

API SERIES NO. 246



**SUGARCANE POLICY ANALYSIS  
FOR  
2013-14 CROP**



**AGRICULTURE POLICY INSTITUTE  
MINISTRY OF NATIONAL FOOD SECURITY AND RESEARCH  
GOVERNMENT OF PAKISTAN  
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<b>ABRIVIATIONS</b>	
AARI	Ayub Agricultural Research Institute
AJ&K	Azad Jammu and Kashmir
API	Agriculture Policy Institute
CIF	Cost, Insurance and Freight
COP	Cost of Production
CPI	Consumer Price Index
CPR	Cane Procurement Receipt
CRS	Crop Reporting Service
DAP	Di-Ammonium Phosphate
DCO	District Coordination Officer
DRC	Domestic Resource Cost
ECC	Economic Coordination Committee
EPB	Export Promotion Bureau
EPC	Effective Protection Coefficient
FAO	Food and Agriculture Organization
FBR	Federal Board of Revenue
FCA	Federal Committee on Agriculture
FOB	Free on Board
FYM	Farm Yard Manure
GST	General Sales Tax
HIES	Household Income and Expenditure Survey
ISO	International Sugar Organization
KPK	Kyber Pakhtoonkwhah
MNFS&R	Ministry of National Food Security and Research
NAs	Northern Areas
NFDC	National Fertilizer Development Centre
NGOs	Non Governmental Organizations
NPC	Nominal Protection Coefficient
OLS	Ordinary Least Squares
PAKGAP	Pakistan Good Agriculture Practice
PARC	Pakistan Agricultural Research Council
PBS	Pakistan Bureau of Statistics
PSMA	Pakistan Sugarmills Association
SBP	State bank of Pakistan
TCP	Trading Corporation of Pakistan

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# ***SUMMARY OF FINDINGS AND RECOMMENDATIONS***

Sugarcane area and production in 2012-13 increased by 6%, and 7.4% over 2011-12 respectively. Negligible growth was registered in Punjab (Area: -0.2% and Production: 0.3%) and KPK (Area: 0.8% and Production: 1.8%). In Sindh, area increased by 33.7% and production by 38.2%.

2. The sugar production in the year 2012-13 was reported 5.037 million tons against 4.657 million tons in 2011-12. Stocks of sugar as on 12 July 2013 are 0.371 million tons. The total available sugar stocks are 5.408 million tons. Sold /off take stocks are 2.477 million tons. Net available sugar on 12<sup>th</sup> July 2013 is 2.931 million tons. Ministry of Industries reported that these stocks are sufficient till the 1<sup>st</sup> March 2014. The sugar industry has been allowed to export 1.2 million tons of sugar but the actual shipment made by the industry is 0.823 million tons. Domestic sugar consumption during 2013-14 (1<sup>st</sup> October 2013 – 30<sup>th</sup> September 2014) is estimated at 4.245 million tons which can easily be met after the end of coming crushing season.

3. Pakistan Bureau of Statistics reported that both retail and wholesale prices of sugar in the country are quite stable however international Price of white sugar has declined from \$ 557.76/ton in October 2012 to \$ 482.29/ton on 13 July 2013. Due to declining trend of international sugar prices further export of sugar will be a difficult option and its impact will keep sugar prices stable in the domestic market (Annex XI).

### **Important determinants**

4. Important determinants are summarized below to ascertain indicative price of sugarcane for 2013-14 crop. The prices once announced after due consideration of relevant factors must be ensured to the growers by the Provincial Sugarcane Commissioners.

Based on	Sugarcane price at mill gate (Rs. per 40 Kgs)		
	Punjab	KPK	Sindh
<b>1. Cost of production of sugarcane details are in Annex III to V.</b>	<b>155.07</b>	<b>152.65</b>	<b>152.08</b>
<b>2. Average wholesale prices of sugarcane derived from sugar Prices given below:-</b>	<b>121</b>		<b>122</b>
a) Rs 50,000 per ton	105	-	106
b) Rs 55,000 per ton	116	-	117
c) Rs 60,000 per ton	126	-	127
<b>3. Prices received by cane growers</b>	<b>170</b>	-	<b>172</b>
<b>4. Import Parity based on average fob London price of white sugar at US \$ 482.40/ton (Average of 1 to 12 July 2013).</b>	<b>150</b>	-	<b>151</b>
<b>5. Export Parity based on: average fob London price of white sugar at US \$ 482.29/ton (Average of 1 to 12 July 2013).</b>	<b>121</b>	-	<b>122</b>

## PRICE RECOMMENDATION

5. In view of the satisfactory domestic sugar stock position and world market situation, the price policy recommendations is to retain the indicative price of sugarcane at the last year level at Rs. 170/40 kgs for Punjab and KPK and Rs. 172/40 kgs for Sindh. The measure will not only cover the domestic cost of production but will also provide fairly handsome profit margin of 9.6% -13% to the farmers.

## NON PRICE RECOMMENDATIONS

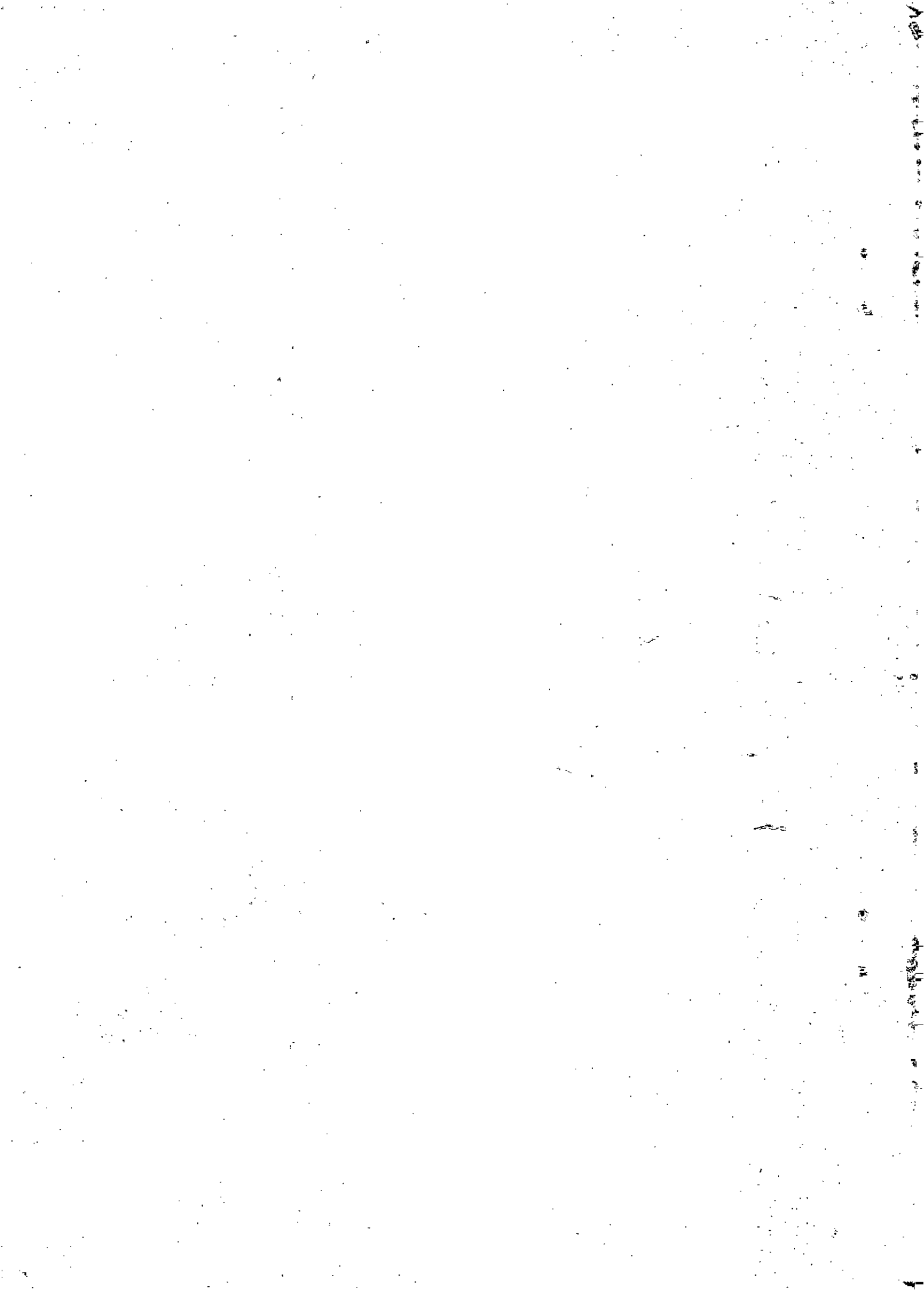
6. The issues relating to sugarcane marketing and low cane productivity have been discussed in detail in the API's Standing Committee and in the main report. Few are summarized below for action by the respective departments and institutions.

a) The Provincial Department of Agriculture (Extension) may take a lead in introducing a 'Green Diesel Scheme' in collaboration with the Agricultural Engineering Departments to estimate financial requirements and develop modalities for launching the scheme.

b) General Sales Tax (GST) on Agriculture inputs may be reduced or eliminated.

- c) Pakistan Agriculture Research Council may play pivotal role and coordinate with other research institutes like AARI, Faisalabad which are doing research in promoting high yield varieties of sugarcane to ensure their availability to farmers.
- d) Provincial Agriculture (Extension) Departments may inform farming community about the banned and approved varieties of the sugarcane through electronic/ print media.
- e) A campaign may be started by the Provincial Agriculture Departments (Extension Dept.) against those who are selling adulterated fertilizers and pesticides.
- f) The role of middlemen in sugarcane marketing may be minimized by imposing provincial tax on their income.
- g) The Provincial Agriculture department may introduce solar energy tube wells which are quite cheap and easy to operate. Ministry of Finance (FBR) should be approached for reduction in custom duty on its import.
- h) The Provincial Agriculture Departments (Extension Dept) may introduce on-farm water economy to disseminate water saving technology for sugarcane cultivation. Such techniques include sprinkler irrigation, trench cultivation and laser land leveling etc. These technologies may be promoted by launching awareness campaigns among the farmers on a mass scale. Under the existing provincial agriculture set-up, the major responsibility goes to the Provincial Departments of Agriculture (Extension). The department may be mandated to identify progressive sugarcane growers for demonstrating these technologies on their farms. The provincial authorities should provide advance subsidy for installation of sprinkler systems at small farms because the initial cost of these technologies is very high.
- i) Federal Ministry of National Food Security and Research may coordinate with the Provincial Departments of Agriculture (Extension Dept.) must take appropriate measures for the revival of **Federal Committee of Agriculture (FCA)** to fix the annual targets and to monitor the achievements and development of the crops in the country.
- j) The provincial governments may take necessary action to implement indicative price by involving district administration. Respective DCOs must be directed to ensure implementation of the indicative price in their jurisdictions.





## INTRODUCTION

1. Sugarcane is one of largest cash crop of Pakistan. A large rural and urban population involves in its business. It generates handsome income for all the stakeholders. At international level Pakistan's crop play a significant role in determine international price, demand, supply and stock position of sugar. Sugarcane is mainly grown for sugar production. Sugarcane also produces numerous valuable by products like, alcohol used by pharmaceutical industry, ethanol used as a fuel, bagasse used for paper, and chip board manufacturing and press mud used as a rich source of organic matter and nutrients for crop production. It is an important source of income and employment for the farming community. Sugarcane production in Pakistan has increased over time.
2. Sugarcane Price Policy Report is a routine feature of API. In order to prepare the report every year. A field survey was conducted during the last week of March in Punjab, Sindh and KPK to collect field data on custom hire rates/costs of different operations required for producing the crop, data so collected has been used in the preparation of this report. The standing committee meeting of API was held on 11 June 2013 to obtain farmers opinion on their problems and future prospects of the crop and to formulate an indicative price of sugarcane for the 2013-14 crop.
3. According to the available data, sugarcane area, yield and production increased by 6%, 1.3% and 7.4% respectively in 2012-13 against 2011-12 figures. Major increase in production happened due to 33.7% increase in area of Sindh which may be attributed to shifting of cotton area to sugarcane area. Cotton crop was damaged by heavy rain which compelled growers to grow more sugarcane instead of cotton. Another reason is that the demand of sugarcane has increased due to establishment of new sugar mills in Sindh. However, area and production in Punjab and KPK are almost stagnant. Targets fixed for area and production of sugarcane have been achieved for the 2012-13 crop.
4. Despite expansion in production over the years, increase in the productivity per unit of area has been very low in Pakistan. Yield per acre of 2012-13 crop is reported less than the previous year. On the whole the yield per acre has remained between 500-700 Maund/acre. The most frequent explanations are shortage of irrigation water due to excessive power shut downs and less water in the irrigation canals.
5. Pakistan occupies an important position in sugarcane producing countries of the world. It ranks at the fifth position in acreage and production and almost 53th position in yield. The average sugarcane production in the country remained static between 45-50 tons/ha, which is quite low compared to the sugarcane production in other countries. The average yield of sugarcane in the world is around 60 tons/ha, while India and Egypt are getting around 66 tons/ha and 105 tons/ha, respectively. In this way, Egypt with highest cane yield in the world is getting about 142 per cent high-yield than Pakistan. India with almost similar soil and climatic conditions is obtaining about 53 per cent higher cane yield than Pakistan.
6. Since it is one of the cash crops of the country, therefore, efforts should be made to improve its productivity. As a result of these efforts, substantial improvement can take place

in its yield. Improved production and distribution of seeds and quality control on other inputs depend largely upon the availability of skilled and competent local manpower, which is sufficiently available in Pakistan.

7. The Agriculture Policy Institute conducted a field survey of 2012-13 sugarcane crop in March 2013 and found that farmers got an average price of Rs 150/ 40 kg at the procurement centre level. Due to the delay in payments by the mills, farmers have sold their standing crop to the middle men and received immediate payment from them. The farmers reported that they have faced many problems including delivery of cane to sugar mills, water shortage, load shedding at the time of irrigation, rising input prices, delayed in payment, undue deduction, under weighing at procurement centers, commission demanded by middlemen etc. Farmers also reported that they are very much depressed due to these problems and this year, they have cultivated less sugarcane. In view of these circumstances, it is likely that the crop of 2013-14, if not better than previous year, will remain at the level of previous year or decline in Punjab and KPK. In Sindh, crop may be impressive, however, will be short of demand as new mills have been established and farmers could be in a better bargaining position.

8. In order to increase the production of sugarcane several steps were taken by the government and the sugar mill association to help farmers. In past several reports/ research studies to increase the production were published which include chemical composition as well as agricultural reforms/steps to increase the recovery and improvement of yield. However, a lot measures need to be taken. Many recommendations suggested to the provincial governments are mentioned at the end of this report to improve marketing and productivity of sugarcane in the country.

## 2. SUGARCANE PLANTING AND HARVESTING SEASONS

9. Sugarcane is a tropical crop, which requires temperature of more than 20C° for proper germination and growth and two months of dry and cool weather towards maturity. The climatic conditions in Pakistan generally provide a growing season of 8 to 10 months for sugarcane in a year. Recommended times of planting spring and autumn crops of sugarcane by province are given in Table-1.

**Table-1: Planting and Harvesting Times of Sugarcane by Province**

Province	Planting Time	
	Spring crop	Autumn crop
Punjab	15 <sup>th</sup> February to 3 <sup>rd</sup> week of March	September
Sindh	1 <sup>st</sup> February to 15 <sup>th</sup> March	September to 15 <sup>th</sup> October
NWFP	15 <sup>th</sup> February to 3 <sup>rd</sup> week of March	September
	Harvesting Time	
Punjab, Sindh, KPK	15 <sup>th</sup> October to 1 <sup>st</sup> March	

Source: Sugarcane Coordinator, NARC, Islamabad.

### 3. PROVINCIAL SHARES

4. Provincial shares in area and production of sugarcane, cane crushed and sugar made have been discussed below:

#### 3.1 Area and Production

5. Shares of area and production of sugarcane during the decade encompassing 2002-03 to 2012-13 and changes therein are presented in Table-2.

**Table-2: Comparison of Provincial Shares in Area and Production of Sugarcane: 2002-03 to 2004-05 and 2010-11 to 2012-13**

Country/Province	Area		Production	
	2002-03 to 2004-05	2010-11 to 2012-13	2002-03 to 2004-05	2010-11 to 2012-13
	----- Percent -----			
Pakistan	100.0	100.0	100.0	100.0
Punjab	66.5	69.3	65.6	70.0
Sindh	23.4	21.2	24.7	22.4
KPK	10.1	9.5	9.6	7.6
Balochistan	0.1	0.1	0.1	0.1
KPK/Baloch:	10.1	9.5	9.6	7.7

Source: Worked out from Annex-I.

6. It is reflected in the above table that the shares of Punjab, Sindh and KPK are 69, 21 and 10 percent in area and 70, 22 and 8 percent in production respectively. Over time the share of Punjab has gone up by 2.8 percent in area and 4.4 percent in production. In case of Sindh the share of area is down by 2.2 percent and that of production by 2.3 percent. In the KPK the share of area is also down by 0.6 percent and 2.0 percent share in production. Provincial shares are also depicted in Figures 1 to 4.

### 4. IMPORTANT SUGARCANE PRODUCING DISTRICTS

7. Sugarcane is a high delta crop. It is grown in irrigated conditions. Districts which grow 100 thousand tonnes or more of sugarcane are R.Y.Khan, Faisalabad, Sargodha, Jhang, Chiniot, T.T.Singh, Kasur, Muzaffargarh, M.B.Din, Rajanpur, Vehari, Bahawalnagar, Nankana Sahib, Bahawalpur, Bhakkar, Okara, Layyah, Khanewal, Sahiwal, Khushab, Hafizabad, Pakpattan, D.G.Khan, Mianwali, Sheikhpura Multan, Gujrat, and Gujranwala in the Punjab; Badin, Nawabshah, Tando Muhammad Khan, N.Feroze, Thatta, Khairpur, Tando Allahyar, Matiari, Mirpur Khas, Sanghar, Hyderabad, Ghotki, Dadu, Sukkur and Umer Kot in Sindh; Mardan, Charsadda, Peshawar, D.I.Khan, Nowshera, Malakand and Swabi in KPK. These 50 districts; 28 from the Punjab, 15 from Sindh and 7 from KPK collectively account for 99 per cent of the sugarcane's area and production (Annex-II).

8. However, 23 districts, namely, R.Y.Khan, Faisalabad, Sargodha, Jhang, Chiniot, T.T.Singh, Kasur, Muzaffargarh, M.B.Din, Rajanpur, Vehari, Bahawalnagar, Nankana Sahib, Badin, Nawabshah, Tando Muhammad Khan, N.Feroze, Thatta, Khairpur, Tando Allahyar, Charsadda and Mardan collectively produce 81 per cent of the total sugarcane produced in the country.

