rabi season wheat, sugarcane,

#### 4.3. Source of Technical Information

Source of information	No	%
Electric Media	14	23.33
Newspapers	6	10
Neighbours	36	60
Agril:Department	4	06.67

It was observed that majority of the selected farmers i.e. majority of obtained technical information from neighbouring farmers, while 23.33% obtained knowledge about Sugarcane production practices from electric media and newspapers 10%. The role of agriculture department on providing technical information about cultural practices and marketing was found minor as shown above. It was found that majority of the selected farmers i.e. majority of obtained technical information from neighbouring farmers, while 23.33% obtained knowledge about Sugarcane production

practices from electric media and newspapers 10%. The role of agriculture department on providing technical information about cultural practices and marketing was found minor as shown in above Table 4.

#### 4.3. Yield of Sugarcane:

Table presents yields and selling prices of sugarcane, thus results reveal that yield of sugarcane crop was obtained 300 mounds/ha with an average selling price of Rs.168/40kg. Results indicate that revenue received by growers was Rs.540, 000/ha.

	Sugarcane Soled
Yield (mounds/ha)	3000
Selling Price (Rs./40kg)	180
Revenue (Rs./ha)	540,000

#### 4.4. Total fixed cost:

Total Fixed Cost is simply the summation of the several types of fixed costs (Ronald, 1996). In the present study, the total fixed costs include the rent of land (lease) and the land taxes. Fixed costs are those costs, which are incurred irrespective of the level of output. Another characteristic of fixed costs is that they are not under the control of the manager in the short run. They exist and at the same level regardless of how much or how little the resource is used. The only way they can avoid is to sell the item, which can be done in the long term.

Table: 4.5. Average per hectare cost

Cost	Minimum	Maximum	Average
Rent of land	80000	90000	85000
Land tax	1000	2000	1500
Irrigation	3000	4000	3500
Other	1000	2000	1500
Levelling	1100	1400	1250
Sowing	1938	2480	2209
Ploughing	3235	3569	3402
Fertilizer	14260	16440	15350
Other	52100	63740	57920
Total	157,633	185,629	171,631

The averages per hectare costs presented in Table 6, the results revealed that sugarcane farmers incurred an average per hectare cost of 171631 and indicates that the cost in the study area ranged between 157633 to Rs.185629.

Table: Average per hectare net income realized by the sugarcane growers in study area. The average per hectare net income is presented in Table. 19 Results reveal that Sugarcane farmers earn an average per hectare net returns of 368369. The table further indicates that the net returns in the study area ranged between 262387 and 474371.

Economic problems		
Item	No	%
1.Lack of capital	13	21.66
2. High prices of inputs	12	20.00
3.Low price of out put	19	31.66
4. Late payments	10	16.66
5. Lack of recourses etc	6	10.00
Total	60	100

Technical problems		
Item	No	%
1. Scientific Knowledge	25	41.67
2. Land preparation	12	20.00
3. Seed	8	13.33
4. Pesticide	5	8.33
5. Inadequate irrigation	6	10.00
6. Natural calamity etc	4	6.67
Total	60	100

Social problems		
Item	No	%
1. Theft of sugar cane	20	33.33
2. Cutting of tops	15	25.00
3.Chewing	16	26.67
4. Transportation etc	9	15.00
Total	60	100

The results show that sugarcane grower faces economic, technical and social problem respectively. In economic problems growers faces Lack of capital, High prices of inputs, Low price of output, late payments and Lack of recourses with 21.66%, 20.00%, 31.66%, 16.66% and 10.00% respectively. In technical problems growers faces Lack of scientific Knowledge, Land preparation, Seed, Pesticide, Inadequate irrigation and Natural calamity with 41.67 %, 20.00%, 13.33%, 8.33%, 10.00% and 6.67 respectively. In social problems growers face theft of sugar cane, cutting of tops, Chewing and Transportation with percentage 33.33%, 25.00%, 26.67% and 15.00% respectively. Agriculture is central to economic growth and development in Pakistan. Sugarcane crop occupies an important position in national economy in order to drive the large sugar industry. Status of agricultural grower in the surveyed area, it was found that almost all the selected sugarcane growers owned their own land and 83.33% of them were owner and 16.67% were farmers operating the farm enterprise. There were two sources of irrigation water: underground water through boring and canal water found from the field areas. Some farmers having their own tube well because they have not approached canal irrigation systems. Results show that majority 66.67 percent growers used canal irrigation source in the study area. Whereas, 23.33 percent growers used both (tube well and canal water) and 10 percent used tube well water respectively.

The sugarcane growers of the study area were asked about the reason of planting of sugarcane crop, 25% respondents viewed that it property productive and high price, whereas 33% were of the opinion that sugarcane increase income and remaining 16% good for livestock hence they are decided to planting the sugarcane

crop as presented. The average per hectare total costs is presented in the results reveal that sugarcane farmers incurred an average per hectare cost of Rs. 171,631 as total cost of production including fixed cost, labour cost, capital inputs and marketing cost.