Figure No. 1

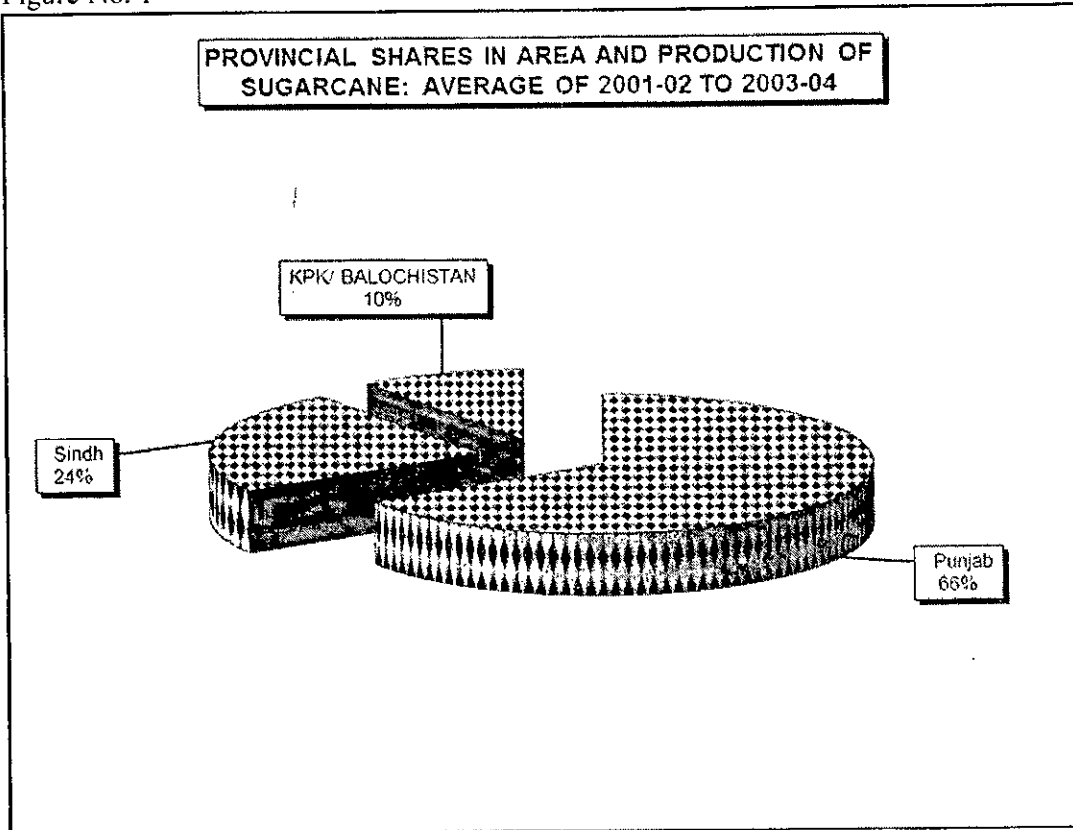


Figure No. 2

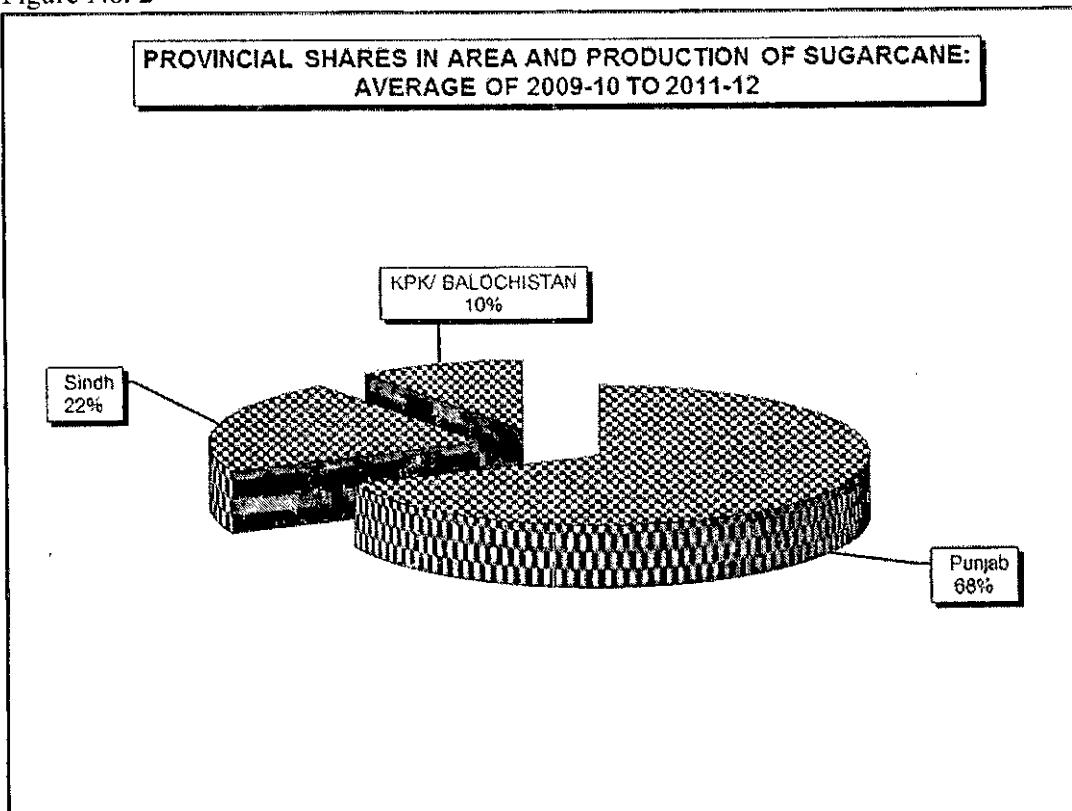


Figure No. 3 **PROVINCIAL SHARES IN PRODUCTION OF SUGARCANE:  
AVERAGE OF 2001-02 TO 2003-04**

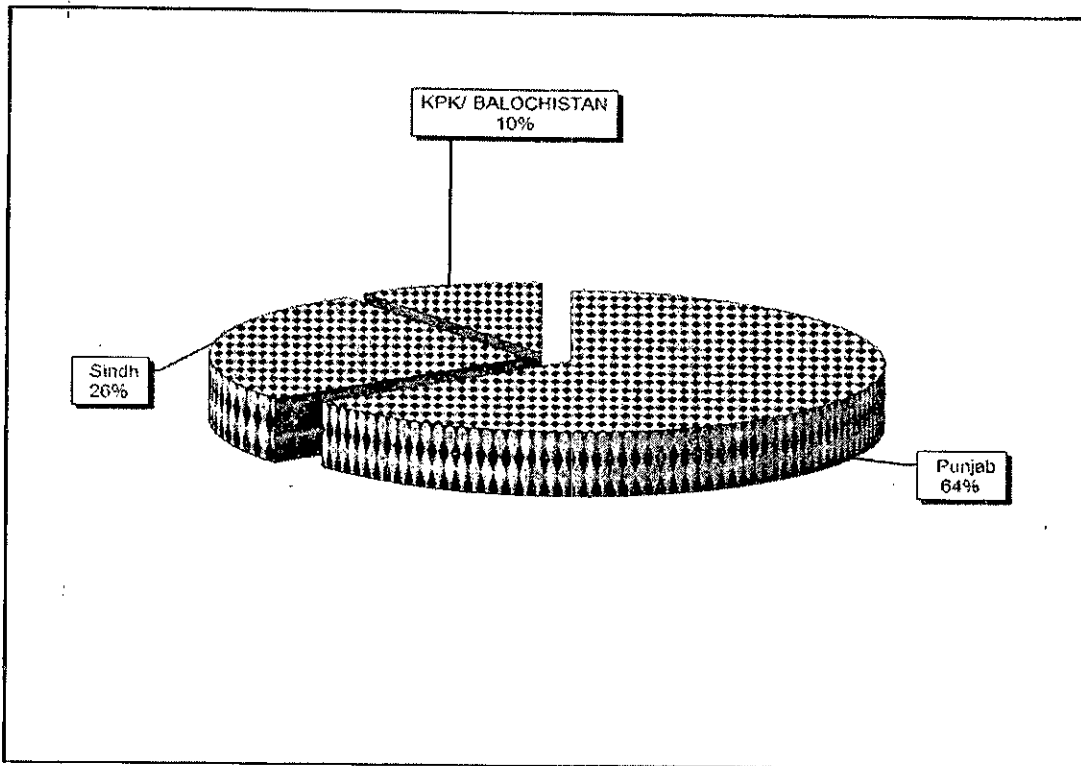
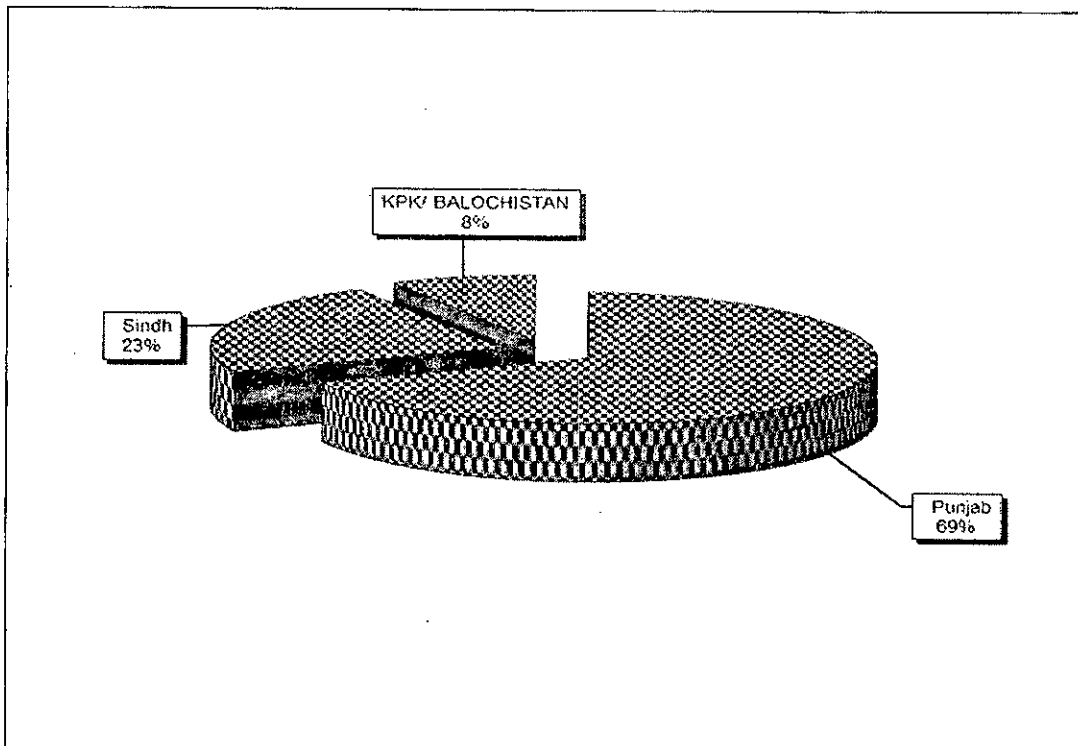


Figure No. 4 **PROVINCIAL SHARES IN PRODUCTION OF SUGARCANE:  
AVERAGE OF 2009-10 TO 2011-12**



## 5. CHANGES IN AREA, YIELD AND PRODUCTION

9. During the decade ending 2012-13 area under sugarcane at country level ranged between 907.5 to 1241.3 thousand hectares (2242.4 to 3067.4 thousand acres) production from 44.666 to 63.920 million tonnes and yield oscillated between 47 to 56 tonnes per hectare.

10. Long-term and short-term changes in area, yield and production of sugarcane are discussed below:

### 5.1 Long-term Changes: 2002-03 to 2012-13

11. During the period under discussion sugarcane production increased @ 1.7 per cent per annum mainly due to improvement in yield @ 1.6 per cent and 0.2 per cent per annum expansion in area (Table-3).

**Table-3:- Average Annual Growth Rates of Area Yield and Production of Sugarcane: 2002-03 to 2012-13**

Country/Province	Area	Yield	Production
	Percent per annum		
Pakistan	0.2	1.6	1.7
Punjab	0.4	2.0	2.4
Sindh	-0.5	1.2	0.7
KPK	-0.4	-0.4	-0.8
Balochistan	1.0	0.0	1.0

Note: The growth rates have been worked out by estimating the equation,  $Y=(1+r)^x$ , through ordinary least square method (OLS) from the data given in Annex-I.

12. Sugarcane production in Punjab during the period under reference increased @ 2.4 percent per annum, as a result of 2.0 per cent improvement in yield and 0.4 per cent expansion in area. Sugarcane production in Sindh has also increased @ 0.7 per cent solely due to 1.2 per cent improvement in yield as the area contracted @ 0.5 percent. In the KPK sugarcane production decreased @ 0.8 per cent per annum mainly due to a decrease in yield and area.

### Short-term Changes: 2011-12 and 2012-13 Crops

13. According to the estimates of Provincial Agriculture Departments sugarcane production at country level for 2012-13 crop is reported at 62.724 million tones reflecting an increase of 7.4 percent over last year's crop of 58.397 million tones. The rise in production is mainly by 6.0 percent expansion in area and 1.3 percent increase in yield (Table-4).

14. In Punjab sugarcane production was reported at 43.014 million tones showing an increase of 0.3 percent over the crop harvested last year due to intermittent rains and favorable weather conditions during period. However area showed a decrease of 0.2 per cent over the last year but the yield increased by 0.4 percent.

15. In KPK, production increased by 1.8 percent mainly due to an increase in area and yield by 0.8 and 1.1 percent respectively.

**Table-4: Area, Yield and Production of Sugarcane: 2011-12 and 2012-13 Crops**

Country/ Province	Area		Chang es	Yield		Chang es	Production		Chang es
	2011- 12	2012- 13		2010- 11	2011- 12		2010-11	2011-12	
	000 ha		%	tones per ha		%	000 tonnes		%
Pakistan	1057.5	1121.1	6.0	55.2	55.9	1.3	58397.0	62724.4	7.4
Punjab	761.2	760.0	-0.2	56.3	56.6	0.4	42893.0	43014.0	0.3
Sindh	189.7	253.7	33.7	56.9	58.8	3.3	10788.3	14908.7	38.2
KPK	105.9	106.7	0.8	44.2	44.7	1.1	4684.3	4770.2	1.8
Balochis- tan	0.7	0.7	0.0	44.9	45.0	0.3	31.4	31.5	0.3

Source: Annex-I.

16. Sugarcane production in Sindh increased by 38.2 percent over the previous year, from 10.788 to 14.909 million tones, mainly due to an increase of 33.7 and 3.3 per cent in area and yield respectively. The reason of increase in both area and production are as under:

#### Area

- In the last year more area of cotton and other crops were damaged due to heavy monsoon rains but the sugarcane crop survived.
- Growers cultivated sugarcane crop keeping in view forecast of the heavier monsoon rains.
- More area came under sugarcane crop cultivation because due to last year's heavy monsoon rains low lying lands could not come in condition for Rabi crops cultivation.

#### Production

- Last year, growers received proper price of their produce, as announced by the government and therefore, growers were induced to manage their crop properly. They also applied a balanced doze of inputs which contributed towards an increased yield per acre of the crop.
- No significant pest problem in the crop was reported and therefore an improved yield per acre was achieved. Introduction of new high yielding varieties of sugarcane also contributed in enhancing the yield per acre.
- All of the above factors contributed towards more production of the sugarcane crop.

#### 6. TARGETS VS ACHIEVEMENTS: 2012-13 CROP

17. In the absence of Federal Agriculture Committee (FCA), respective Provincial Agriculture Departments have fixed sugarcane production target for 2012-13 crop at 53.690 million tones. As per the second estimates of Provincial Agriculture Departments sugarcane production is reported at 62.724 million tones. 16.8 percent more than the target due to over achievement of 4.8 and 11.5 percent in area and yield (Table-5).



18. In the province of Punjab and KPK, sugarcane production exceeded the target by 27.1 and 2.8 percent respectively while in the Sindh and Balochistan, it lagged behind the target by 1.7 and 5.4 percent respectively. There is a need to revive FCA as early as possible because in the absence of FCA, no exact and correct policy planning of each and every crop is possible.

**Table-5: Targets and Estimated Achievements of Area, Yield and Production of Sugarcane: 2012-13 Crop**

Country/ Province	Area		Deviati on from target	Yield		Deviatio n from the target	Production		Deviati on from target
	Target	Achiev ement		Target	Achiev ement		Target	Achiev ement	
	--- 000 ha ---		%	Tonnes/ha		Per cent	-- 000 tonnes --		%
<b>Pakistan</b>	<b>1069.7</b>	<b>1121.1</b>	<b>4.8</b>	<b>50.2</b>	<b>55.9</b>	<b>11.5</b>	<b>53690.3</b>	<b>62724.4</b>	<b>16.8</b>
Punjab	698.0	760.0	8.9	48.5	56.6	16.7	33846.0	43014.0	27.1
Sindh	269.0	253.7	-5.7	56.4	58.8	4.2	15170.0	14908.7	-1.7
KPK	102.0	106.7	4.6	45.5	44.7	-1.7	4641.0	4770.2	2.8
Baluchistan	0.7	0.7	0.0	47.6	45.0	-5.4	33.3	31.5	-5.4

Sources: For targets: Working paper of the 92<sup>nd</sup> Meeting of FCA. For achievements: Annex-I.

## 7. DOMESTIC AND GLOBAL SUGARCANE YIELD GAP

19. A comparison of sugarcane and sugar yield gap of Pakistan with other sugar producing countries is given in table 6. It is evident from the table that in spite of having the fifth largest sugarcane area and production, in terms of yield, Pakistan stand at the lowest level by producing only 56 tons of sugarcane per hectare. All other nine countries are better than Pakistan. In Pakistan there is no standard of Good Agriculture Practice (PAKGAP), especially for sugarcane yield and production. Management of cultural practices is not very impressive so that better yield can be achieved to reach at a top position. This is the responsibility of Extension Departments of Provincial Governments to introduce Global Agriculture Practice for sugarcane. They have to study other countries' practices and suggest an optimum solution to improve yield gap to farmers.

**Table-6 Area, Yield and Production in top 15 sugarcane producing countries: 2011**

S. No	Country	Area (000 Ha)	Production (mil. Tones)	Yield (tones/Ha)
1	Brazil	9601.32 (1)	734.00 (1)	76.44 (24)
2	India	4944.39 (2)	342.38 (2)	69.25 (26)
3	China	1730.7 (3)	115.12 (3)	66.52 (38)
4	Thailand	1259.24 (4)	95.95 (4)	76.19 (25)
5	Pakistan	987.7 (5)	55.31 (5)	56.00 (53)
6	Mexico	713.824 (6)	49.73 (6)	69.67 (35)
7	Cuba	506.1 (7)	15.8 (15)	31.22 (80)
8	Philippines	439.698 (8)	34.00 (7)	77.32 (23)
9	Indonesia	360.00 (9)	24.00 (11)	66.66 (37)
10	USA	353.13 (10)	26.65 (8)	75.48 (28)

Source FAOSTAT

## 8 SUGARCANE CRUSHED AND SUGAR MADE IN PAKISTAN

20. As evident from table 7, the overall sugarcane produced and crushed, sugar production and recovery have increased remarkably. On Pakistan's basis during 2011-12,

sugarcane crushing was 48.248 million tons higher by 8.36 per cent compared with 44526 million tons of last year. Sugar production has increased to 4.670 million tons 12 per cent more than produced during 2010-11. Recovery has also improved to 9.64 per cent in the same year from 9.28% in 2010-11. The main reason of improvement in productivity was sugarcane producers' cultivated improved varieties and the supply was regular without any disturbance. Irrespective of traditional differences between farmers and millers, the overall sugar sector scenario was better than that of the previous year.

**Table-7: -Sugarcane and Sugar Produced and Cane Utilization in Pakistan**

Year	Cane Produced	Cane Crushed	Utilization	Sugar Produced	Recovery	No. of Mills
2001-02	48.989	36.709	76.33	3.198	8.71	69
2002-03	52.050	41.787	80.28	3.653	8.74	71
2003-04	53.811	43.661	81.19	3.997	9.15	71
2004-05	47.243	32.102	73.74	2.922	9.10	71
2005-06	44.314	30.091	67.94	2.588	8.60	74
2006-07	54.871	40.484	73.78	3.516	8.69	77
2007-08	63.920	52.777	82.60	4.741	8.98	78
2008-09	50.046	33.139	66.21	3.134	9.46	82
2009-10	49.373	34.611	70.36	3.133	9.05	84
2010-11	55.038	44.526	80.51	4.172	9.28	84
2011-12	58.038	48.248	83.13	4.670	9.64	86

Source, Pakistan Sugar Mills Associations.

## 9. COST OF PRODUCTION OF SUGARCANE

21. The cost of production is very important and is a crucial consideration in devising the price proposal for farm produce. However, its rational estimation involves compound problems and practical complications on account of wide variations in agro-climatic conditions and farming systems under which the crop is grown. In case of sugarcane, the problem is further compounded as fresh and ratoon crops i.e. spring and autumn are raised with different duration and husbandry practices resulting in varying use of inputs, crop duration and yield level.

22. The cost of production (COP) of sugarcane for the 2013-14 crop in the Punjab, Sindh and Khyber Pakhtunkhwa have been analysed by adopting the input-output parameters as used in calculating COP estimates for the 2012-13 crop and the latest prices of various farm inputs and custom hiring rates of cultural operations. These rates were collected through the annual field survey conducted by the API in the major sugarcane producing areas of the Punjab, Sindh and Khyber Pakhtunkhwa during March-April 2013. The detailed cost estimates are presented in Annex III to V while summary of the results is given in Table- 8.

### 9.1 Cost of Production of Sugarcane by province

#### Punjab

23. The Table- 8 reveals that the cost of growing one acre of sugarcane in Punjab during 2013-2014 crop season is likely to be Rs. 79160, including land rent. Give that the average yield is 565 maunds (40 kgs) per acre, the cost of production at farm level comes to Rs 140 per 40 kgs. Adding up marketing expenses @ Rs 15.0 per 40 kgs, the cost of sugarcane at

mill-gate would be Rs 155.07 per 40 kgs, higher by Rs 5.60 (3.75 per cent) than the analogous cost estimates of 2012-13 crop.

**Table-8: Average Farmers' Cost of Production of Sugarcane: 2012-13 and 2013-14 Crops**

Items	Unit	Cost estimates		Increase in 2013-14 over 2012-13
		2012-13 crop	2013-14 Crop	
<b>Punjab</b>				
1. Cost of cultivation	Rs/acre	76986	79160	2174
2. Yield	40 kgs/acre	565.15	565.15	-
3. Cost of production at farm level	Rs/40 kgs	136.22	140.07	3.85
4. Marketing cost	"	13.25	15.00	1.75
5. Cost of production at mill-gate	"	149.47	155.07	5.60
<b>Sindh</b>				
1. Cost of cultivation	Rs/acre	90197	93128	2931
2. Yield	40 kgs/acre	676.02	676.02	-
3. Cost of production at farm level	Rs/40 kgs	133.42	137.76	4.34
4. Marketing cost	"	13.32	14.32	1.00
5. Cost of production at mill-gate	"	146.74	152.08	5.34
<b>KPK</b>				
1. Cost of cultivation	Rs/acre	78412	80856	2444
2. Yield	40 kgs/acre	585.46	585.46	-
3. Cost of production at farm level	Rs/40 kgs	133.93	138.11	4.18
4. Marketing cost	"	13.27	14.54	1.27
5. Cost of production at mill-gate	"	147.20	152.65	5.45

Source: Annex III to V.

### Sindh

24. During the 2013-14 crop season, the cost of cultivation of sugarcane in Sindh for 2013-14 crop year works out to Rs. 93128 per acre, including land rent. The farm level cost of production of sugarcane is estimated at Rs 137.76 per 40 kgs, based on an average yield of 676 maunds per acre. Accounting for marketing expenses including cane development cess @ Rs 14.32 per 40 kgs, the mill-gate cost of production would be Rs 152.08 per 40 kgs, higher by Rs 5.34 (3.62 per cent) than the corresponding cost of Rs. 146.76/40 kgs of previous year.

### Khyber Pakhtunkhwa

25. In KPK, growing cost of the sugarcane during 2013-14 crop year is estimated at Rs 80856 per acre, including land rent. Keeping in view an average yield of 585 maunds (40 kgs) per acre, the cost of production works out at Rs 138.11 per 40 kgs. Adding transportation charges and sugarcane development cess @ Rs 14.54 per 40 kgs, the mills-gate cost would come to Rs 152.65, showing an increase of Rs 5.45 per kg or 3.70 per cent over last year's corresponding cost of Rs 147.20/40 kgs.

## 9.2 Cost of major operations/inputs

26. The shares of major operations and farm inputs in the total cost of cultivation of sugarcane for 2012-13 and 2013-14 crops in the Punjab, Sindh and KPK are shown in the

Table-9. In Punjab, Sindh and KPK, major increase is witnessed in the land preparation and land rent. However, in Sindh increase in pesticides and in KPK increase in irrigation charges have also been registered. In KPK, intercultural and earthing-up charges are also very high. In case of Sindh prices of fertilizer including Farm Yard Manure and in KPK seed and sowing operations charges showed decline. It can be observed from the table given below that input prices and charges of different cultural operations are on the increasing side and these have been reflected in the cost of production of sugarcane.

**Table-9. Cost of major operations/inputs of Sugarcane: 2012-13 and 2013-14 Crops**

Operations/inputs	2012-13 crop	2013-14 crop	Percent share in the increased cost
	Rs/acre		Per cent
<b>Punjab</b>			
1. Land preparation	7588 (10)	8189 (10)	27.7
2. Seed and sowing operations	7190 (9)	7215 (9)	1.2
3. Intercultural and earthing-up	1905 (2)	2036 (2)	6.0
4. Plant protection	273 (1)	305 (1)	1.5
5. Irrigation	7809 (10)	7953 (10)	6.6
6. Fertilizer including FYM	11452 (15)	11613 (15)	7.4
7. Land rent	21667 (28)	22750 (29)	49.8
8. Harvesting and stripping	7273 (9)	7273 (9)	-
9. Others	11829 (16)	11826 (15)	(-) 0.2
10. Total cost	76986 (100)	79160 (100)	100.0
<b>Sindh</b>			
1. Land preparation	9195 (10)	10176 (11)	33.5
2. Seed and sowing operations	12981 (14)	13006 (14)	0.9
3. Intercultural and earthing-up	3579 (4)	3972 (4)	13.4
4. Plant protection	358 (1)	393 (1)	1.2
5. Irrigation	3532 (4)	3618 (4)	2.9
6. Fertilizer including FYM	16572 (19)	16320 (18)	(-) 8.6
7. Land rent	20000 (22)	21333 (23)	45.5
8. Harvesting and stripping	8788 (10)	8788 (9)	-
9. Others	15192 (16)	15522 (17)	11.3
10. Total cost	90197 (100)	93128 (100)	100.0
<b>KPK</b>			
1. Land preparation	4301 (5)	4885 (6)	23.9
2. Seed and sowing operations	11711 (15)	10545 (13)	(-) 47.7
3. Intercultural and earthing-up	3715 (5)	4177 (5)	18.9
4. Plant protection	450 (1)	494 (1)	1.8
5. Irrigation	4867 (6)	5154 (6)	11.7
6. Fertilizer including FYM	10702 (14)	10931 (14)	9.4
7. Land rent	30000 (38)	31875 (39)	76.7
8. Harvesting and stripping	1751 (2)	1751 (2)	-
9. Others	10916 (13)	11046 (14)	5.3
10. Total cost	78412 (100)	80856 (100)	100.0

- Notes: 1. "Others" include mark-up, management, land tax, drainage cess and expected escalation in the cost of selected items.  
 2. Figures in parenthesis are percent shares in total cost.  
 3. Rounding off figures may result in slight differences.

27. The most important factors causing increase in the likely cost of production of sugarcane for the 2013-14 crop year in the Punjab, Sindh and KPK are higher hiring rates of farm operations, chemical fertilizer and land rental charges. However, decrease in the rates of

sugarcane seed in KPK has partially counter balanced the rise in cost of production of sugarcane in KPK for 2013-14 crop.

### **Punjab**

28. In the Punjab, land rent is the most leading constituent of the cost of cultivation of sugarcane for 2013-14 crop, contributing 29 per cent. The other constituents are: fertilizers including FYM & others (15 % each), land preparation and irrigation (10 % each), seed/sowing operations & harvesting and stripping (9 % each).

### **Sindh**

29. The major components of the cost of cultivation of sugarcane in Sindh during 2013-14 crop year are: land rent (23 %), fertilizer including FYM (18 %), others (17 %), seed and sowing operations (14 %), land preparation (11 %), harvesting and stripping (9 %).

### **Khyber Pakhtunkhwa**

30. Land rent is the foremost constituent of the cost of cultivation of sugarcane for the 2013-14 crop in KPK, contributing 39 per cent. The other component are: fertilizer including FYM and others (14 % each), seed and sowing operations (13 %), irrigation and land preparation (6 % each), interculture (5 %) and harvesting and stripping (2 %).

## **10. NOMINAL AND REAL INDICATIVE / MARKET PRICES OF SUGARCANE: 2000-01 TO 2012-13**

31. The nominal and real prices of sugarcane in the Punjab and Sindh for the period 2000-01 to 2012-13 are analyzed and presented in Tables 10 and 11. These prices are also depicted in Figures 4 and 5.

### **10.1 Nominal and Real Indicative / Market Prices of Sugarcane in Punjab**

32. The indicative prices of sugarcane in Punjab during the period 2000-01 to 2012-13 reflected an overall increase of 386 per cent from Rs 35 per 40 kgs in 2000-01 to Rs 170 in 2012-13. During the same period, the Consumer Price Index (CPI), the most commonly used measure of inflation in the economy, escalated by 185 per cent. Consequently, the real indicative price of sugarcane in 2012-13 is worked to Rs 59.58 per 40kgs, which shows a surge of 70 per cent over the real indicative price of Rs 35 in 2000-01. The real indicative price, during the reference period, fluctuated between Rs 32.79 per 40 kgs in 2004-05 and Rs 59.58 in 2012-13.

33. Nominal market price of sugarcane also showed a significant increase over the base year from Rs 45 per 40 kgs in 2000-01 to Rs 170 in 2012-13. For the 185 per cent escalation in cumulative CPI, the real market price of the crop turns into Rs 59.58 in 2012-13, showing an improvement of 32 per cent over the base year.

Fig- Nominal and Real Indicative Prices of Sugarcane Realized by growers in Punjab during 2000-01 to 2012-13

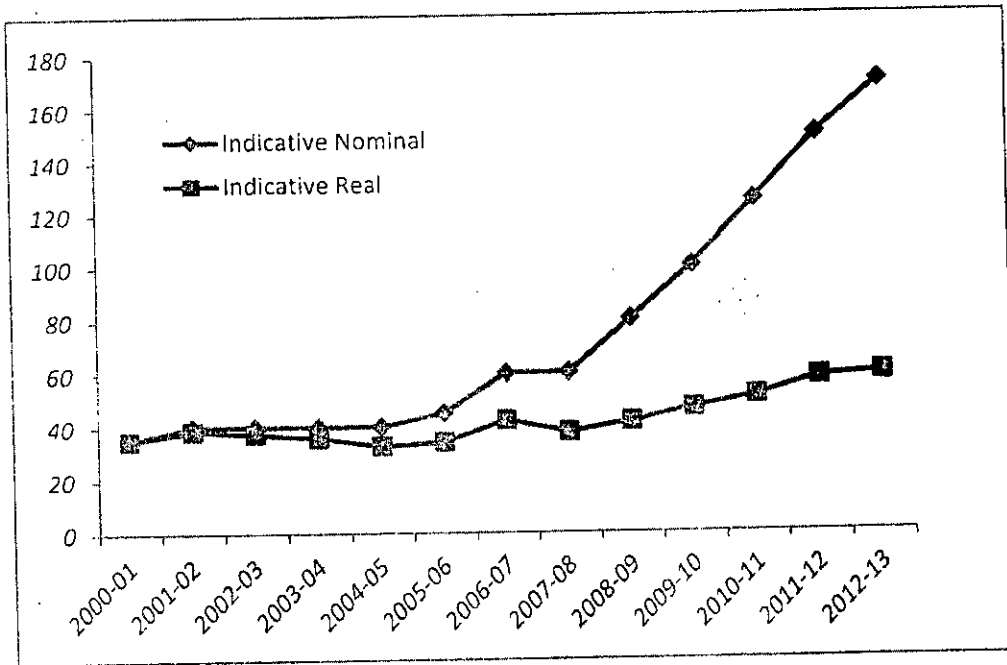


Fig- Nominal and Real Market Prices of Sugarcane Realized by growers in Punjab during 2000-01 to 2012-13

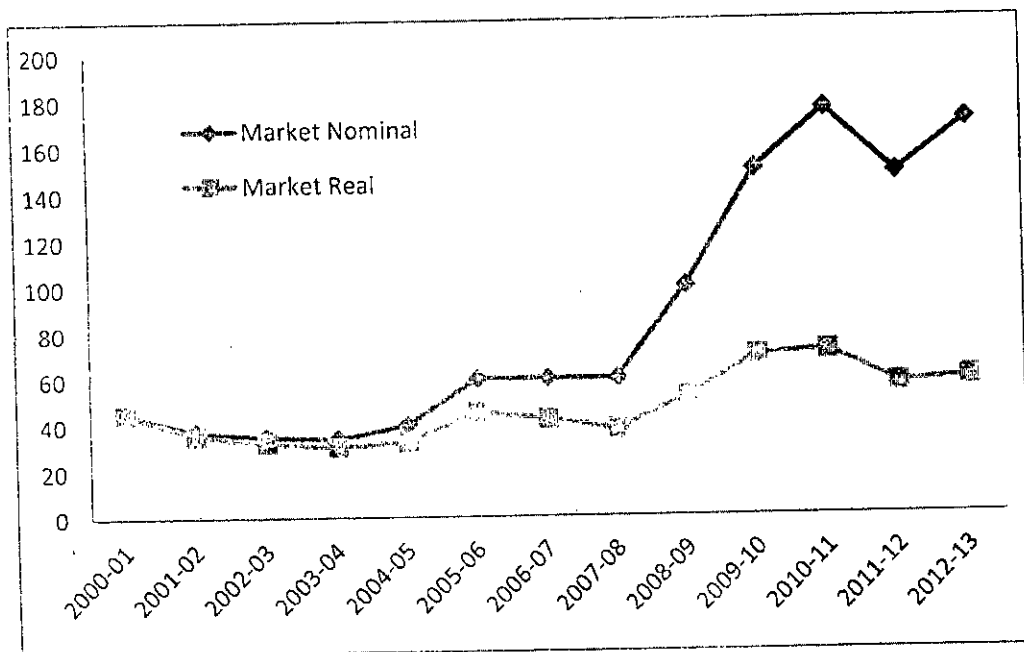


Fig- Nominal and Real Indicative Prices of Sugarcane Realized by growers in Sindh during 2000-01 to 2012-13

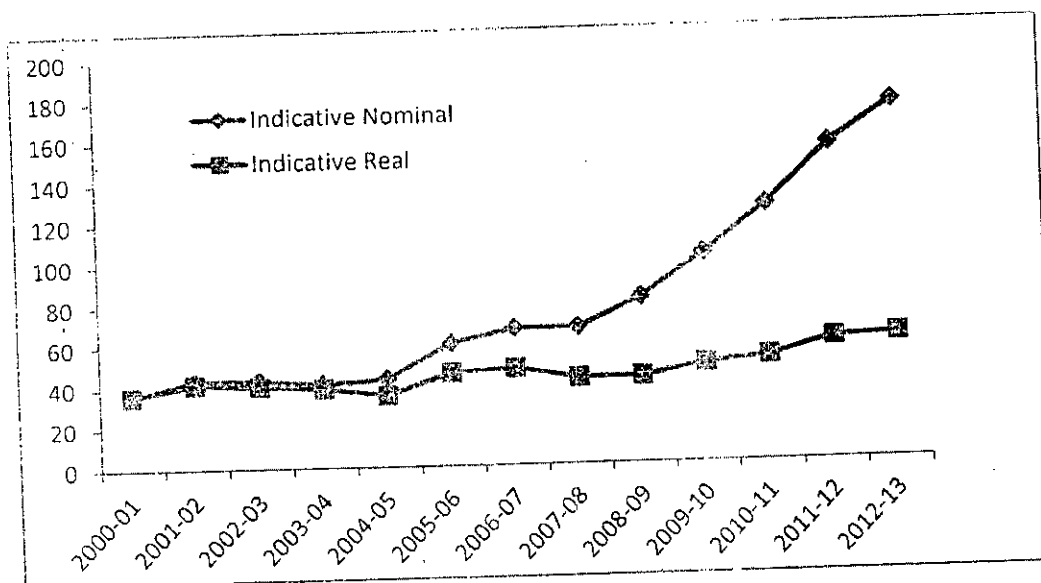
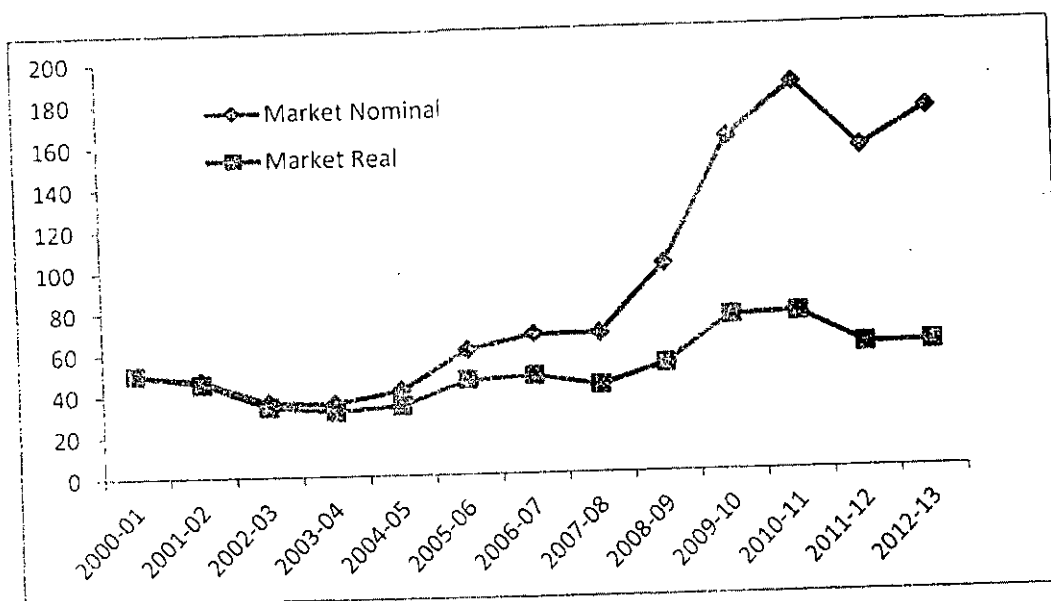


Fig- Nominal and Real Market Prices of Sugarcane Realized by growers in Sindh during 2000-01 to 2012-13



**Table-10: Nominal and Real Indicative / Market Prices of Sugarcane Realized by the Growers in the Punjab: 2000-01 to 2012-13**

Crop year	Nominal Prices		Consumer Price Index (CPI)	Real Prices	
	Indicative *	Market**		Indicative	Market
	---- Rs per 40 kgs ----		2000-01=100	---- Rs per 40 kgs ----	
1	2	3	4	5=(2/4)x100	6=(3/4)x100
2000-01	35	45	100.00	35.00	45.00
2001-02	40	37	103.54	38.63	35.73
2002-03	40	35	106.75	37.47	32.79
2003-04	40	34	111.63	35.83	30.46
2004-05	40	40	121.98	32.79	32.79
2005-06	45	60	131.64	34.18	45.58
2006-07	60	60	141.87	42.29	42.29
2007-08	60	60	158.90	37.76	37.76
2008-09	80	100	191.90	41.69	52.11
2009-10	100	150	212.41	47.08	70.62
2010-11	125	175	244.26	51.17	71.64
2011-12	150	148	258.32	58.07	57.29
2012-13	170	170	285.34	59.58	59.58

Notes: \* Indicative price of sugarcane at mill-gate fixed by the Provincial Government.

\*\*Prices of sugarcane actually realized by the growers reported during the API's field survey.

Sources: - 1. Price Policy Report for Sugarcane by API (various issues).  
2. Statistical Supplement, Pakistan Economic Survey, 2011-12.

34. It may be noted that the market price remained above the indicative price announced by the Punjab Government throughout the reference period except 2001-02 to 2003-04. However, in 2011-12, the nominal market price in Punjab averaged at Rs 148 per 40 kgs marginally lower than the indicative price of Rs 150 per 40 kgs. The real market price surged over 2011-12 price by 14 per cent in 2012-13 crop season.

## 10.2 Nominal and Real Indicative / Market Prices of Sugarcane in Sindh

35. The nominal and real indicative / market prices of sugarcane in Sindh for the period 2000-01 to 2012-13 are set out in Table-11 and also shown in Figure 5 and 6.

36. The nominal indicative price of sugarcane in Sindh during the period 2000-01 to 2012-13 has reflected a cumulative increase of 383 per cent from Rs 36 per 40 kgs in 2000-01 to Rs 174 in 2012-13. During the same period, the cumulative CPI has risen by 185 per cent. Consequently, the real indicative price of sugarcane for 2012-13 at Rs 60.98 per 40 kgs showed a surge of 69 per cent over 2000-01 crop. The real indicative price of sugarcane during the period has experienced ups and downs, touching the lowest level of Rs 35 per 40 kgs in 2004-05 and the highest level of Rs 60.98 in 2012-13 crop.

37. The nominal market price of sugarcane has observed an overall rise of 244 per cent during 2000-01 to 2012-13. During the same period, the cumulative CPI increased by 185 per cent. Consequently, the real market price of sugarcane in Sindh province recorded at Rs 60.28 per 40 kgs in 2012-13 shows an improvement of 20.56 per cent over the base year. During the period under study, the real market prices of sugarcane occasionally fluctuated but remained below the base year level except the last 5 years. Average nominal market price of



sugarcane in the main producing districts of Sindh recorded at Rs 172 per 40 Kgs during 2012-13 shows 11.7 per cent improvement over 2011-12 crop season.

**Table-11. Nominal and Real Indicative / Market Prices of Sugarcane Realized by the Growers in Sindh: 2000-01 to 2012-13**

Crop year	Nominal Prices		Consumer Price Index (CPI)	Real Prices	
	Indicative *	Market **		Indicative	Market
	--- Rs per 40 kgs ---		2000-01=100	--- Rs per 40 kgs ---	
1	2	3	4	5=(2/4)x100	6=(3/4)x100
2000-01	36	50	100.00	36.00	50.00
2001-02	43	47	103.54	41.53	45.39
2002-03	43	36	106.75	40.28	33.72
2003-04	41	35	111.63	38.73	31.35
2004-05	43	41	121.98	35.25	33.61
2005-06	60	60	131.64	45.58	45.58
2006-07	67	67	141.87	47.23	47.23
2007-08	67	67	158.90	42.16	42.16
2008-09	81	100	191.90	42.21	52.11
2009-10	102	160	212.41	48.02	75.32
2010-11	125	185	244.26	51.17	75.56
2011-12	154	154	258.32	59.62	59.62
2012-13	172	174	285.34	60.98	60.28

Notes: \* Indicative price of sugarcane at the mill gate fixed by the Provincial Government.

\*\* Prices of sugarcane actually realized by the growers collected through the API field survey.

Sources: - 1. Price Policy Report for Sugarcane by API (various issues).

2. Statistical Supplement, Pakistan Economic Survey, 2011-12

## 11. ECONOMICS OF SUGARCANE AND COMPETING CROPS

38. Resource allocation among the competing enterprises is primarily governed by the economic considerations reflected in their gross cost, gross income, gross margin, net income, output-input ratio, etc.

39. Sugarcane is planted in the irrigated regions of the country and being an annual crop, it competes for land, water and other farm resources with both the 'kharif' and 'rabi' crops. Economics of sugarcane and competing crops/crop combinations has been analyzed in terms of output prices received by the growers and input prices paid by growers during the 2012-13 crop year. Detail of the analysis is presented for the Punjab and Sindh provinces in Annex-VI. A summary of various economic indicators is provided in Tables-12 and 13.

### 11.1 Punjab

40. The Government of the Punjab announced an indicative price of sugarcane at Rs 170 per 40 kgs for 2012-13 season which was about 13 per cent higher than last year's price actually realized by the cane growers. Due to lucrative indicative price, sugarcane performed better than all crop combinations in terms of all economic criteria used in this analysis except returns to irrigation water where cotton + wheat and cotton + sunflower

rotations have an edge over sugarcane. While in terms of revenue per crop day, the returns to Basmati + sunflower combination was higher than sugarcane.