Components	Minimum	Maximum	Average
Gross income	420,000	660,000	540,000
Total cost of production	157,633	185,629	171,631
Net income a-b=c	262,367	474,371	368,369

The table further indicates that the total cost in the study area ranged between Rs.157633 to Rs.185629. The average per hectare revenue productivity is presented in results reveal that sugarcane farmers realized an average per hectare revenue productivity of Rs.540000. The table further indicates that the revenue productivity in the study area ranged between Rs.420000 to Rs.660000. The average per hectare net income is presented in results reveal that Sugarcane farmers earn an average per hectare net returns of Rs. 368369. The table further indicates that the net returns in the study area ranged between Rs. 262387 to 474371.

### 5. Conclusions And Suggestions

The results revealed moderate production inefficiency for sampled sugarcane farmers in the study area and, hence, significant potential for sugarcane farmers increasing efficiency. A further cost reduction can be obtained by operating with optimal scale, which is medium size farms. Given the importance of sugarcane production for income, contribution to food security, employment and export in Sindh province and Pakistan, the benefits from increasing farms efficiency would be substantial. Results suggested that efficiency in production is influenced by many factors including lack of education, lack of adoption of new varieties, lack of required fertilizer efficient use of pesticide and one of the major factor non-availability of water at the sowing time. The analysis also indicates that increasing land holding and farms size does not have substantial benefits for efficiency, as results to scale are slightly increasing to medium size farmers which suggest that the benefits of small farmers are distributed across large number of people.

It was found that almost all the selected sugarcane growers owned their own land and 83.33% of them were full time and 16.67% were part time operating the farm enterprise.

### 5.1. Suggestions

To increase per hectare yield further, and consequently the income of farmer, the following suggestion should be followed.

1. Credit facilities may be extended and the procedures be further simplified,
2. Chemicals/fertilizers, insecticides and pesticides may be provided at cheaper rates.
3. Seed of quantity and high yielding varieties be supplied on cheaper rates.
4. Technical assistance to farmers be extended.
5. Quick and cheap transport facilities be provided to farmers at farm gates.
6. Pucca roads should be constructed to facilitate the transport
7. Technical information should be disseminated by farmers by Agriculture Extension and Research Sindh.
8. Technical assistance be extended by the department of agricultural education extension and short courses, Sindh Agriculture University / agricultural research Sindh tandojam.
9. Agricultural extension farms services should be extended by the Sindh agriculture university Tandojam.

### Literature Cited

- Aguilar-Rivera, N., D. A. Rodríguez L., V. Enríquez R., A. Castillo M. and A. Herrera S. 2012. The Mexican Sugarcane Industry: Overview, Constraints, Current Status and Long-Term Trends. *Sugar Tech.* 14(3):207–222.
- Azam, M. and M. Khan. 2010. Significance of the sugarcane crops with special reference to NWFP. *Sarhad J. Agric.* 26(2): 289-295.
- Devaraja T.S 2008. Cost of production of sugar from sugarcane in Karnataka- a comparative analysis approach cooperative sugar, 39(6): 15-22
- Devi Abujam Anuradha, and Chahal S.S. 2013. Socio-economic constraints perceived by cane growers in sugarcane production in Punjab. *Socio-economic constraints perceived by cane growers in sugarcane production in Punjab.* 9(2):93-113.
- Economic Survey of Pakistan 2007 (various issues) Finance Div. Econ. Advisors Wing, Islamabad
- Girei A.A. and Giroh D.Y. (2012) *Analysis of the factors affecting sugarcane (saccharum officinarum) production under the out growers scheme in numen local government area adamawa state, Nigeria advances in agriculture, sciences and engineering research, vol 2, no 5*
- Gomatee Singh. 2013. An empirical study of economics of sugarcane cultivation and processing based farming in Uttar Pradesh. *Sky Journal of Agricultural Research.* 2(1):7-19.
- GOP, (2012) Economic Survey of Pakistan.
- GOP, (2007) Economic Survey of Pakistan.
- GOP. 2011. Pakistan statistical year book 2011. Federal Bureau of Statistics. Statistical Division. Government of Pakistan.
- GOP. 2013. Pakistan statistical year book 2012-13. Federal Bureau of Statistics. Statistical Division. Government of Pakistan.
- Laghari, A.H., and Shah, Y.M., 2003, Sugarcane production in Sanghar Area. unpublished M.Sc. Thesis department of Agricultural Economics, Submitted Sindh Agriculture university, TandoJam
- Gulam, S.T., AND Muhammad, H. B., Lal, M.B., 2012, Technoguide for the Enhancement of Sugarcane production, sugarcane section agriculture research institute tandojam. pp8-12.
- Lahoti, S. R.; Chole, R. R. and Rathi, N. R. 2010. Constraints in adoption of sugarcane production technology. *Agricultural Science Digest.* 30(4): 270-272.
- Mohammad, F.H., S. Anwar and Z. Hussain 2006. Economics of sugarcane production in Pakistan: A Price Risk Analysis, *International Research Journal of Finance and Economics.*
- Hussain M.F., S. Anwar and Z. Hussain. 2006. Economics of sugarcane production in Pakistan: A Price Risk Analysis. *Int'l J. Finance & Econ.* 4 (2006). <http://www.eurojournals.com/finance.htm>
- Alam, M.M, M.I Haque, and G.M.M. Alam, 2005. Economics of Sugar Industries Performance in Bangladesh *Bangladesh J. Sugarcane* 28-34 Vol. 24-27
- Masood, M. A Malik A J forecast (2004) model for sugarcane in Pakistan *Pak. J Agri. Sci., Vol.* 41(12).