**Table-12: Economics of Sugarcane and Competing Crops at Prices Realized by the Growers for 2012-13 crop in the Punjab Province**

Competing crops/ combinations	Output-input ratio	Gross revenue per		
		Rupee of purchased inputs cost	Day of crop duration	Acre-inch of irrigation water used
----- Rupees -----				
1. Sugarcane	1.23	3.84	225	1846
2. Cotton + wheat	1.09	2.82	203	2503
3. Cotton + sunflower	1.10	2.83	217	2074
4. Basmati + wheat	1.11	2.44	219	1126
5. Basmati + sunflower	1.13	2.46	236	1062
6. IRRI + wheat	1.08	2.45	204	994
7. IRRI + sunflower	1.10	2.47	221	949

Source: Annex-VI.

## 11.2 Sindh

41. Similarly, the growers in Sindh have also received about 13 per cent higher indicative price of sugarcane during 2012-13. Accordingly, the farmers received higher returns in sugarcane farming than the competing crops in terms of all economic criteria adopted in this analysis except irrigation water where the cotton combinations with wheat and sunflower edged over sugarcane. In terms of returns to crop day, the rotation of IRRI + sunflower performed better than sugarcane.

**Table-13: Economics of Sugarcane and Competing Crops at Prices Realized by the Growers in for 2012-13 Crop in Sindh**

Competing crops/ combination	Output- input ratio	Gross revenue per		
		Rupee of purchased inputs cost	Day of crop duration	Acre-inch of irrigation water used
----- Rupees -----				
1. Sugarcane	1.28	3.80	223	1530
2. Cotton+wheat	1.15	3.09	195	2729
3. Cotton+sunflower	1.17	3.48	220	2306
4. IRRI+wheat	1.21	3.04	206	1092
5. IRRI+sunflower	1.22	3.02	235	1085

Source: Annex-VI.

## 11.3 Economics of Sugarcane: Inter Provincial Comparison

42. In view of its longer duration, sugarcane crop in Sindh province requires more water and other inputs as compared to Punjab. Chemical fertilizers in Sindh are used on higher side by 86 per cent in nitrogenous and by 15 per cent in phosphatic ingredients. Similarly, the cost of purchased inputs is also higher in Sindh by about 24 per cent (Table-14).

43. The higher yield of Sindh by 20 percent over Punjab may be explained in terms of relatively greater use of inputs. Overall returns to purchased inputs and crop duration are relatively higher in Sindh. However, the returns to water used for the crop in Sindh are less than Punjab. Thus it may be ascertained that the water use efficiency in Sindh lags behind as compared to Punjab.

**Table-14: Inputs Use Level and Yield of Sugarcane in Sindh versus Punjab: 2012-13 Crop**

Item	Unit	Sindh	Punjab	Difference of Sindh over Punjab (Per cent)
Crop duration	Crop days	488	394	24 (+)
Irrigation water	Acre-inches	71	48	48 (+)
Cost of purchased Inputs	Rs/acre	28,582	23,063	24 (+)
Fertilizer Use:				
N	Nutrient Kgs/acre	104	56	86 (+)
P	//	39	34	15 (+)
Crop yield	40 kg /acre	676	565	20 (+)

## 12. IMPACT OF INCREASE IN SUGAR PRICE ON CONSUMER PRICE INDEX (CPI)

44. Expenditure on sugar is one of the important items in average household budget. Sugar is also included in the basket of goods used in estimating the Consumer Price Index (CPI). Any change in sugar price affects the household budget and CPI as well. The details of analysis are presented in Annex-VII, while a summary of the results is given in Table-15.

### 12.1 Impact on CPI

45. The Pakistan Bureau of Statistics (PBS) has estimated the changes in CPI as a result of increase in sugar price over the base price of Rs 47 per kg. The impact of increase in sugar price on CPI is given in Table-15.

46. It is evident from Table-15 that every increase of rupee 1 per kg over the base price of Rs 47 per kg is expected to raise the CPI by 0.02 per cent, other things remaining the same. Accordingly, the CPI is likely to increase by 0.11 and 0.22 per cent, if sugar price is increased by Rs 5 and Rs 10 per kg.

### 12.2 Impact on Household Expenditure

47. According to the Household Integrated Economic Survey (HIES) during 2010-11 by the PBS, average household in Pakistan consists of 6.38 members. The annual per capita availability of sugar based on the Balance Sheet Method has averaged at 24 kgs during the last three years. In view of per capita sugar availability @ 24 kgs per annum and average household size of 6.38 members, the impact of the selected increases in sugar price on the average household expenditure has been presented in Table-15. It may be seen that every increase of Re 1 in sugar price over the base level of Rs 47 per kg would increase the annual

expenditure by Rs 24 per head or Rs 153 per household, other things remaining the same. Accordingly, an increase of Rs 5 and Rs 10 over the base level would increase the per head expenditure by Rs 120 and Rs 240 per annum and average household expenditure by Rs 765 and Rs 1531 per annum.

**Table-15: Impact of Increase in Sugar Price on CPI and Household Expenditure**

Sugar price Rs per kg	Rise in CPI Per cent	Increase in annual expenses on the basis of average per capita sugar availability @ 24 kgs per year	
		Per person	Per household
47 (Base price)		----- Rupees -----	
48	0.02	24	153
49	0.04	48	306
50	0.07	72	459
51	0.09	96	612
52	0.11	120	765
53	0.13	144	918
54	0.15	168	1072
55	0.17	192	1225
56	0.20	216	1378
57	0.22	240	1531

Note: Average size of household comprises 6.38 members.

Sources: 1. Pakistan Bureau of Statistics (PBS), Karachi.  
2. Annex-VIII and IX.

### 13. Economic Efficiency of Sugarcane Production in Pakistan

48. Economic efficiency of a crop is generally assessed by the magnitudes of the Nominal Protection Coefficient (NPC), Effective Protection Coefficient (EPC) and Domestic Resource Cost Coefficient (DRC). For the sugarcane crop 2013-14 these parameters are studied under import situation as Pakistan is not a regular sugar exporting country rather has sometimes imported sugar in the past. The said parameters are based on the cost of production of sugarcane (2012-13 crop). To ascertain the overtime changes in input/ output prices, domestic and international sugar prices and crop revenues, the analysis is done for previous six years i.e 2008-09 to 2012-13. For studying resource use efficiency differentials within the country, the analysis is conducted for the main sugarcane producing provinces i.e Punjab and Sindh. Numeric of the above referred three parameters under import situation are produced in table 16 while background analysis is placed at Annex VIII to X.

#### 13.1 Under import scenario

##### Nominal Protection Coefficient (NPC)

49. Nominal Protection Coefficient is the ratio between the nominal price of sugarcane in the domestic market and the corresponding social price. In this calculation the social price is the denominator. By definition social price is the import or export parity price of the commodity minus market charges (transport charges) from farm to the mill gate.

50. Basically, NPC indicates the level of implicit taxation or protection incurred to a crop in lieu of its domestic price. As a rule of thumb, if the NPC is less than one, it means producers of the crop in the country are not getting economic price i.e import parity price and are implicitly taxed. On the other hand if NPC is greater than one, it means that local farmers are getting price more than the import parity price and are protected through the crop pricing policy. The former situation discourages the crop while the latter encourages its production.

51. It is obvious from table 16 that sugarcane growers in Punjab are implicitly taxed because NPC value throughout the analysis period has been less than one except in 2012-13 wherein NPC improved to 1.21. This may be attributed to an increase in domestic price of sugarcane in 2012-13. In 2011-12 it was Rs. 149/ 40 Kg while in 2012-13 it rose to Rs. 170/ 40 Kg. At the same time import parity price decreased from Rs. 177 in 2011-12 to Rs. 154/ 40 Kg in 2012-13. Consequently in relative terms social price decreased and as social price is the denominator in NPC calculation, resultantly NPC increased. However, situation for the Sindh province is slightly different. NPC for 2008-09 is found higher than one. Its main reason is the relatively higher sugarcane price during this year in Sindh. The NPC coefficients on the whole imply that substitution of imported sugar with domestic sugar is a valid proposition for Pakistan.

**Table-16 Economic Efficiency Indicators for Sugarcane in Pakistan**

Province/ Year	Under import situation			Under export situation		
	NPC	EPC	DRC	NPC	EPC	DRC
<b>Punjab</b>						
2008-09	0.72	0.64	0.30	0.72	0.65	0.30
2009-10	0.78	0.75	0.29	0.77	0.72	0.28
2010-11	0.78	0.72	0.29	0.93	0.89	0.36
2011-12	0.90	0.83	0.63	1.05	1.02	0.77
2012-13	1.21	1.28	0.87	1.43	1.61	1.10
<b>Sindh</b>						
2008-09	1.07	1.05	0.49	0.86	0.78	0.53
2009-10	0.79	0.76	0.24	0.50	0.41	0.24
2010-11	0.78	0.76	0.29	0.62	0.52	0.34
2011-12	0.93	0.92	0.60	1.08	1.08	0.74
2012-13	1.20	1.25	0.78	1.44	1.74	1.13

Source: Annex VIII and IX

#### Effective Protection Coefficient (EPC)

52. Effective Protection Coefficient is the ratio between the value added in producing a commodity at private prices and at social prices. Unlike the NPC, which ignores the input costs, EPC includes both input costs and crop revenues in its calculation. Thus EPC is a more meaningful measure for analyzing protection or taxation to a given crop or sector. In the formula of EPC, numerator is crop revenue minus traded inputs cost at private prices and denominator is crop revenue minus traded inputs costs at social prices. The findings of EPC analysis and their implications are produced in the above table.

53. It is clear from the table that under import situation, EPC values on the whole are less than one. It is above one only for Punjab in 2012-13 and for Sindh in 2008-09 and 2012-13. The underlying reason is that domestic price of sugarcane increased from Rs. 149/40 Kg in 2011-12 to Rs. 170/40 Kg in 2012-13. Contrarily import parity price decreased from Rs. 165/40 Kg in 2011-12 to Rs. 140/40 Kg in 2012-13. Thus due to decreased denominator EPC increased above one. The same situation also occurred in other years where EPC is above one. It is concluded from the EPC estimates that sugarcane growers on the whole are implicitly taxed which impede promotion of the crop in the country. For improvement of the crop domestic market price will have to be increased at par with the import parity price of sugarcane.

#### **Domestic Resource Cost Coefficient (DRC)**

54. Domestic Resource Cost Coefficient (DRC) is an economic indicator of comparative advantage in a crop or sector. Like NPC and EPC, this is an estimate which is achieved by dividing the non-traded inputs costs at social prices by the difference of the crop revenue and the traded inputs costs at social prices. Thus it indicates the opportunity cost of domestic resources used per unit of the value added at social prices in the production of a commodity. DRC coefficient greater than one indicates comparative disadvantage in a crop and the vice versa. A situation of DRC less than one implies comparative advantage in a crop or sector as it can save/ generate foreign exchange at costs less than the corresponding cost of import. The DRCs estimated under the import scenario (table-16) are less than one throughout the period under analysis both for Punjab and Sindh. It means that sugarcane in both provinces is efficient in terms of the cost of domestic resources employed in its production.

### **13.2 Under export scenario**

#### **Nominal Protection Coefficient (NPC)**

55. Nominal Protection Coefficient (NPC) values both for Punjab and Sindh are presented in table-16. The NPC Coefficients from 2008-09 through 2010-11 both for Punjab and Sindh are less than one. Less than one value of NPC implies that the sugarcane producers have got prices for their produce less than the respective export parity price. But during the succeeding two years i.e 2011-12 and 2012-13, NPC values exceeded one in both provinces which means that domestic sugarcane prices during these two years were higher than the corresponding export parity price. The results for these two years imply that sugar production for export, should not be a priority for Pakistan.

#### **Effective Protection Coefficient (EPC)**

56. The EPC statistics produced in the above referred table also supports the conclusion drawn in the above paragraph that production of sugar for export purpose is not a valid proposition for Pakistan because EPC values for the last two years for both Punjab and Sindh are found higher than one. It means that during these two years sugarcane producers in Pakistan got price for their produce higher than the respective export parity price. Thus they were implicitly protected through the price policy while during the earlier years they were implicitly taxed.

### Domestic Resource Cost Coefficient (DRC)

57. As already mentioned that Domestic Resource Cost Coefficient is a measure of the comparative advantage, a country has in a particular crop. As a decisive rule if DRC is less than one, the country does not have comparative advantage in the crop and the vice versa. It may be noted that DRC values in both Punjab and Sindh in table -16 are less than one, except last year. In means Pakistan does not have comparative advantage in producing sugar for export purpose and thus the productions may be confined to domestic consumption only.

## 14. DOMESTIC DEMAND, SUPPLY, STOCK AND PRICES OF SUGAR

### 14.1 Domestic demand, supply and stocks

58. The sugar production from 2012-13 crop has been estimated at 5.036 million tones. Adding 1394 thousand tones of leftover stocks from 2011-12, the total sugar supply for 2012-13 consumption year is estimated to 6.430 million tones. Based on average per capita availability of sugar estimated at 22.13 kgs during 2010-12, total domestic requirement for a population of 191.81 million has been worked at 4.245 million tones for 2012-13 consumption year. The sugar year ends on September 30 each year. Hence there is an estimated 2.185 million tones surplus sugar is available at country level. Annex-X may be seen.

### 14.2 Behavior of sugar prices in domestic market

59. The monthly average wholesale prices of sugar in major domestic markets during 2012 and 2013 (Jan - May) are given in Annex-XI, while for the last 13 years in Annex- XII. These prices have shown a volatile pattern during the period under review averaging at Rs 5072 per 100 kgs in 2012. However, the sugar price decreased during 2013 (January to May) averaging at Rs 4968 per 100 kgs.

## 15. WORLD SUPPLY, DEMAND, STOCKS, TRADE AND PRICES OF SUGAR

### 15.1 Supply, demand, stocks and trade

60. The data on world balance sheet of sugar (raw equivalent) for the period of 2010-11 to 2012-13 are presented in Table-17:

**Table-17: World Balance Sheet of Sugar (Raw Equivalent):2010-11 to 2012-13 (Oct-Sept)**

S.No	Item	2010-11	2011-12 (Estimated)	2012-13 (Forecast)	Changes 2012-13 over 2011-12
		----- Million tonnes -----			Per cent
1.	Opening stocks	61.3	62.9	65.6	(+)4.29
2.	Production	165.6	175.2	180.0	(+)2.74
3.	Total supply (1+2)	226.9	238.1	245.6	(+)3.15
4.	Disappearance (consumption)	159.8	169.8	173.5	(+)2.18
5.	Stock Adjustment*	4.2	2.7	2.7	0.00
6.	Ending stocks	62.9	65.6	69.4	(+)5.79
7.	Trade (export)	54.8	52.5	51.1	(-)2.67

Note: \* Including adjustment for unknown net trade of 2.7.

Source: Food Outlook, FAO, June, 2013.

61. The world sugar production during 2011-12 was estimated to be 175.2 million tones, 9.6 million tones (5.78 per cent) higher than the last year level of 165.6 million tones. Accounting for the opening stocks of 62.9 million tones, global supply of sugar in 2011-12 was reported to be 238.1 million tones (4.9 per cent) higher than 2010-11. The world consumption in 2011-12 is 6.26 per cent higher than last year. End year stocks in 2011-12 were settled at 65.6 million tones, 4.29 per cent higher than last year.

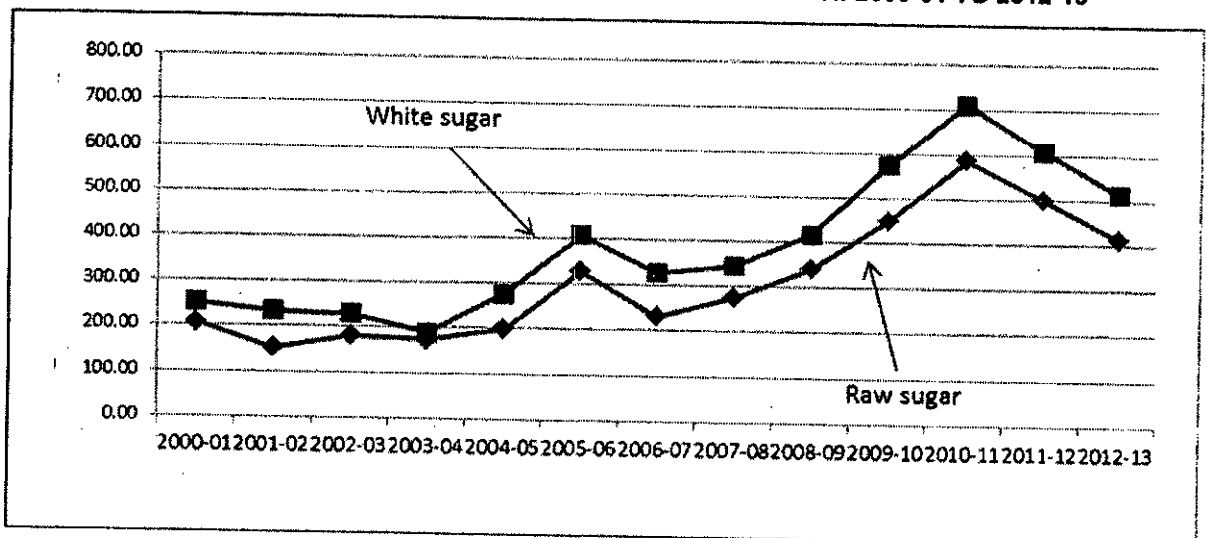
62. World sugar production during 2012-13 is forecast at 180 million tones, 2.74 percent higher than last year production. Accounting for the opening stocks of 65.6 million tones, global supply of sugar in 2012-13 is projected at 3.15 percent higher than 2011-12. The world consumption in 2012-13 is projected at 173.5 million tones, 2.18 per cent higher than last year. End year stocks in 2012-13 are projected to further increase at 69.4 million tones.

### 15.2 International Prices of Sugar

63. The international prices of raw (fob Caribbean ports) and white (fob London) sugar from 2000-01 to 2012-13 are presented in Annex-XIII while their graphical movement shown in fig 7.

64. The prices of both raw and white sugar have fluctuated during the period under review. During 2001-02, the prices of raw sugar averaging at US \$ 232.48 per tone declined to \$ 179.03 per tone in 2002-03. The price recovered sharply and jumped to \$ 327.14 per tone in 2005-06 but again declined to \$ 229.90 in the next year. From 2007-08 prices started to move upward and averaged at \$ 585.45 per tone in 2010-11, the highest level of price during the period review. During 2011-12 prices declined slightly to \$ 499.96 per tone. In the current season 2012-13 (Oct- May) prices showed further down ward trend. The prices of white sugar during the same period have followed similar pattern as that of raw sugar.

Figure No. 7 INTERNATIONAL PRICES OF RAW AND WHITE SUGAR: 2000-01 TO 2012-13



65. International Price behavior of sugar during the month of July 2013 till the completion of this document is given in table 19 below. Price in international market has been declined from 17.26 cents/lb or \$ 380.50 recorded on 1<sup>st</sup> July 2013 to 16.59 cents/lb or \$



365.7 settled on 12 July 2013. Prices of refined sugar have also been declined during the same dates from 490.50 \$ /tone to 470.60 \$ /tone. Average prices of 12 days for raw equivalent and refined sugar have been set at \$ 372 / tone and \$ 482.29 / tone respectively.

**Table 18. Daily Prices of ISO on 13 July 2013**

Date	ISA Daily Price *	ISA Daily Price *	15 Day Average +	White Sugar Price Index **	
	cts/lb	\$/tone		\$/Tone	cts/lb
1/7/2013	17.26	380.5	17.16	490.50	22.25
2/7/2013	17.10	377.0	17.18	486.55	22.07
3/7/2013	16.96	373.9	17.19	486.90	22.90
4/7/2013	16.89	372.4	17.20	485.70	22.03
5/7/2013	16.81	370.6	17.17	484.45	21.97
8/7/2013	16.86	371.7	17.13	485.35	22.02
9/7/2013	16.86	371.7	17.10	485.15	22.01
10/7/2013	16.77	369.7	17.06	477.30	21.65
11/7/2013	16.63	366.6	17.05	470.35	21.33
12/7/2013	16.59	365.7	17.01	470.60	21.35
<b>Average</b>	<b>16.87</b>	<b>372.0</b>	<b>17.13</b>	<b>482.29</b>	<b>21.96</b>

Source International Sugar Organization (ISO)

## 16. IMPORT AND EXPORT PARITY PRICES OF SUGARCANE

66. Estimation of import parity price of a commodity is helpful in determining the opportunity cost of resources used in its domestic production while the export parity prices are helpful in ascertaining its competitiveness in the international market. Since Pakistan has been importer of sugar in some years and exporters in the others, both the import and export parity prices of sugarcane have been worked out for analyzing price policy options for the next crop season.

67. Both the import and export parity prices have been calculated on the basis of white sugar price (fob London). Detailed calculations in this connection are given at Annexes-XIV and XVI, while the results are summarized in Table-19.

**Table-19: Import/Export Parity Prices of Sugarcane as Worked Back from Average fob (London) Prices of Sugar**

Average fob London prices of white sugar per tonne	Sugarcane prices (Rs/40 kgs)	
	Punjab	Sindh
<b>Import parity</b>		
US \$ 482.80 (May 2013)	145.90	146.50
US \$ 512.84 (Oct 2012 to May 2013)	153.66	154.29
US \$ 643.34 ( 2009-10 to 2011-12)	186.93	187.70
<b>Export parity</b>		
US \$ 482.80 (May 2013)	117.16	117.64
US \$ 512.84 (Oct 2012 to May 2013)	124.62	125.13
US \$ 643.34 ( 2009-10 to 2011-12)	157.01	157.66

Source Annexes -XI and XIII

**17. MILL-GATE PRICES OF SUGARCANE BASED ON DOMESTIC WHOLE SALE PRICES OF SUGAR DURING 2010-11 CONSUMPTION YEAR**

68. Sugarcane prices have also been estimated from the wholesale prices of sugar during 2012-13 consumption year and presented in Table-21. This analysis is based on actual sucrose recovery as reported by the PSMA; processing cost of sugar and General Sales Tax @ 17 percent. A summary of sugarcane prices estimated under this scenario from various wholesale prices of sugar is presented in Table-21 while the details are given in Annex - XVI.

**Table- 20: Sugarcane Prices Estimated from Expected Wholesale Prices of Sugar During 2013-14**

Wholesale prices of sugar (Rs /Tonnes)	Sugarcane prices (Rs/40 Kgs)	
	Punjab	Sindh
Rs 50000	104.84	105.28
Rs 55000	115.33	115.80
Rs 60000	125.81	126.33

**18. SUGAR BEET AN ALTERNATIVE CROP TO SUGARCANE?**

69. The Agriculture Policy Institute has always tried to facilitate high net returns to growers but without much success, area under sugarcane has been stagnant around one thousand hectares during last seven years.

70. Higher prices and limited crop inputs such as fertilizers, insecticides and irrigation water, low crop price and delayed payments by sugar millers are some of the impediments in expansion of area under sugarcane cultivation in the country. Owing to climate change that is affecting sugarcane output, sugar beet can be an alternative cum supplement to increase sugar production. Hence there is a strong need to devise a policy, both at the federal and provincial level, to promote sugar beet as a supplement to sugarcane for sugar production in the country.

71. Beet is basically a crop of temperate origin but after a decade's effort, cultivation in tropical and sub-tropical areas have been made possible. Tropical sugar beet cultivars are grown in winter unlike summer crops in temperate areas. The crop has the capacity to produce the same amount of sugar within short duration even in half of the time using one-third of water required for sugarcane. Shorter crop duration also saves labor cost and expenditure on plant protection measures. One sugarcane crop needs water 30 times while sugar beet crop needs water only 8 times. In view of the water problem, high water-requiring crop of sugarcane can be replaced with lower water-requiring crop such as sugar beet.

72. Sugar beet can grow equally better in marginal saline soils due to its halophytic nature. Even Na<sup>+</sup> fertilizer is recommended in sugar beet cultivation where already available Na<sup>+</sup> is less in soil. Sugar beet can also be used for reclamation of saline-sodic and sodic soils because it accumulates considerable amount of Na<sup>+</sup> in its leaves and helps in its removal from salt-affected fields.

73. Growing conditions are similar to winter crops with 5-10 °C temperature for its germination and relatively high temperature during vegetative growth with optimal of 25-30°C. Sugar beet can also tolerate high temperature up to 40 °C but prolonged exposure to high temperature can result in yield losses.

74. Sugar beet can produce almost two times higher sugar yield per hectare with less water and other input resources in a short period of four to six months as compared to sugarcane that needs a long growth period. Per hectare sugarcane output is about 500 maunds while sugar beet per hectare output is 600 maund. The sucrose level in sugar beet is about 11 percent compared to 9 percent in sugarcane. New hybrid sugar beet seeds should be used so that per acre production could be increased.

75. Basic crop production technologies need to be developed under local conditions. International seed companies are working to optimize their cultivars in various districts of Pakistan. Beet sugar contents also vary with crop duration and optimizing cultivars with sowing date in different areas is of prodigious significance.

76. Now it is the appropriate time to promote sugar beet cultivation on a large scale to avoid looming sugar crisis under water shortage. Despite continuing water shortage, the growers and mill owners should take steps to promote sugar beet production and crushing in the country. All the other Kharif Crops are not replaceable, but sugarcane could easily be replaced with sugar beet, which would help maximisation of land use and consumes less water compared to sugarcane.

77. It is pertinent to mention that sugar beet cultivation in Khyber Pakhtunkhwa was tried in the 1960s which proved successful. In 2007, some districts of KPK, Punjab and Sindh were found suitable for sugar beet production. Tropical sugar beet cultivars have high adaptability in these areas with similar yield potential as in temperate areas.

78. Few sugar mills are operating in the KPK province and have added plants to their factories for the manufacturing of sugar from sugar beet. The sugar beet cultivation in the province not only helped in more sugar production for the country, but also in generating income for the growers in the province. Sugar beet contributes about 20 percent of the world sugar production, with sugarcane contributing 80 percent. It should be noted that at present, KPK occupies 98 per cent of the national sugar-beet area and contributes 99 per cent of the total sugar-beet production in the country.

79. Farming communities should strive to replace sugarcane crop with sugar-beet to increase per acre production, to save water and maximize land utilization. It is said that entire country is suitable for the cultivation of sugar-beet by replacing sugarcane. Climatic conditions of lower Sindh and some parts of Punjab were also suggested favorable to the crop conditions similar to Nile delta valley of Egypt, where commercial sugar beet production has been successful for many years.

80. Sugarcane is the main source of sugar production in the country and the industry is entirely dependent on the availability of sugarcane whereas the crop is a high delta crop, notorious for its lavish water use and occupies land for 12 months in Punjab and 18 months in Sindh. If Pakistani farmers begin cultivating sugar beet as a comparative advantage, it is a low delta crop and occupies land for 4-5-months.
81. About cultivation of sugar beet in Sindh, crop experts have warned that farmers should avoid taking any hasty decision of shifting cultivation of sugarcane to sugar beet, as their decision may prove counter-productive both for the growers and as well as for the industry. They have advised the farmers to consider pros and cons before deciding to go for mass scale beet plantation.
82. Factually, it should be ecology of the region that needs to dictate the cropping pattern of that particular locality. It must not be just experiments that force a shift in the decades old prevailing cropping pattern of the region. Even if the ecology of an area favours the production of an industrial crop such as sugar beet, it is not economically viable to grow it on mass scale in the absence of required industrial support.
83. In order to gear-up the existing sugar mills for additional beet sugar processing facilities, it would require an investment of around Rs. 350 million per mill mainly in foreign exchange. This is quite a heavy investment, which the mill owners are not willing to spend as introduction of sugar-beet cultivation on a commercial scale. Discontinuing the cultivation of sugarcane is not very certain and the economic and technical viability of the project is also a big question mark.
84. There are only three sugar mills in KPK designed to process beet in Pakistan. The processing of beet sugar requires different equipments for extraction and processing. Therefore sugar mills are reluctant to extend operation in any form to introduce cultivation of sugar beet as they do not have required beet processing facilities with them.
85. In 2007 studies declared sugar beet cultivation in KPK very promising for sugar production but it didn't prove to be as well as it was claimed. The past history and performance of 40 years of sugar beet cultivation and its processing in the KPK shows an erratic performance i.e. production fluctuation between 5,000 to 40,000 tonnes per annum and a very low capacity factory operation due to non-availability of sugar beet. This dismal history of beet production in most suitable area of the country is a discouraging factor. Table No. 22 shows sugar beet crushed by the sugar mills which have modified their plants for crushing of sugar beet. In the year 2002-03 there were three sugar mills which were crushing sugar beet but in 2011-12 only two sugar mills have the capacity of crushing beet and producing only 18216 tones sugar. However, their rate of recovery is better than their recovery from sugarcane.
86. No doubt that cumulative water requirement of sugar beet is almost half but there is still a need to explore watering of both crops with reference to permanent wilting point of the respective crops. Although beet needs eight watering during its four months cultivation

period against cane that needs only four during its entire one year cultivation time, the latter is reported to survive even after two watering, whereas the former cannot sustain in case of water shortage.

**Table 21. Beet Sliced, Sugar and Molasses Produced 2002-03 to 2011-12**

Year	No of Sugar Mills	Beet Sliced Tones	Sugar Made Tones	Recovery in %	Molasses Made
2002-03	03	222063	22066	9.94	8490
2003-04	03	250171	23797	9.51	8684
2004-05	02	120903	11373	9.41	4287
2005-06	02	93518	8934	9.55	3404
2006-07	01	83580	7143	9.04	2973
2007-08	01	64095	5532	8.80	2576
2008-09	01	9310	947	10.55	419
2009-10	02	53336	4641	9.15	2140
2010-11	02	151265	13535	8.95	7027
2011-12	02	176709	18216	10.31	8392

Source Pakistan Sugar Mills Associations

87. Germ plasm suitability under identical locations needs testing for optimization and developing cultivars under local conditions. Proper nutrient management practices such as potassium and nitrogen is of great importance for beet-maturity time and sucrose concentration to harvest good quality beet.

88. Under the current energy crisis, problems can be faced during sugar beet processing which demands high energy and therefore cost of sugar production can be increased. Another problem is quick disposal of sugar beet to avoid its decomposition owing to high temperature at the time of harvesting. The time of sowing and harvesting can be modified by selecting suitable cultivars and proper nutrient management. Installation of beet processing and sugar production units near beet growing areas can minimize this loss.

89. Moreover proposed shifting from sugarcane to beet would entail scrapping of all the research efforts and results obtained during last 50 years for the development of high yielding, pest resistant and higher sucrose content sugarcane varieties. Ultimately this shifting would wind up the National Sugarcane Research Institutes thereby rendering valuable services of sugar scientists futile.

90. An important factor which needs to be considered is that sugar beet being a Rabi crop will compete for water with wheat the major Rabi crop when the water supply is much lower than that of Kharif season in the country. As our farmers already get a fixed water allocation during both seasons, therefore if the farmers are compelled to grow sugar beet then they will have to offset wheat cultivation, which will not be an economical option both for farmers and the country.

91. All these factors should have to be given due thought by the farming communities and sugar mills before an enforcement of a change in cropping pattern is resorted to, as any forced shifting will bring negative impacts for the national sugar industry.

## 19. MARKETING OF SUGARCANE ----- ISSUES AND SOLUTIONS

92. Sugarcane is an important cash crop of Pakistan. It is mainly grown for sugar production in the country. It is an important source of income and employment for the farming community. It is also an essential item for industries of sugar, chip board, paper, beverages, confectionery, chemicals, plastics, paints, synthetics, fibre, insecticides and detergents. In view of its perishable nature, the marketing of sugarcane faces various problems. To ascertain the situation regarding marketing of sugarcane, the API conducted a field survey in the main sugarcane growing areas during March-April 2013. The survey teams interviewed cane growers, sugar mills management and crop experts. Moreover, a meeting of the API's Committee on Sugarcane was held on 11-6-2013 at Islamabad. Various matters relating to cane marketing were discussed in detail. The problems faced by the growers in marketing of sugarcane are discussed as under:

### **Delayed Payments**

93. Farmers could not avail the benefits of the indicative price announced by the Punjab and Sindh governments for the 2012-13 crop. The price was Rs. 170/40 kgs for Punjab and Rs. 172/40 kgs Sindh. However, it was ascertained in the API annual meeting that actually farmers could not get this price in Punjab. Sugar mills were not making payments in time. Consequently, farmers had to make a deal with the sugar mills staff deputed at the procurement centers to sell their cane to receive quick payments from the sugar mills. For this, they agreed to pay 5-12% commission to the sugar mills, inflicting a considerable loss to the farmers.

94. Farmers are facing severe problems in obtaining their payments from the sugar mills despite considerable elapse of the time they have not been able to get their payments whereas Sugarcane Act obligates the sugar mills to make payments within 15 days. Delayed payment behavior of the mills is adversely affecting other crops. Farmers are unable to purchase the required inputs etc. The mills are of the view that this happens due to liquidity problems.

95. Thus, there is a need to improve the cash flow position of sugar mills for timely payment to the cane growers. Ministry of Industries and NFS&R may coordinate with the provincial governments to assure immediate payments of pending dues to the sugarcane growers. In future, provincial governments should take necessary actions to assure implementation of the indicative price by involving district administration. Respective DCOs may be directed to ensure implementation of indicative price in real sense in their jurisdictions.

### **Supply of Sugarcane**

96. There was a comfortable supply of sugarcane to the sugar mills in the country during 2012-13 crushing season. No shortage of cane supply to any sugar mill in the survey area in the Punjab, and KPK has been reported. However, in Sindh situation was a bit different due to establishment of new sugar mills, Demand was more than supply. Sugar mills took advantage of de-zoning and middlemen played their role in purchasing sugarcane from neighboring districts of Punjab by paying a price more than the government's indicative price to growers. On the whole supply position of sugarcane was satisfactory but less than the crushing capacity of sugar mills.

97. The only way to meet the requirement of the industry is improvement of sugarcane yield. In this regard AARI has developed new varieties which can give better results of yield. Farmers Associations, NGOs, should consult AARI and purchase hybrid seeds of sugarcane.

### **Price paid by sugar mills to cane farmers**

98. Sugar mills in the Punjab, by and large, were paying Rs 170 per 40 kgs at the mill gate. Price of cane paid by the mills in Sindh is reported around Rs 172 per 40 kgs including quality premium and transport subsidy. This price was paid to middlemen only. Farmers got less price around 150 to 160 per 40 kgs. In KPK sugar mills almost paid Rs 170 per 40 kgs at the mill-gate. However, in some gur making areas, Rs 184 per 40 kgs of cane price have also been reported at the mill gate in competition with gur making factories. It is suggested that to minimize the role of middlemen, mills should sign supply contract directly with farmers.

### **Under weighing**

99. The under weighing of sugarcane at purchase centres and the mill-gate is reportedly a common practice on part of the mills, their agents and the private purchase centres. The scales and weighbridges installed at the procurement centers do not record the correct weight. The extent of under weighing varies from place to place for each mill. The growers have alleged that under weighing was up to the extent of 7-8 per cent. The district governments may install their own weighbridges to solve this problem and ban the use of temporary weighbridges at purchase centers. Provincial Sugarcane Commissioner should take immediate action for the correctness of weighbridges.

### **Undue Deductions**

100. It has been noticed that mills are making deductions on the plea that poor quality cane with high trash content is brought by the farmers. In some places these deductions go up to 0.25 kg per 40 kgs. To overcome the situation, the growers may be educated to properly clean the trash before bringing cane to the mills and the Cane Commissioners may have strict check for undue deductions. Provincial Agriculture Extension Departments should provide guidance and training to farmers.

### **Presence of Middlemen**

101. The presence of middlemen is considered necessary in marketing the agricultural commodities. As the manufacturing of sugar is a chemical process, the presence of middlemen in sugarcane supply to the mills cause delay and hence reduction in sugar recovery. The middlemen in sugarcane marketing do harm to the mills and growers. Thus, the involvement of middlemen in sugarcane supply needs to be banned through administrative measures.

### **Purchase of CPRs**

102. Since some of the mills delay the payments, the growers are compelled to sell the CPRs at a lesser price. This practice causes huge losses to the growers, so it needs to be stopped altogether. The mills should also be obligated to make payments within two weeks after supply to the mills as laid down in the Sugar Factories Control Act. In addition, the pressure for selling the CPRs could also be subsided if the CPR is treated as a bank negotiable instrument like a bank cheque.

### **Use of Sugarcane Cess Fund**

103. The provincial governments collect and maintain the accounts of sugarcane cess fund. The cess fund is to be utilized for the construction of new roads and improvement of the existing roads including other infrastructure in the mill premises. The fund can also be utilized for research and development of sugarcane crop. The provincial governments are known to have accumulated huge amounts of cess funds which needs to be properly used for infrastructure and varietal development.

### **Amendments in Sugar Factories Control Act**

104. The sugar mills function under the provisions of the Sugar Factories Control Act, 1950. Many changes have occurred in cane marketing after de-zoning and the functioning of the Act has become less effective. So there is a need to amend the Act according to the current needs, especially the promotion of the provisions of the contract system between growers and the sugar mills and removal of provisions regarding prohibition of gur making and zoning, etc.

## **20. IMPROVING PRODUCTIVITY**

105. Since Sugarcane is high water delta crop and with increasing water shortages, horizontal expansion of this crop is neither feasible nor desirable. However, to maintain the regular supply of raw material (sugarcane) to 2<sup>nd</sup> largest agro-based (sugar) industry of Pakistan enhanced productivity is the only way forward. Therefore, API has recommended the following productivity enhancement measures.

### **20.1 Varietals Development**

106. The government should pursue the PSMA and provincial Agricultural Research Institutes to emphasize on cane varietals development having character of low water



requirement and high percentage of sugar recovery. To meet the expenditure on varietal development, Provincial Governments should take strict measures to implement the ECC decision regarding the release and utilization of "Cess Fund" in this regard.

## 20.2 Improved Cultural practices

107. Provincial Departments of Agriculture Extension should take the following steps in this regard:

- Cost effective and zone specific crop production technologies might be developed and disseminated through coordinated efforts.
- With the optimal use of fertilizer and water, the crop becomes tender and attracts pests and diseases. To have effective control, Chemicals and bio-control agents for the management of pests and diseases should be used.
- Modernizing technology for improving productivity and competitiveness in the sugar cane industry Provision of Agricultural machinery and tools for diverse ecologies and varied farm sizes , may be looked in to.
- To conserve water, there is a need for improvement in efficiency and productivity of irrigation water
- Each fertilizer element plays its role in the development and production of a normal cane crop. Soil fertility and productivity significantly affect cane production, so for its optimal utilization soil analysis should be popularized
- Encourage Use for healthy seed of improved varieties of sugarcane and discourage cultivation of un-approved varieties.
- No of plants in the field plays a vital role in yield and seed of fresh crop 6 – 8 months old gives better results. This should be encouraged. Apprise the farmers for achieving the desirable plant population per acre.
- The selection of an appropriate planting method and schedule greatly influences crop growth, maturity, and yield recommended Practice 'row to row' distance in sugarcane fields for effective weed control and less water requirement be popularized.
- Healthy seed gives better result in production of crop, to avoid disease and ensure healthy crop, motivate farmers for 'Hot Water Treatment' of sugarcane sets for disease control.
- For production of cost effective crop and to maintain desired level of organic matter in the soil, use of press mud to improve soil fertility be popularized in addition to use of different fertilizers in recommended dosage.

- Apprise the growers about use of weedicides needs to be promoted for increasing quantity and quality of the crop .Good land preparation is a key factor in controlling weeds.

### 20.3 Biological Control

108. The government should emphasize PSMA and Provincial Agriculture Depts to establish IPM labs for rearing predators for disease control in sugarcane crop. Awareness campaign to educate sugarcane growers about the benefits of IPM techniques.

### 20.4 Role of Sugar Industry in Cane Development

109. To promote sugarcane crop, the sugar industry of Pakistan should:

- Take concrete measures to multiply and disseminate high sucrose varieties along with necessary extension work for development of sugarcane crop.
- Take immediate steps to increase supply of improved varieties of cane seed among the farmers in addition to government efforts in this regard
- Supply press mud free of cost or on subsidize rates to sugarcane growers to ensure adequate amounts of organic matter in the soil to sustain necessary fertility level to improve yield of the sugarcane crop

### 20.5 Low Sugar Recovery

110. Provincial Agricultural and PARC Research Institutes should determine the reasons for low sugar recovery. The comparison with the world sugar recovery rate, which is on average higher than 10 percent, indicates that efforts are required to enhance this percentage, in order to increase sugar production.

### 20.6 Commercial Varieties and their yield/grown Potential in the Punjab, Sindh and KPK

111. The yield potential of sugarcane varieties in the Punjab range between 80 to 130 tones per hectare. The highest yield potential of HSF-240, HSF-242 and CPF-243, varieties is estimated at 130,108 and 102 tones per hectare and highest sugar recovery percentage are 12.7,12.5 and 12.4 of the varieties CP-77-400, CPF-243, CPF-237, HSF-240, CPF-247. If these varieties are adopted for vast cultivation in their specified field areas with their recommended production technology and timely supply of inputs and application, the yield per hectare would definitely improve at the country level. List of the Varieties may be seen in Annex XVII ✓

112. Yield of High yielding cane varieties evolved by Research Institutes in Sindh range between 170 to 200 tonnes per hectare and highest recovery varieties is Thatta-10 and LRK-2001, on the top with 11 per cent sugar recovery. The highest yield potential of Ghulabi-95 is

estimated at 200 tones per hectare and in KPK high yielding variety is CP-77-400 estimated at 100 tones per hectare with 12.7 per cent sugar recovery.

## 21. COMPETITIVENESS OF PAKISTANI SUGAR IN THE INTERNATIONAL MARKET ----- REQUIRED MEASURES

113. Installed capacity of sugar in the country is capable of generating exportable surplus for at least a decade. Therefore, it is in the national interest to facilitate the industry to make its presence felt in the international export market on a sustainable basis. The current scenario is well known to justify export of sugar. It is likely that by promoting export of sugar, its benefits will definitely trickle down to growers.

### 21.1 Potential of Sugar Production

114. As evident from the table 22 that the sugar industry has great potential to become competitive for export. It may be seen that as a requirement for the sugar industry, sugarcane is about 72 million but available supply of it is approximately 55 million tones. This gap can be bridged by improving yield or by providing input subsidies to growers. Two incentives can play a pivotal role one is timely payment to growers and second is supply of reliable, adulteration free inputs at low price.

**Table 22. Potential of Pakistani Sugar Industry for Export of Sugar**

Sugar Mills in Pakistan	(Nos)	80
Average Capacity	(TPD)	6,000
Average working in a season.	(Days)	150
Cane requirement For a) Crushing b) Seed	(Tons)	72,000,000 <u>8,250,000</u> 80,250,000
Average Sugar Recovery	(%)	9.16
Area under cane cultivation	(Million Hectares)	1.1
Required yield	(Tons / Hectare)	72.95
Current yield	(Tons / Hectare)	55.2
Yield gap	(Tons / Hectare)	17.75
How to bridge the gap – A separate subject.		
Potential sugar availability	(Million tons)	6.6
Estimated local consumption	(Million tons)	4.2
Potential exportable surplus	(Million tons)	2.4
Sugar actually exported between 1March 2012 to 11July 2013.	(Million tons)	0.853

### 21.2 Export Performance

115. Keeping in view domestic production, demand, supply, consumption and stock situation of sugar in the country the government has allowed export of sugar by the mills and

providing a subsidy of inland transportation Rs. 1.79 per kg. The Economic Coordination Committee (ECC) of the Cabinet has allocated export quota as mentioned in Table 24.

116. Out of total allocated quota of 12, 00,000 tons, mills are able to export 8,53,223 tons, still short of 346,777 tones to meet the total allocation. Major destination of sugar exports are Afghanistan, Djibouti, Malaysia Saudi Arabia, Sudan, UAE, Vietnam and Yemen. The unit price is ranging \$ 583 to \$ 639 per tone. FOB Price of sugar (raw equivalent) on 1<sup>st</sup> July was \$ 367/tone and of Refined sugar was \$ 499/tons.

**Table No. 23 Government interventions in 2012-13 for Export of Sugar**

SUGAR EXPORTS	QUANTITY IN TONS	
	Quota allocated for export by ECC vide its	Quota approved by SBP
Decision dated 31-01-2012 (100,000 tons)	95,603 tons	54,729 tons
Decision dated 15-05-2012 (200,000 tons)	2,00,000 tons	1,44,201 tons
Decision dated 03-10-2012 (200,000 tons)	2,00,000 tons	66,138 tons
Decision dated 22-11-2012 (200,000 tons)	1,99,926 tons	1,57,118 tons
ECC Decision dated 11-12-2012 (5,00,000)	5,04,471 tons	4,31,037 tons
<b>Total</b> 12,00,000 tons	<b>12,00,000 tons</b>	<b>8,53,223 tons</b>
<b>*SOURCE: TCP/SBP</b>		

### 21.3 Proposed Measures

117. Pakistan enters the export market of sugar once in six to eight years. As a result, there is no consistent policy on the export of sugar and knee jerk reactions are observed in the situation as it starts unfolding. For instance up to January 9, 2013, permission for export was given once the firm contract was produced. After January 9, the requirement is either to deposit 10% of the contract amount in foreign exchange or produce L/C. Keeping in view the crop size and local needs, export targets should be determined before commencement of every season. Pro-rata Provincial and Mill shares should be determined well in time. Every mill should be provided a separate export refinance limit on a pro-rata basis.

118. Illegal export of sugar from Chaman and Landi Kotal should be discouraged. Thus, Pakistan is deprived of much needed foreign exchange. Being relatively new to the export business, export refinance facilities should be provided at relatively favorable terms.

119. Sugarcane constitutes almost 85% of the total cost of production of sugar at current rates of both sugar and sugarcane. The repeated national requirement needs accelerated pace of taking appropriate measures to improve productivity of sugarcane growing to the benefit of all stakeholders.

120. Export documentation is a huge problem as sugar mills do not possess properly trained manpower required for this purpose. They are required to the job once in many years. Sugar mills employees' capacity should be built by providing training on export procedure of sugar.

121 There is no coordination between sugar mills and Independent International Surveyors like Union control, SGS, Cotecna, etc. Manpower training seminars should be organized by the surveyors with the assistance of PSMA for the improvement of sugar standards.

122. Sugar is a perishable commodity and attracts moisture that converts it into lumps. Proper storage facilities need to be created at the seaport. Encourage export of sugar more frequently preferably every year. For this purpose a consistent sugar export policy should be announced and ban on sugar export by the private sector should be lifted.

123. In fact competitiveness of any product including sugar depends upon: 1) *Quality* 2) *Cost of Production*. As far as quality is concerned Pakistan produces white refined sugar of medium and bold grain. The grain configuration is non-uniform. 170 countries of the World consume fine grain.

124. Sugar and Ethanol export is poised to contribute US \$ 1 billion to the national exchequer during the current financial year. This can be easily extended to US \$ 2 billion every year. Pakistan is currently earning this amount from the export of rice.

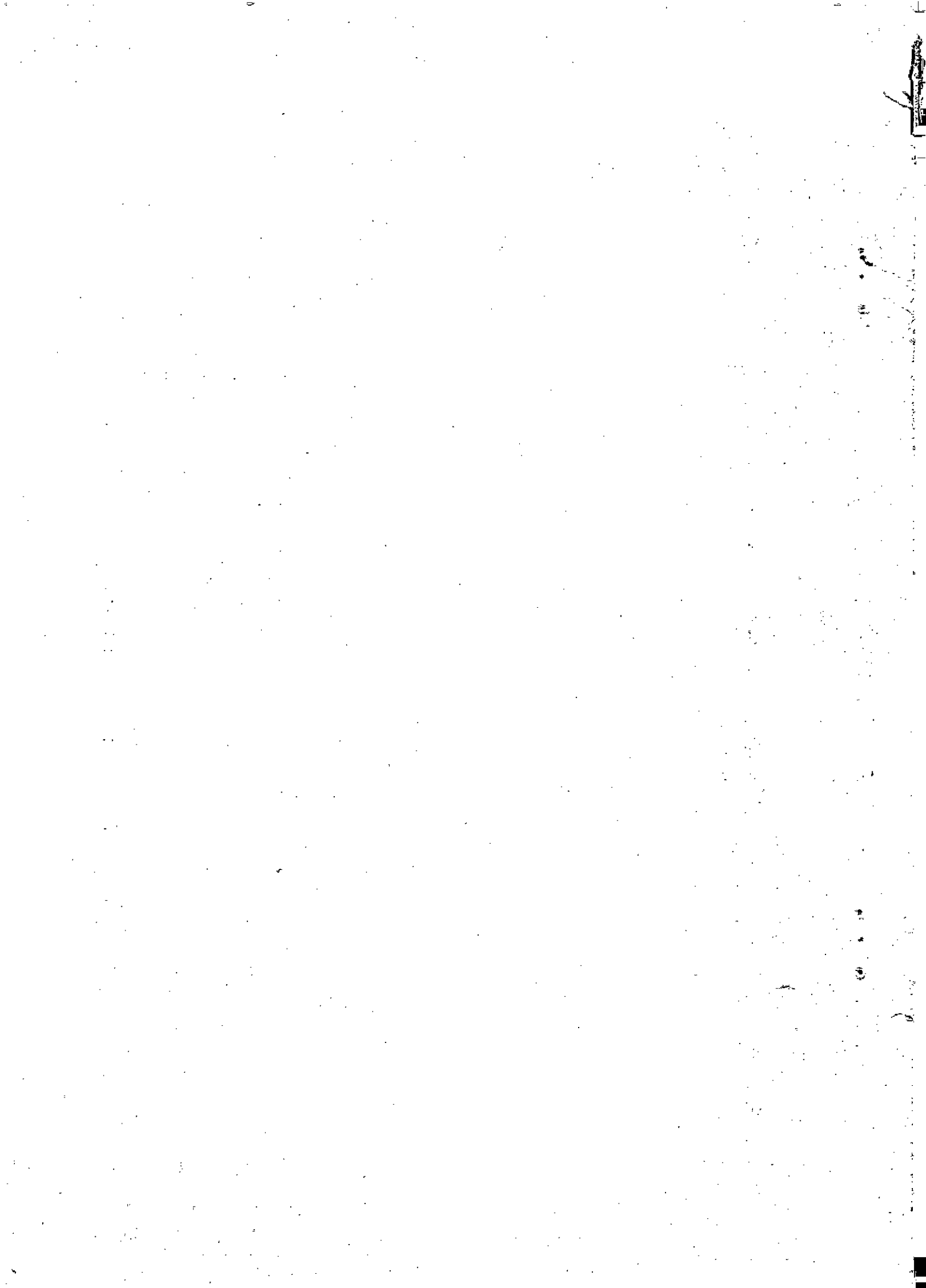
**22. ACKNOWLEDGEMENT****Officers**

1. Mr. Sohail Mohammad Khan, Chief (***National Coordinator of Sugarcane***)
2. Mr. M. B. Siddiqui, Chief
3. Mr. Abdul Rauf Ch. Chief
4. Mr. Sherzada Khan, Deputy Chief
5. Mr. Muhammad Ikram, Deputy Chief
6. Mr. Sardar Ali Khan, Deputy Chief
7. Mr. Muhammad Ijaz Ahmed, Assistant Chief
8. Mr. Mohammad Amin Assistant Chief
9. Husain Ali Turi, Assistant Chief
10. Syed Riaz Ali Shah, Assistant Chief

**Staff**

11. Mr. Muhammad Altaf, Assistant Private Secretary (***Composer***)
  12. Mr. Muhammad Naeem, DMO
  13. Mohammad Shakeel N/Q
  14. Hafiz Ghulam Mustafa N/Q
- 

**Chairperson, API**



**PROVINCE-WISE AREA ,PRODUCTION AND YIELD OF SUGARCANE  
IN PAKISTAN : 2002-03 TO 2012-13**

YEAR	PUNJAB	SINDH	KPK	BALUCHISTAN	PAKISTAN
<b>AREA</b>	<b>----- 000 hectares -----</b>				
2002-03	735.3	258.6	104.9	0.8	1099.6
2003-04	709.0	259.9	104.8	0.8	1074.5
2004-05	644.7	214.9	106.4	0.4	966.4
2005-06	625.2	183.2	98.6	0.5	907.5
2006-07	711.8	214.7	101.8	0.5	1028.8
2007-08	827.2	308.8	104.8	0.5	1241.3
2008-09	666.5	263.9	98.2	0.8	1029.4
2009-10	607.4	233.9	100.8	0.7	942.8
2010-11	672.2	226.5	88.4	0.6	987.7
2011-12	761.2	189.7	105.9	0.7	1057.5
2012-13	760.0	253.7	106.7	0.7	1121.1
<b>YIELD</b>	<b>----- Tonnes per hectare -----</b>				
2002-03	45.11	53.35	48.13	50.75	47.34
2003-04	47.99	56.22	45.28	48.25	49.72
2004-05	51.26	43.54	45.27	51.20	48.88
2005-06	46.33	61.38	45.02	32.22	49.22
2006-07	52.74	58.36	45.63	50.60	53.21
2007-08	48.73	60.86	45.73	56.20	51.49
2008-09	48.45	50.41	44.89	49.22	48.62
2009-10	51.57	57.74	44.72	50.86	52.37
2010-11	55.76	60.78	45.59	51.33	56.00
2011-12	56.35	56.87	44.23	44.86	55.22
2012-13	56.60	58.77	44.71	45.00	55.95
<b>PRODUCTION</b>	<b>----- 000 Tonnes -----</b>				
2002-03	33168.6	13797.6	5049.0	40.6	52055.8
2003-04	34023.0	14611.8	4745.6	38.6	53419.0
2004-05	33048.0	9357.4	4816.2	22.5	47244.1
2005-06	28968.6	11243.4	4439.0	14.5	44665.5
2006-07	37541.9	12529.2	4645.0	25.3	54741.4
2007-08	40306.0	18793.9	4792.0	28.1	63920.0
2008-09	32294.7	13304.3	4408.5	37.9	50045.4
2009-10	31324.0	13505.4	4507.9	35.6	49372.9
2010-11	37481.0	13766.4	4030.3	30.8	55308.5
2011-12	42893.0	10788.3	4684.3	31.4	58397.0
2012-13	43014.0	14908.7	4770.2	31.5	62724.4

**Sources:**

1. 2002-03 to 2009-10 : Agricultural Statistics of Pakistan 2009-10, MINFA, Islamabad.
2. Final estimates provided by Pakistan Bureau of Statistics, Islamabad
3. Second estimates of Punjab, Sindh, Baluchistan and KPK provided by Provincial Agriculture Department **DISTRICT- WISE**



## AREA, YIELD AND PRODUCTION OF SUGARCANE AVERAGE OF 2010-11 TO 2012-13

Area: 000 ha  
Production: 000 tones  
Yield: Tones/hectare

S.No	Province/ District/ Agency	Area	Production	Share in total production	Yield	S.No	Province/ District/ Agency	Area	Production	Share In total production	Yield
<b>PUNJAB</b>						<b>KHYBER PAKHTUNKHWA</b>					
1	R.Y.Khan	104.68	7495.09	12.74	71.60	1	Mardan	31.29	1505.01	2.56	48.09
2	Faisalabad	108.99	5631.89	9.58	51.67	2	Charsadda	28.42	1229.54	2.09	43.26
3	Sargodha	63.80	3575.10	6.08	56.03	3	Peshawar	10.54	549.22	0.93	52.09
4	Jhang	56.38	3082.31	5.24	54.67	4	D.I.Khan	12.27	517.28	0.88	42.15
5	Chinlot	48.29	2590.85	4.41	53.65	5	Nowshera	5.05	256.89	0.44	50.89
6	T.T.Singh	44.11	2568.80	4.37	58.24	6	Malakand	4.70	179.47	0.31	38.22
7	Kasur	41.82	2086.78	3.55	49.90	7	Swabi	4.30	168.12	0.29	39.07
8	Muzaffargarh	36.02	2058.50	3.50	57.15	8	Bannu	0.73	28.37	0.05	38.70
9	M.B.Din	36.96	1759.61	2.99	47.61	9	Khyber AG.	0.64	14.76	0.03	23.20
10	Rajanpur	15.52	1085.90	1.85	69.98	10	Mohmand AG.	0.42	11.55	0.02	27.81
11	Vehari	17.27	1061.51	1.80	61.48	11	Tank	0.25	6.36	0.01	25.13
12	Bahawalpur	16.46	1043.77	1.77	63.43	12	Kohat	0.18	6.16	0.01	34.88
13	Nankana Sahib	21.18	1007.59	1.71	47.57	13	Dir Lower	0.18	5.46	0.01	30.76
14	Bahawalnagar	17.13	991.51	1.69	57.87	14	Lakki Marwat	0.09	3.33	0.01	37.48
15	Bhalkar	17.27	879.55	1.50	50.94	15	Haripur	0.10	3.21	0.01	31.59
16	Okara	16.86	831.78	1.41	49.33	16	F.R.Bannu	0.07	3.00	0.01	41.06
17	Layyah	11.06	591.27	1.01	53.44	17	Bunir	0.93	2.14	0.00	2.29
18	Khanewal	7.96	424.38	0.72	53.34	18	F.R.D.I.Khan	0.09	2.00	0.00	22.93
19	Sahwal	8.23	377.42	0.64	45.86	19	N.Waziristan	0.04	1.71	0.00	41.49
20	Khushab	7.28	341.08	0.58	46.83	20	Hangu	0.02	0.68	0.00	34.92
21	Hafizabad	5.53	237.70	0.40	42.96	21	F.R.Peshawar	0.01	0.36	0.00	30.02
22	Pakpattan	4.05	211.88	0.36	52.36	22	Mansehra	0.01	0.30	0.00	22.20
23	D.G.Khan	3.64	204.60	0.35	56.16						
24	Mianwali	3.10	185.60	0.32	59.81						
25	Sheikhupura	3.64	182.07	0.31	50.02						
26	Multan	3.37	171.02	0.29	50.70						
27	Gujrat	2.56	112.91	0.19	44.05						
28	Gujranwala	2.16	102.95	0.18	47.74						
29	Lodhran	1.75	87.40	0.15	49.94						
30	Narowal	1.62	62.36	0.11	38.49						
31	Sialkot	1.62	52.60	0.09	32.47						
32	Lahore	0.40	18.23	0.03	45.58						
33	Jhelum	0.20	7.72	0.01	38.62						
34	Attock	0.20	7.59	0.01	37.97						
	<b>Sub Total</b>	<b>731.12</b>	<b>41129.33</b>	<b>69.94</b>	<b>56.26</b>		<b>Sub Total</b>	<b>100.34</b>	<b>4494.91</b>	<b>7.64</b>	<b>44.80</b>
<b>SINDH</b>						<b>BALOCHISTAN</b>					
1	Badin	41.15	2342.05	3.98	56.92	1	Sibi	0.60	28.79	0.05	47.63
2	Nawabshah	29.81	1793.67	3.05	60.16	2	Lasbela	0.05	2.39	0.00	50.72
3	T. M. Khan	24.16	1470.80	2.50	60.89	3	Nasirabad	0.00	0.04	0.00	57.00
4	N.Feroze	18.30	1123.44	1.91	61.39						
5	Thatta	19.31	1034.70	1.76	53.59						
6	Khalpur	16.95	1013.45	1.72	59.79						
7	Tando Allahyar	17.08	1004.99	1.71	58.83						
8	Matlari	12.22	786.21	1.34	64.36						
9	Mirpurkhas	11.73	714.11	1.21	60.89						
10	Sanghar	11.13	621.95	1.06	55.88						
11	Hyderabad	5.97	369.46	0.63	61.94						
12	Ghotki	4.75	290.71	0.49	61.16						
13	Dadu	3.52	191.48	0.33	54.42						
14	Sukkur	2.93	169.76	0.29	57.96						
15	Unerkot	2.05	108.85	0.19	53.23						
16	Tharparkar	0.92	47.50	0.08	51.92						
17	Jamshoro	0.69	37.95	0.06	54.78						
18	Larkana	0.42	22.21	0.04	52.93						
19	Shadadkot	0.10	5.48	0.01	53.07						
20	Shikarpur	0.06	3.33	0.01	54.51						
21	Kashmore	0.04	2.36	0.00	52.94						
	<b>Sub Total</b>	<b>223.28</b>	<b>13154.47</b>	<b>22.37</b>	<b>58.91</b>		<b>Sub Total</b>	<b>0.65</b>	<b>31.22</b>	<b>0.05</b>	<b>47.87</b>
							<b>Pak Total</b>	<b>1055.39</b>	<b>58809.95</b>	<b>100.00</b>	<b>55.72</b>

Notes: 1. Data arranged in descending order of production. 2 Percentage shares are calculated on the basis of country total

Sources: 1- MINFAL, Islamabad 2- Respected Agriculture Provincial Departments

## AVERAGE FARMERS' COST OF PRODUCTION OF SUGARCANE IN THE PUNJAB: 2012-13 AND 2013-14 CROPS

Sr. No.	Operations / inputs	Avg No. of oprs/units/ acre	2012 - 13 Crop		2013 - 14 Crop		Change in 2013-14 over 2012-13
			Cost per unit	Cost per acre	Cost per unit	Cost per acre	
1	2	3	4	5=3*4	6	7=3*6	8=7-5
-----Rupees-----							
1	Land preparation:						
1.1	Deep ploughing	0.476	1300.00	618.80	1400.00	666.40	47.60
1.2	Rotavator	0.152	1400.00	212.80	1500.00	228.00	15.20
1.3	Ploughing	7.847	600.00	4708.20	650.00	5100.55	392.35
1.4	Planking	3.309	300.00	992.70	325.00	1075.43	82.72
1.5	Levelling	0.561	650.00	364.65	700.00	392.70	28.05
2	Seed bed preparation:						
2.1	Ploughing/Furrow making	0.467	600.00	140.10	650.00	151.78	11.68
2.2	Planking	0.193	300.00	28.95	325.00	31.36	2.41
2.3	Trench/Ridge making						
2.3.1	Manual (m.days)	0.106	300.00	15.90	300.00	15.90	0.00
2.3.2	Tractor	0.7	600.00	210.00	650.00	227.60	17.50
2.4	Bund making						
2.4.1	Manual (m.days)	1.655	300.00	248.25	300.00	248.25	0.00
2.4.2	Tractor	0.158	600.00	47.40	650.00	51.35	3.95
3	Seed and Sowing operations:						
3.1	40 kg units	6.578	190.00	624.91	190.00	624.91	0.00
3.2	Manias	10.64	950.00	5054.00	950.00	5054.00	0.00
3.3	Harvesting, stripping and making of set (m.days)	4.798	300.00	719.40	300.00	719.40	0.00
3.4	Transport	-	-	325.00	-	350.00	25.00
3.5	Sowing of sets (m.days)	0.781	300.00	117.15	300.00	117.15	0.00
3.6	Contract sowing	-	-	350.00	-	350.00	0.00
4	Interculture and Earthing up:						
4.1	Manual/binding of plants	0.609	1150.00	700.35	1200.00	730.80	30.45
4.2	Bullock/tractor	2.008	600.00	1204.80	650.00	1305.20	100.40
5	Plant Protection:						
5.1	Weedicides	0.124	475.00	58.90	550.00	68.20	9.30
5.2	Granules	0.120	450.00	54.00	500.00	60.00	6.00
5.3	Sparys	0.305	525.00	160.13	580.00	176.90	16.78
6	Irrigation:						
6.1	Canal	8.9	-	250.00	-	250.00	0.00
6.2	Private tubewell	4.44	1250.00	5550.00	1280.00	5683.20	133.20
6.3	Mixed	2.18	255.00	550.80	260.00	561.60	10.80
6.4	Labour for irrigation and water course cleaning (m.days)	4.86	300.00	1458.00	300.00	1458.00	0.00
7	Farm Yard Manure:						
7.1	Material	-	-	1100.00	-	1100.00	0.00
7.2	Transport & application	-	-	1050.00	-	1050.00	0.00
8	Fertilizers: (bags)						
8.1	DAP	1.28	3842.00	4917.76	3905.00	4998.40	80.64
8.2	Urea	1.73	1680.00	2908.40	1693.00	2928.89	22.49
8.3	Nitrophos	0.35	2447.00	856.45	2548.00	891.80	35.35
8.4	SSP	0.01	1180.00	11.80	1100.00	11.00	-0.80
8.5	CAN	0.01	1679.00	16.79	1674.00	16.74	-0.05
8.6	SOP	0.07	3917.00	274.19	3965.00	277.55	3.36
8.7	Gypsum	0.44	150.00	66.00	150.00	66.00	0.00
8.8	Fert. transport and application	3.89	65.00	252.85	70.00	272.30	19.45
9	Mark up @ 12.0 % per annum for 13 months on items 1 to 8 minus item 6.1	-	-	4675.77	-	4817.98	142.20
10	Land rent for 13 months	-	20000.00	21668.67	21000.00	22750.00	1083.33
11	Average weighted land tax @ Rs 132/acre/ annum for 13 months	-	-	143.00	-	143.00	0.00
12	Management charges for 13 months	-	-	1845.00	-	2103.00	258.00
13	Harvesting & stripping (40 kg units)	565.15	13.00	7273.48	13.00	7273.48	0.00
14	Expected escalation in cost of selected items	-	-	5165.00	-	4761.00	-404.00
15	Total cost (Items 1 to 14)	-	-	76986.34	-	76159.70	2193.38
16	Yield (40 kg units)	-	-	565.15	-	565.15	0.00
17	Cost of production at farm level: (Rs/40 kgs)						
17.1	Including land rent	-	-	136.22	-	140.07	3.85
17.2	Excluding land rent	-	-	97.88	-	99.81	1.93
18	Marketing expenses: (Rs/40 kgs)						
18.1	Transport, etc.	-	-	13.00	-	14.00	1.00
18.2	Development cess	-	-	0.25	-	1.00	0.75
19	Cost of production at mill-gate: (Rs/40 kgs)						
19.1	Including land rent	-	-	149.47	-	155.07	5.60
19.2	Excluding land rent	-	-	111.13	-	114.81	3.68

## AVERAGE FARMERS' COST OF PRODUCTION OF SUGARCANE IN SINDH: 2012-13 AND 2013-14 CROPS

Sr. No.	Operations / inputs	Avg No. of oprs/units/acre	2012 - 13 Crop		2013 - 14 Crop		Change in 2013-14 over 2012-13
			Cost per unit	Cost per acre	Cost per unit	Cost per acre	
1	2	3	4	5=3*4	6	7=3*6	8=7-5
-----Rupees-----							
1	Land preparation :						
	1.1 Deep ploughing	0.523	1400.00	732.20	1500.00	784.50	52.30
	1.2 Ploughing	5.606	900.00	5045.40	1000.00	5606.00	560.60
	1.3 Planking	1.577	450.00	709.65	500.00	788.50	78.85
	1.4 Levelling	0.972	900.00	874.80	1000.00	972.00	97.20
2	Seed bed preparation:						
	2.1 Ploughing/Furrow making	1.136	900.00	705.46	1000.00	783.84	78.38
	2.2 Planking	1.34	450.00	416.07	500.00	462.30	46.23
	2.3 Trench/ridge making						
	2.3.1 Manual (m.days)	0.074	300.00	15.32	300.00	15.32	0.00
	2.3.2 Tractor (hrs)	0.174	900.00	108.05	1000.00	120.06	12.01
	2.4 Bund making (m.days)						
	2.4.1 Manual (m.days)	0.403	300.00	83.42	300.00	83.42	0.00
	2.4.2 Tractor (hrs)	0.812	900.00	504.25	1000.00	560.28	56.03
3	Seed and Sowing operations:						
	3.1 40 kg units	64.118	190.00	8405.87	190.00	8405.87	0.00
	3.2 Ghuntas	0.685	5000.00	2363.25	5000.00	2363.25	0.00
	3.3 Harvesting, stripping and making of set (m.days)	4.42	300.00	914.94	300.00	914.94	0.00
	3.4 Transportation	-	-	575.00	-	600.00	25.00
	3.5 Sowing of sets (m.days)	0.588	300.00	121.72	300.00	121.72	0.00
	3.6 Contract sowing	-	-	600.00	-	600.00	0.00
4	Interculture and Earthing up:						
	4.1 Manual	1.782	1150.00	2026.30	1275.00	2246.55	220.25
	4.2 Bullock/tractor	1.725	900.00	1552.50	1000.00	1725.00	172.50
5	Plant Protection :						
	5.1 Weedicides	0.300	450.00	135.00	500.00	150.00	15.00
	5.2 Granules	0.245	425.00	104.13	450.00	110.25	6.13
	5.3 Sprays	0.265	450.00	119.25	500.00	132.50	13.25
6	Irrigation						
	6.1 Canal	20.88	-	181.87	-	181.87	0.00
	6.2 Private tubewell	2.45	650.00	1592.50	685.00	1678.25	85.75
	6.3 Labour for irrigation and water course cleaning (m.days)	5.859	300.00	1757.70	300.00	1757.70	0.00
7	Farm Yard Manure:						
	7.1 Material	-	-	1700.00	-	1700.00	0.00
	7.2 Transport & application	-	-	950.00	-	950.00	0.00
8	Fertilizers: (bags)						
	8.1 DAP	1.512	3768.00	5697.22	3817.00	5771.30	74.09
	8.2 Urea	3.625	1678.00	6082.75	1614.00	5850.75	-232.00
	8.3 Nitrophos	0.376	2900.00	1090.40	2567.00	965.19	-125.21
	8.4 CAN	0.185	1383.00	255.86	1435.00	265.48	9.62
	8.5 AS	0.046	1695.00	77.97	1695.00	77.97	0.00
	8.6 SOP	0.085	3990.00	339.15	3900.00	331.50	-7.65
	8.7 Fert. transport and application	5.829	65.00	378.89	70.00	408.03	29.15
9	Mark up @ 12.0 % per annum for 16 months on item 1 to 8 minus item 6.1	-	-	7365.60	-	7568.39	202.79
10	Land rent for 16 months	-	15000.00	20000.00	16000.00	21333.33	1333.33
11	Land tax @ Rs 200/acre/annum for 16 months	-	-	267.00	-	267.00	0.00
12	Drainage cess	-	-	24.00	-	24.00	0.00
13	Management charges for 16 months	-	-	2270.00	-	2589.00	319.00
14	Harvesting & stripping (40 kg units)	676.02	13.00	8788.26	13.00	8788.26	0.00
15	Expected escalation in cost of selected items	-	-	5265.00	-	5074.00	-191.00
16	Total cost (items 1 to 15)	-	-	90198.73	-	83128.32	2831.80
17	Yield (40 kg units)	-	-	676.02	-	676.02	0.00
18	Cost of production at farm level: (Rs/40 kgs)						
	18.1 Including land rent	-	-	133.42	-	137.76	4.34
	18.2 Excluding land rent	-	-	103.84	-	106.20	2.36
19	Marketing expenses: (Rs/40 kgs)						
	19.1 Transport, etc.	-	-	13.00	-	14.00	1.00
	19.2 Development cess	-	-	0.32	-	0.32	0.00
20	Cost of production at mill-gate: (Rs/40 kgs)						
	20.1 Including land rent	-	-	146.74	-	152.08	5.34
	20.2 Excluding land rent	-	-	117.16	-	120.52	3.36

## AVERAGE FARMERS' COST OF PRODUCTION OF SUGARCANE IN KPK: 2012-13 AND 2013-14 CROPS

Sr. No.	Operations / inputs	Avg No. of oprs/units/acre	2012 - 13 Crop		2013 - 14 Crop		Change in 2013-14 over 2012-13
			Cost per unit	Cost per acre	Cost per unit	Cost per acre	
1	2	3	4	5=3*4	6	7=3*6	8=7-5
-----Rupees-----							
1	Land preparation:						
	1.1 Deep ploughing/Rotavator	0.665	1650.00	1097.25	1800.00	1197.00	99.75
	1.2 Ploughing	2.776	775.00	2151.40	900.00	2498.40	347.00
	1.3 Planking	0.435	390.00	169.65	450.00	195.75	26.10
	1.4 Levelling	0.344	775.00	266.60	900.00	309.60	43.00
2	Seed bed preparation:						
	2.1 Ploughing/Furrow making	0.982	775.00	395.75	900.00	459.58	63.83
	2.2 Planking	0.027	390.00	5.48	450.00	6.32	0.84
	2.3 Trech/Ridge making (tractor hrs)	0.039	775.00	15.72	900.00	18.25	2.54
	2.4 Bund making (m.days)	1.274	300.00	198.74	300.00	198.74	0.00
3	Seed and Sowing operations:						
	3.1 40 kg units	76.337	250.00	9923.81	220.00	8732.95	-1190.86
	3.2 Harvesting, stripping and making of set (m.days)	3.671	300.00	572.68	300.00	572.68	0.00
	3.3 Transport	-	-	575.00	-	600.00	25.00
	3.4 Sowing of sets (m.days)	4.097	300.00	639.13	300.00	639.13	0.00
4	Interculture and Earthing up :						
	4.1 Manual/binding of plants	1.642	1385.00	2274.17	1525.00	2504.05	229.88
	4.2 Bullock/tractor	1.859	775.00	1440.73	900.00	1673.10	232.38
5	Plant Protection:						
	5.1 Weedicides	0.360	550.00	198.00	600.00	216.00	18.00
	5.2 Granules	0.240	450.00	108.00	500.00	120.00	12.00
	5.3 Sprays	0.275	525.00	144.38	575.00	158.13	13.75
6	Irrigation:						
	6.1 Canal	15.19	-	863.00	-	863.00	0.00
	6.2 Private tubewell	2.61	550.00	1435.50	660.00	1722.60	287.10
	6.3 Private canal (manual labour)	2.43	75.00	182.25	75.00	182.25	0.00
	6.4 Labour for irrigation and water course cleaning (m.days)	7.953	300.00	2385.90	300.00	2385.90	0.00
7	Farm Yard Manure:						
	7.1 Material	-	-	1700.00	-	1700.00	0.00
	7.2 Transport & application	-	-	1375.00	-	1400.00	25.00
8	Fertilizers: (bags)						
	8.1 DAP	0.83	3800.00	3154.00	3900.00	3237.00	83.00
	8.2 Urea	1.97	1650.00	3250.50	1690.00	3329.30	78.80
	8.3 Nitrophos	0.33	2490.00	821.70	2550.00	841.50	19.80
	8.4 CAN	0.13	1450.00	188.50	1500.00	195.00	6.50
	8.5 Fert. transport and application	3.28	65.00	211.90	70.00	228.20	16.30
9	Mark up @ 12.0 % per annum for 15 months months on item 1 to 8 minus item 6.1	-	-	5232.26	-	5298.21	65.96
10	Land rent for 15 months	-	24000.00	30000.00	25500.00	31875.00	1875.00
11	Average weighted land tax @ Rs 75/acre/ annum for 15 months	-	-	94.00	-	94.00	0.00
12	Management charges for 15 months	-	-	2130.00	-	2427.00	297.00
13	Harvesting & stripping (40 kg units)	585.46	13.00	1750.53	13.00	1750.53	0.00
14	Expected escalation in cost of selected items	-	-	3460.00	-	3227.00	-233.00
15	Total cost (Items 1 to 14)			78411.50		80858.17	2447.66
16	Yield (40 kg units)			585.46		585.46	0.00
17	Cost of production at farm level: (Rs/40 kgs)						
	17.1 Including land rent	-	-	133.93	-	138.11	4.18
	17.2 Excluding land rent	-	-	82.69	-	83.66	0.97
18	Marketing expenses: (Rs/40 kgs)						
	18.1 Transport, etc.	-	-	13.00	-	14.00	1.00
	18.2 Development cess	-	-	0.27	-	0.54	0.27
19	Cost of production at mill-gate: (Rs/40 kgs)						
	19.1 Including land rent	-	-	147.20	-	162.86	15.66
	19.2 Excluding land rent	-	-	95.96	-	98.20	2.24

**Notes for Annex- III to V**

1. The input-output parameters for estimating cost of production for sugarcane 2013-14 Crop have been adopted from the Price Policy Report for sugarcane 2012-13 Crop, API's Series No. \_\_\_\_.
2. The hiring rates of farm operations, input prices, wage rates, land rentals and charges for harvesting and stripping have been revised/adjusted in light of the data obtained through annual field survey conducted by the API in the major sugarcane growing districts area of the Punjab, Sindh and KPK during March-April 2013 and other sources as described below:
3. Seed and related costs (items 2 and 3) for the fresh planted crop have been estimated @ 50, 69 and 52 per cent of their original values for the Punjab, Sindh and KPK respectively in view of the incidence of ratooning reported @ 50, 31 and 48 per cent during sugarcane's large field survey for 1999-00 crop.
4. The cost of supplementary irrigation has been adjusted in view of changing in the prices of diesel from Rs 107.40 to Rs 106.06/lt during February 2012 to May 2013 and power tariff rates from Rs 5.31 to Rs 6.77/kwh, based on the ratios of electric and diesel tube-wells of 13:87 in the Punjab, 23:77 in Sindh and 73:27 in KPK as reported in the Agriculture Statistics of Pakistan, 2010-11, Pakistan Bureau of Statistics Islamabad.
5. The prices of chemical fertilizers have been revised in view of the fertilizers prices published by the Federal Bureau of Statistics, Islamabad for the week ending on 9<sup>th</sup> May 2013.
6. In view of the 1999-00 Crop survey, about 1 per cent of the acreage under sugarcane was harvested in lieu of sugarcane tops in the Punjab and 77 per cent in KPK. The expenditure on account of harvesting and stripping has been adjusted accordingly.
7. The likely escalation in the cost of operations like interculture, plant protection, supplementary irrigation, nitrogenous fertilizer, harvesting/stripping and marketing during 2013-14 crop year has been estimated as 18.85 per cent in the Punjab, 19.89 per cent in Sindh and 17.72 per cent in KPK on the basis of average weighted annual increase in their costs for the last 4 years.

8. The management charges for a manager looking after a 25-acre farm and devoting one-fourth of his time to the managerial activities have been worked at Rs. 16179 per month for a Field Assistant at the 10<sup>th</sup> stages in BPS-6 as per revised scale of July 2012.

9. Land rent is influenced by several factors and extensively varies from field to field and region to region. It is a very important constituent of the cost of production in both provinces. For updating the land rentals, there is no precise measure available at hand. However, keeping in view the observations obtained during the field survey as cited above, the land rentals have been revised accordingly.

**ECONOMICS OF SUGARCANE AND COMPETING CROPS AT  
PRICES REALIZED BY THE GROWERS: 2012-13 CROPS**

S #	Province/crops/crop combination	Crop duration	Water used	Gross cost	Cost of purchased inputs	Gross revenue	Gross margin	Net income	Output-input ratio	Revenue per		
										Rupee of purchased inputs	Crop day	Acre inch of water used
		Days	Acre inches	.....Rupees per acre.....						Ratio	.....Rupees.....	
1	2	3	4	5	6	7=6-5	8=6-4	9=6/4	10=6/5	11=6/2	12=6/3	

**Punjab**

1	Sugarcane	394	48	71821	23063	88587	65524	16766	1.23	3.84	225	1846
2	Seed cotton	240	22	46506	16928	47868	30940	1362	1.03	2.83	199	2176
3	Basmati paddy	180	58	39279	19159	41565	22406	2287	1.06	2.17	231	717
4	IRRI paddy	180	62	36388	16874	36333	19460	-55	1.00	2.15	202	586
5	Wheat	180	12	31898	13200	37240	24040	5342	1.17	2.82	207	3103
6	Sunflower (spring)	180	22	36204	15361	43400	28040	7196	1.20	2.83	241	1973
7	Seed cotton + wheat	420	34	78404	30128	85108	54980	6704	1.09	2.82	203	2503
8	Seed cotton + sunflower	420	44	82710	32288	91268	58980	8558	1.10	2.83	217	2074
9	Basmati paddy+wheat	360	70	71177	32360	78805	46446	7629	1.11	2.44	219	1126
10	Basmati paddy+sunflower	360	80	75483	34520	84965	50446	9483	1.13	2.46	236	1062
11	IRRI paddy + wheat	360	74	68286	30074	73573	43499	5287	1.08	2.45	204	994
12	IRRI paddy+sunflower	360	84	72592	32234	79733	47499	7141	1.10	2.47	221	949

**Sindh**

1	Sugarcane	488	71	84932	28582	108623	80041	23691	1.28	3.80	223	1530
2	Seed cotton	240	18	42561	14686	48840	34154	6279	1.15	3.33	204	2713
3	IRRI paddy	180	56	33013	12616	41226	28610	8213	1.25	3.27	229	736
4	Wheat	180	12	28569	11788	33034	21247	4466	1.16	2.80	184	2753
5	Sunflower (spring)	180	22	36191	15364	43400	28037	7209	1.20	2.82	241	1973
6	Seed cotton + wheat	420	30	71130	26473	81874	55401	10744	1.15	3.09	195	2729
7	Seed cotton + sunflower	420	40	78753	26473	92240	65767	13488	1.17	3.48	220	2306
8	IRRI paddy+ wheat	360	68	61582	24404	74261	49856	12679	1.21	3.04	206	1092
9	IRRI paddy+sunflower	360	78	69204	27980	84626	56646	15422	1.22	3.02	235	1085

### Notes for Annex - VI

1. The economic analysis presented in the above exercise is based on the input-output prices applicable for 2012-13 crops.
2. The data regarding input-output parameters have been adopted from the API's policy analysis papers for sugarcane, seed cotton, rice paddy and wheat, 2012-13 crops. However, the relevant data for sunflower and canola were adopted from the last support price policy for non-traditional oilseeds, 2000-01 crops with necessary adjustments in input prices for updating costs and incomes for the 2012-13 crops. To incorporate the escalations in input prices, which occurred during the growing period of 2012-13 crops, some marginal revisions have been made as under:
  - 2.1 The cost of supplementary irrigation has been adjusted in accordance with the variation in the electric charges; @ 22 % for sugarcane, seed cotton, & rice paddy and 8.23% for wheat. Similarly, diesel rates have also been adjusted @ 34% for sugarcane, 7% for seed cotton, 17.85 % for rice paddy and 11 % for wheat crop.
  - 2.2 The cost of fertilizers has been revised in view of their prices prevailed at the time of application for the respective crops in 2012-13 season.
3. Water use has been estimated from the number of irrigations as reported in the cost of production estimates of the respective crops assuming each irrigation of 3 inches and 'rauni' of 4 inches.
4. Following prices as realized by the growers for different crops are adopted for the analysis:
  - 4.1 The support price of Rs. 1200 per 40 kgs as announced by the Government for 2012-13 wheat crop has been used for current analysis.
  - 4.2 The wholesale market prices of basmati paddy and IRRI paddy during the post harvest period 2012-13 in major producer area markets have averaged at Rs 1424 and Rs 918 per 40 kgs for Punjab. While, the average price of IRRI paddy in Sindh is reported at Rs 798 per 40 kgs.
  - 4.3 The wholesale market prices of seed cotton during the post-harvest period of 2012-13 in the main producer area markets have averaged at Rs 2552 per 40 kgs in the Punjab. In Sindh, the corresponding prices are averaged at Rs 2543 per 40 kgs.
  - 4.4 The average market price of Rs. 2200 per 40 kgs for sunflower 2012-13 crop as reported by PO DB is used for current analysis.
  - 4.5 The market prices of sugarcane at mill-gate for 2012 – 13 crop in the major cane producing areas are reported to hover around Rs 170 per 40 kgs in the Punjab and Rs 174 in Sindh.



5. The market prices have been adjusted for the marketing expenses to make them effective at the farm level. These expenses amount to Rs 13.25 per 40 kgs in Punjab and Rs 13.32 in Sindh for sugarcane, Rs 35 for seed cotton in Punjab and Sindh, Rs 35 for rice paddy, and Rs 25 for wheat and oilseeds.

6. Gross income = (Yield per acre multiplied by price of principal produce at farm gate) plus (value of by-products per acre).
7. Cost of purchased inputs = Cost incurred on seed and related items, fertilizer, supplementary irrigation including labour, canal water rate, pesticides and weedicides.
8. Gross margin = Gross income minus cost of purchased inputs.
9. Net income = Gross income minus gross cost.
10. Output-input ratio = Gross income divided by gross cost
11. Revenue per rupee of purchased inputs cost = Gross income divided by cost of purchased inputs
12. Revenue per crop day = Gross income divided by crop duration in days.
13. Revenue per acre-inch of water used = Gross income divided by irrigation water used in acre inches.

**IMPACT OF RISE IN SUGAR PRICE ON AVERAGE  
HOUSEHOLD EXPENDITURE**

Sugar price	Expenditure on sugar at average per capita availability of 24 kgs per year		Rise in expenditure	
	Per person	Per household	Per person	Per household
Rs per 40 kg	----- Rupees per year -----			
47 (Base price)	1128	7197		
48	1152	7350	24	153
49	1176	7503	48	306
50	1200	7656	72	459
51	1224	7809	96	612
52	1248	7962	120	765
53	1272	8115	144	918
54	1296	8268	168	1072
55	1320	8422	192	1225
56	1344	8575	216	1378
57	1368	8728	240	1531

Note: Average size of Household comprises 6.38 members.

ECONOMIC EFFICIENCY OF RESOURCE USE IN SUGARCANE PRODUCTION (PUNJAB) Based on import parity prices				
Description	Revenue	Traded Inputs Cost	Domestic Factor Cost	Profit
----- Rupees per acre -----				
<b>2008-09</b>				
Private Prices	56515	14777	20463	21275
Social Prices	78415	13359	19291	45765
Transfers	-21900	1419	1171	-24490
<b>2009-10</b>				
Private Prices	87900	11621	32253	44026
Social Prices	112049	10687	29206	72156
Transfers	-24149	934	3047	-28130
<b>2010-11</b>				
Private Prices	98901	22391	32697	43813
Social Prices	126062	20445	30517	75100
Transfers	-27161	1945	2180	-31286
<b>2011-12</b>				
Private Prices	84207	29104	44258	10846
Social Prices	93148	26574	41822	24752
Transfers	-8941	2530	2435	-13906
<b>2012-13</b>				
Private Prices	96076	32427	45920	17728
Social Prices	79353	29612	43305	6436
Transfers	16723	2815	2616	11292
ECONOMIC EFFICIENCY OF RESOURCE USE IN SUGARCANE PRODUCTION IN SINDH Based on import parity prices				
Description	Revenues	Traded Cost	Domestic Factors' Cost	Profits
----- Rupees per acre -----				
<b>2007-08</b>				
Private Prices	50024	13615	21024	15386
Social Prices	46205	12589	22790	10826
Transfers	3819	1026	-1766	4560
<b>2008-09</b>				
Private Prices	73008	17785	23794	31429
Social Prices	68736	16201	25611	26924
Transfers	4272	1584	-1817	4506
<b>2009-10</b>				
Private Prices	114920	18261	28574	68086
Social Prices	144286	16701	30116	97469
Transfers	-29365	1559	-1542	-29383
<b>2010-11</b>				
Private Prices	133510	20012	44317	69182
Social Prices	169500	19738	43769	105993
Transfers	-35990	273	548	-36811
<b>2011-12</b>				
Private Prices	112554	24384	58867	29303
Social Prices	119821	24094	57414	38313
Transfers	-7267	290	1453	-9010
<b>2012-13</b>				
Private Prices	124384	26797	62638	34949
Social Prices	104807	26504	60785	17518
Transfers	19577	293	1853	17431

<b>ECONOMIC EFFICIENCY OF RESOURCE USE IN SUGARCANE PRODUCTION IN PUNJAB Based on Export Parity Price</b>				
<b>Description</b>	<b>Revenues</b>	<b>Traded Costs</b>	<b>Domestic Factors Cost</b>	<b>Profits</b>
	----- Rupees per acre -----			
<b>2008-09</b>				
Private Prices	56515	13462	20958	22095
Social Prices	78697	12044	20303	46350
Transfer	-22182	1418	655	-24255
<b>2009-10</b>				
Private Prices	84773	15596	20303	48873
Social Prices	109780	13952	26426	69403
Transfer	-25008	1644	-6123	-20529
<b>2010-11</b>				
Private Prices	98901	19988	26426	52487
Social Prices	106876	18044	32323	56509
Transfer	-7974	1944	-5897	-4022
<b>2011-12</b>				
Private Prices	84185	25071	32323	26792
Social Prices	80518	22541	44665	13312
Transfer	3667	2529	-12342	13480
<b>2012-13</b>				
Private Prices	96050	27254	44665	24131
Social Prices	67162	24440	46951	-4229
Transfer	28888	2814	-2286	28360
<b>ECONOMIC EFFICIENCY OF RESOURCE USE IN SUGARCANE PRODUCTION IN SINDH Based on export parity prices</b>				
<b>Description</b>	<b>Revenues</b>	<b>Traded costs</b>	<b>Domestic Factors Cost</b>	<b>Profits</b>
	----- Rupees per acre -----			
<b>2007-08</b>				
Private Prices	45292	13673	21756	9863
Social Prices	27824	12639	22171	-6986
Transfers	17468	1034	-415	16850
<b>2008-09</b>				
Private Prices	54756	17845	24730	12181
Social Prices	63328	16253	24819	22256
Transfers	-8572	1592	-88	-10075
<b>2009-10</b>				
Private Prices	68952	18357	29559	21036
Social Prices	139263	16785	29294	93183
Transfers	-70311	1572	265	-72147
<b>2010-11</b>				
Private Prices	84500	27095	38612	18793
Social Prices	135917	25143	37252	73522
Transfers	-51417	1953	1359	-54729
<b>2011-12</b>				
Private Prices	104104	35154	49045	19905
Social Prices	96411	32526	47275	16610
Transfers	7693	2628	1770	3295
<b>2012-13</b>				
Private Prices	115596	39852	51487	24257
Social Prices	80363	36745	49402	-5784
Transfers	35233	3107	2085	30041

<b>PER CAPITA AVAILABILITY (CONSUMPTION OF SUGAR: 2008-09 TO 2011-12)</b>				
<b>( October - September )</b>				
S. No	Items	2009-10	2010-11	2011-12
-----Thousands tones-----				
1	Opening stocks as on 1st October	900	334	197
2	Production	3100	4630	4657
3	Imports	759	602	7
4	Export	0	0	145
5	Closing stocks as on 30th September	334	1109	1394
6	Net availability (item 1+2+3-4-5)	4425	4457	3322
7	Population	180.48	184.18	187.96
8	Per capita availability ( consumption)	24.52	24.20	17.67
9	Average per capita availability Average (2009-10 to 2011-12)		22.13	
<b>Note:</b>				
a) Population of AJ& K, NAS and Afghan refugees have also been included.				
<b>Sources:</b>				
1. For stocks and production:		Pakistan Sugar Mills Association, Islamabad.		
2. For import and export:		Federal Bureau of Statistics, Karachi.		
3. For population of Pakistan:		Economic Survey, 2011-12.		
4. For population of AJ&K and NAs:		Population Census Organization, Islamabad.		
5. For population of Afghan refugees:		Kashmir Affairs and Northern Areas and States and Frontier Regions Division, Government of Pakistan, Islamabad.		

### Projected for 2012-13

<b>Opening Stock</b>	<b>1.394 Million Tons</b>
<b>Production</b>	<b>5.036 Million Tons</b>
<b>Population 2012-13</b>	<b>191.81</b>
<b>Today Availability</b>	<b>6.434 Million Tons</b>
<b>Requirement</b>	<b>4.245 Million Tons</b>
<b>Surplus</b>	<b>2.185 Million Tons</b>

<b>DOMESTIC AVERAGE WHOLESALE PRICES OF SUGAR IN MAJOR DOMESTIC MARKETS 2012 AND 2013</b>						
Month	Lahore	Faisalabad	Karachi	Hyderabad	Peshawar	Average
	----- Rupees per 100 kgs-----					
<b>2012</b>						
January	4909	4815	4900	4895	4600	4824
February	4744	4693	4528	4895	5000	4772
March	5317	5210	4500	5320	5200	5109
April	5366	5313	5167	5675	5000	5304
May	5111	5090	5000	5500	5300	5200
June	5231	5225	5278	5210	5200	5229
July	5180	5124	5000	5170	5140	5123
August	5198	5122	5000	5380	4800	5100
September	4976	4908	4690	5198	4800	4914
October	-	-	4878	5305	5160	5114
November	5257	5216	5120	5315	4840	5150
December	5081	5013	5110	5033	4860	5019
<b>Average</b>	<b>5125</b>	<b>5066</b>	<b>4931</b>	<b>5241</b>	<b>4992</b>	<b>5072</b>
<b>2013</b>						
January	5010	4910	5004	5200	4800	4985
February	4931	4859	4800	5178	4800	4914
March	4955	4954	4800	5000	-	4927
April	5135	5151	4800	4910	-	4999
May	5121	5111	5000	4830	-	5016
<b>Average</b>	<b>5030</b>	<b>5016</b>	<b>4862</b>	<b>5024</b>	<b>4800</b>	<b>4968</b>
Sources: 1. Agriculture Marketing Information Services Punjab, Lahore 2. Agriculture Marketing Services, Sindh, Hyderabad						

**AVERAGE WHOLESALE PRICES OF SUGAR IN MAJOR DOMESTIC  
MARKETS: 2000-01 TO 2012-13 (October- September)**

Year	Lahore	Faisalabad	Karachi	Hyderabad	Peshawar	Average	Increase (+) decrease(-) in average price over
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----- Rupees per 100 kgs ----- Percent

2000-01	2551	2524	2482	2353	2566	2495	
2001-02	2069	2042	2063	2022	2073	2054	-17.69
2002-03	1939	1906	1892	1872	1972	1916	-6.70
2003-04	1813	1769	1788	1743	1853	1793	-6.42
2004-05	2417	2410	2373	2345	2411	2391	33.35
2005-06	3359	3342	3243	3223	3349	3303	38.14
2006-07	2932	2901	2884	2818	2933	2894	-12.40
2007-08	2444	2410	2390	2346	2473	2413	-16.63
2008-09	4049	3997	3998	3938	4090	4014	66.39
2009-10	6203	6161	6138	6084	6276	6173	53.76
2010-11	7069	6918	6975	7054	7144	7032	13.93
2011-12	5326	5256	5055	5374	5350	5272	-25.02
2012-13 (Oct-May)	5070	5044	4927	5096	4892	5006	-5.06

Sources: 1. Agriculture Marketing information Services, Punjab, Lahore.  
2. Agriculture Marketing Services, Sindh, Hyderabad.

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**AVERAGE INTERNATIONAL PRICES OF SUGAR: 2001-02 to 2012-13 (OCT-SEP)**

Years Oct - Sep	ISA Daily price of Raw sugar (Fob and stowed Caribbean ports in bulk)		London Daily price of White sugar (Fob and stowed European ports in bags of 50 kgs)			Difference between White and raw sugar prices	
	US Cents/ lb	US\$/ tonne	US Cents/ lb	US\$/ tonne	US Cents/ lb	US\$/ tonne	Per cent of White Sugar
	2001-02	6.85	151.01	10.59	232.48	3.74	81.47
2002-03	8.12	179.03	10.36	228.35	2.24	49.32	21.59
2003-04	6.57	144.84	10.16	223.93	3.59	79.09	35.33
2004-05	8.97	197.75	12.48	275.06	3.51	77.31	28.13
2005-06	14.84	327.14	18.34	407.75	3.50	80.61	19.10
2006-07	10.43	229.90	14.80	326.82	4.38	96.92	29.55
2007-08	12.38	273.02	15.62	344.44	3.24	71.42	20.73
2008-09	15.42	340.02	18.94	417.56	3.52	77.54	18.57
2009-10	20.41	450.03	26.07	574.68	4.86	107.23	17.66
2010-11	26.56	585.45	32.29	711.93	5.74	126.49	17.77
2011-12	22.68	499.96	27.54	607.20	4.86	107.23	17.66
<b>2012-13</b>	<b>18.75</b>	<b>413.36</b>	<b>23.26</b>	<b>512.84</b>	<b>4.51</b>	<b>99.48</b>	<b>19.40</b>
October	20.30	447.53	25.30	557.76	5.00	110.23	19.76
November	19.30	425.49	23.70	522.49	4.40	97.00	18.57
December	19.30	425.49	23.50	518.08	4.20	92.59	17.87
January	18.90	416.67	22.90	504.85	4.00	88.18	17.47
February	18.30	403.44	22.60	498.24	4.30	94.80	19.03
March	18.50	407.85	23.50	518.08	5.00	110.23	21.28
april	17.80	392.42	22.70	500.44	4.90	108.02	21.59
May	17.60	388.01	21.90	482.80	4.30	94.80	19.63

## Sources:

- i) From 2000-01 to 2011-12, International Sugar Organization, London "Monthly Market Reports and Press Summaries"  
ii) For 2012-12 Food outlook, FAO, June 2013



**IMPORT PARITY PRICES OF SUGARCANE AT MILL-GATE ON THE BASIS OF FOB (LONDON)**  
**PRICE OF WHITE SUGAR**

S.No	Item	2013 May					
		2012-13 (Oct-May)		2009-10 to 2011-12			
		----- US \$ per tonne -----					
1.	Average fob (London) price	482.80		512.84		643.34	
2.	Freight charges upto Karachi	60		60		60	
3.	C & f cost at Karachi port	543		573		703	
4.	Exchange rate (Rs/\$)	98.52		98.52		98.52	
		----- Rs per tonne -----					
5.	C & f cost at Karachi port (Pak rupees)	53477		56436		69293	
6.	Marine insurance @ 0.20 % of c & f cost	107		113		139	
7.	Cif cost at Karachi port	53584		56549		69432	
8.	Incidental charges incurred on imported sugar (Annex-XII)	3450		3517		3639	
9.	Ex-mill/ market cost of imported sugar	57034		60066		73071	
		<b>Punjab</b>	<b>Sindh</b>	<b>Punjab</b>	<b>Sindh</b>	<b>Punjab</b>	<b>Sindh</b>
10.	Processing cost of sugar (a)	19391	19391	20422	20422	24844	24844
11.	Value of cane to produce one of sugar (item 8-item 9)	37642	37642	39643	39643	48227	48227
12.	Provincial base sugar recovery (Percent)	9.69	9.73	9.69	9.73	9.69	9.73
13.	Quantity of cane in tonnes required to produce one tonne of sugar ((100/ item 12)	10.32	10.28	10.32	10.28	10.32	10.28
14.	Price of one tonne of sugarcane (item 11/item 13) Rs/tonne	3647.54	3662.60	3841.45	3857.31	4673.17	4692.46
15.	Price of 40 kgs of cane ( Rs per 40 kgs)	145.90	146.50	153.66	154.29	186.93	187.70

**Sources:**

- i) For average fob (London) price: Annex IX
- ii) For freight, incidentals and duties: Trading Corporation of Pakistan, Karachi.

**Note:**

- (a) Ratio of cost of cane to processing cost has been estimated at 66.34 from publication " Cost of Production of Sugar " jointly prepared in 1988 by APCOM and Business & Consultancy Services.

EXPORT PARITY PRICES OF SUGARCANE AT MILL-GATE ON THE BASIS OF (FOB LONDON)  
PRICES OF WHITE SUGAR

Item	May 2013		2012- 13 (Oct-May)		During 2009-10 to 2011-12	
	US \$ per tonne					
Average fob (London) price	482.80		512.84		643.34	
Exchange rate (Rs/\$)	98.52		98.52		98.52	
----- Rs. per tonne -----						
Average fob Karachi price ( assuming equivalent to fob London price)	47565		50525		63382	
Transport charges from interior Sindh to port, special packing, inspection transit insurance, loading and unloading, clearing and forwarding agents commission	1000		1000		1000	
Wharfage	54		54		54	
Bank commission @ 1 % of fob price	476		505		834	
Pre- shipment inspection charges@ 0.5% of fob price	238		253		317	
Ex-mill price of sugar ( item 3 minus items 4 through 7)	45798		48713		61377	
	Punjab	Sindh	Punjab	Sindh	Punjab	Sindh
Processing cost of sugar (a)	15571	15571	16562	16562	20868	20868
Value of cane to produce one of sugar (item 8-item 9)	30227	30227	32151	32151	40509	40509
Provincial base sugar recovery (Percent)	9.69	9.73	9.69	9.73	9.69	9.73
Quantity of cane in tonnes required to produce one tonne of sugar ((100/ item 11)	10.32	10.28	10.32	10.28	10.32	10.28
Price of one tonne of sugarcane (item 10/item 12) Rs/tonne	2928.96	2941.05	3115.40	3128.26	3925.31	3941.52
Price of 40 kgs of cane ( Rs per 40 kgs)	117.16	117.64	124.62	125.13	157.01	157.66

For average fob (London) price: Annex IX.

For incidentals and duties: Trading Corporation of Pakistan, Karachi.

For transport charges: Arian Cargo Transport Agency, Karachi.

Ratio of cost of cane to processing cost has been estimated at 66:34 from publication " Cost of Production of Sugar " jointly prepared in 1996 by APCOM and Business & Consultancy Services.

MIL-GATE PRICES OF SUGARCANE WORKED BACK FROM THE EXPECTED WHOLESALE MARKET PRICES OF  
OF SUGAR DURING 2013-13

S.No	Item	WORKED BACK PRICES OF SUGARCANE							
		-----Rupees per tonne-----							
1.	Average wholesale market prices of sugar (a)	50000		55000		60000		65000	
2.	Wholesale dealer margin @5% on net price	2049		2254		2459		2705	
3.	Sales tax @ Rs 17 %	6967		7664		8361		9197	
4.	Net price of sugar (items 1-2-3)	40984		45082		49180		53098	
		Punjab	Sindh	Punjab	Sindh	Punjab	Sindh	Punjab	Sindh
5.	Processing cost of sugar (a)	13795	13795	15175	15175	16554	16554	17873	17873
6.	Value of cane to produce one of sugar (item 8-item 9)	27188	27188	29907	29907	32626	32626	35225	35225
7.	Provincial base sugar recovery (Percent)	9.69	9.73	9.69	9.73	9.69	9.73	9.69	9.73
8.	Quantity of cane in tonnes required to produce one tonne of sugar ((100/ item 12)	10.32	10.28	10.32	10.28	10.32	10.28	10.32	10.28
9.	Price of one tonne of sugarcane (item 11/item 13) Rs/tonne	2635	2645	2898	2910	3161	3175	3413	3427
10.	Price of 40 kgs of cane ( Rs per 40 kgs)	105.38	105.82	116.92	116.40	126.46	126.98	136.53	137.10

Note

- (a) Ratio of cost of cane to processing cost has been estimated at 66.34 from publication " Cost of Production of Sugar " jointly prepared in 1996 by APCOM and Business & Consultancy Services.

Sources:

- 1 Annex —  
2 For sales tax, FBR, Islamabad

**Commercial Sugarcane Varieties Developed and Released through Coordinated  
Sugar Crops Research Program of the PARC**

S. No.	Name of variety	Name of Institute	Year of Release	Maturity	Cane Yield (t/ha)	Sugar recovery (%)
<b>Punjab</b>						
1.	BF-162	AARI, Fsd.	1990	Early	100	10.5
2.	SPSG-26	SRI, Jhang	1991	Early	100	10.2
3.	BF-129	AARI, Fsd.	1996	Mid	100	9.8
4.	CP-43-33	AARI, Fsd.	1996	Early	90	10.8
5.	CP-72-2086	AARI, Fsd.	1996	Early	90	12.0
6.	CP-77-400	AARI, Fsd.	1996	Early	100	12.7
7.	CPF-237	AARI, Fsd.	2000	Early	95	12.5
8.	SPF-213	AARI, Fsd.	2000	Mid	100	11.0
9.	HSF-240	AARI, Fsd.	2002	Early	130	12.5
10.	SPF-234	AARI, Fsd.	2002	Early	100	11.6
11.	SPF-245	AARI, Fsd.	2004	Early	100	11.0
12.	HSF-242	AARI, Fsd.	2006	Early	108	12.4
13.	CPF-243	AARI, Fsd.	2006	Early	102	12.7
14.	NSG-555	SRI, Jhang	2008	Mid	119	10.1
15.	NSG-311	SRI, Jhang	2008	Mid		
16.	CPF-246	AARI, Fsd	2010	Early	105	12.0
17.	CPF-247	AARI, Fsd	2010	Early	105	12.5
<b>Sindh</b>						
18	Ghulabi-95	ARI, Tandojam	1996	Early	200	10.7
19	NIA-98	NIA, Tandojam	1998	Mid	180	10.5
20	Thatta-10	NSCRI, Thatta	2004	Early	180	11.0
21	NIA-2004	NIA, Tandojam	2004	Mid	170	9.5
22	LRK-2001	QAARI, Larkan	2005	Early	200	11.0
<b>KPK</b>						
22.	CPM-13	SCRI, Mardan	1989	Early	70	12.5
23.	CO-1321	SCRI, Mardan	1989	Early	70	12.0
24.	Mardan -92	SCRI, Mardan	1992	Mid	100	12.0
25.	Mardan -93	SCRI, Mardan	1993	Early	100	12.5
26.	CP-77-400	SCRI, Mardan	1996	Mid	80	12.7
27.	Jn-88/1	SBS, Dargai	1996	Early	70	12.7
28.	Abid-96	SBS, Dargai	1996	Early	70	12.5
29.	SN-98	SCRI, Mardan	1998	Early	72	12.2
30.	MCP-421	SCRI, Mardan	2003	Mid	80	12.5
31.	Mardan-2005	SCRI, Mardan	2005	Early	90	12.2
32.	KB-2010	ARS, Bannu	2010	Early		

Source:PARC

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