



# **SUGARCANE POLICY ANALYSIS FOR 2023-24 CROP**



**AGRICULTURE POLICY INSTITUTE**  
**MINISTRY OF NATIONAL FOOD SECURITY AND RESEARCH**  
**GOVERNMENT OF PAKISTAN**  
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## CONTENTS

S.No.	Description	Page No.
-	SUGARCANE POLICY ANALYSIS 2022-23 EXECUTIVE SUMMARY AND RECOMMENDATIONS	i-iii
1.	INTRODUCTION	1
2.	SUGARCANE PLANTING AND HARVESTING SEASONS	2
3.	PROVINCIAL SHARES	3
.	3.1 Provincial Shares in Area and Production	3
4.	IMPORTANT SUGARCANE PRODUCING DISTRICTS	5
5.	CHANGES IN AREA, YIELD AND PRODUCTION DURING 2012-13 TO 2022-23	6
	5.1 Long-term Changes (Growth Rates): 2012-13 to 2022-23	6
	5.2 Short-term Changes: 2021-22 and 2022-23 Crops	6
6.	TARGETS VS ACHIEVEMENTS: 2022-23 CROP	7
7.	COST OF PRODUCTION ESTIMATES OF SUGARCANE	8
	7.1 Cost of Different Inputs and Operations in Punjab, Sindh and Khyber Pakhtunkhwa	8
8.	NOMINAL AND REAL INDICATIVE / MARKET PRICES OF SUGARCANE	12
	8.1 Nominal and Real Indicative and Market Prices of Sugarcane in Punjab	12
	8.2 Nominal and Real Indicative Prices of Sugarcane in Sindh	13
9.	IMPACT OF INCREASE IN SUGAR PRICE ON CONSUMER PRICE INDEX (CPI)	14
	9.1 Impact on CPI	14
	9.2 Impact on Household Expenditure	15
10.	COMPARATIVE ECONOMICS OF SUGARCANE AND COMPETING CROPS	15
	10.1 Economics of Sugarcane: Inter Provincial Comparison	18
11.	ECONOMIC EFFICIENCY OF SUGARCANE PRODUCTION	18
	11.1 Nominal Protection Coefficient (NPC)	19
	11.2 Effective Protection Coefficient (EPC)	20
	11.3 Domestic Resource Cost of Coefficient (DRC)	21
12.	DOMESTIC DEMAND, SUPPLY, STOCK AND PRICES OF SUGAR	22
	12.1 Domestic Demand, Supply and Stocks	22
	12.2 Projected Domestic Requirement for 2023-24 on the basis of Previous Data	23
	12.3 Behavior of Sugar Prices in Domestic Market	23
13.	WORLD SUPPLY, DEMAND, STOCKS, TRADE AND PRICES OF SUGAR	23
	13.1 Supply, Demand, Stocks and Trade	23
	13.2 International Prices of Sugar	24
14.	IMPORT AND EXPORT PARITY PRICES OF SUGARCANE	24
15.	MILL-GATE PRICES OF SUGARCANE BASED ON DIFFERENT SLABS OF SUGAR IN DOMESTIC WHOLESALE MARKETS OF THE COUNTRY DURING 2022-23	25

16.	USE OF SUGARCANE CESS FUND		26
	16.1	Key Achievements by using the CESS Fund Received During 2022-23 by SRDB	27
17.	SUGARCANE CROP RESEARCH AND DEVELOPMENT IN PAKISTAN		27
18.	MARKETING OF SUGARCANE		29
	18.1	Delayed Payments	29
	18.2	Presence of Middlemen	30
	18.3	Underweighment and Undue Deductions	30
	18.4	Contract between Farmers and Sugar Mills	30
	18.5	Intercropping	30
	18.6	Provision of Seed of Approved Varieties	31
	18.7	Low Plant Population	31
	18.8	Amendments in Sugar Factories Control Act, 1950	32
	18.9	Value-Addition and Vertical Integration in Sugar Industry	32
	18.1	Balanced Use of Fertilizers	32
19.	SUGARCANE YIELD AMONG COMPETING COUNTRIES		32
20.	MEASURES FOR IMPROVING PRODUCTIVITY		35
	20.1	Varietal Development	35
	20.2	Improved Cultural Practices	36
	20.3	Biological Control	36
	20.4	Role of Sugar Industry in Cane Development	36
	20.5	Low Sugar Recovery	37
21.	ACKNOWLEDGEMENT		38

<b>S.No.</b>	<b>FIGURES</b>	<b>Page No.</b>
1.	Provincial Shares in Area and Production of Sugarcane: Average 2012-13 to 2014-15 (Shares in Area)	3
2.	Provincial Shares in Production of Sugarcane: Average 2012-13 to 2014-15 (Shares in Production)	4
3.	Provincial Shares in Area and Production of Sugarcane: Average 2020-21 to 2022-23 (Share in Area)	4
4.	Provincial Shares in Production of Sugarcane: Average 2020-21 to 2022-23 (Shares in Production)	5
5.	Output-Input Ratio of Sugarcane in Punjab	16
6.	Output-Input Ratio of Sugarcane in Sindh	17
7.	International Prices of Raw Sugar	24

S.No.	Tables	Page No.
1.	Planting and Harvesting Times of Sugarcane by Province	2
2.	Comparison of Provincial Shares in Area and Production of Sugarcane: 2012-13 to 2014-15 and 2020-21 to 2022-23	3
3.	Average Annual Growth Rate of Area, Yield and Production of Sugarcane: 2012-13 to 2022-23	6
4.	Area, Yield and Production of Sugarcane: 2022-23 versus 2021-22 Crops	7
5.	Targets and Estimated Achievements of Area, Yield and Production of Sugarcane: 2022-23 Crop	7
6.	Cost of Major Items of Cultivation of Sugarcane: 2022-23 versus 2023-24 Crops	9
7.	Estimation of Average Farmer's Cost of Production in Punjab 2022-23 versus 2023-24	10
8.	Estimation of Average Farmer's Cost of Production in Sindh 2022-23 versus 2023-24	11
9.	Estimation of Average Farmer's Cost of Production in Khyber Pakhtunkhwa 2021-22 versus 2022-23	12
10.	Nominal and Real Indicative & Market Prices of Sugarcane Realized by the Growers in the Punjab: 2015-16 to 2022-23	13
11.	Nominal and Real Indicative & Market Prices of Sugarcane Realized by the Growers in Sindh: 2015-16 to 2022-23	14
12.	Impact of Increase in Sugar Price on CPI and Household Expenditure	15
13.	Economics of Sugarcane and Competing Crops at Prices Realized by the Growers for 2022-23 crop in Punjab	16
14.	Economics of Sugarcane and Competing Crops at Prices Realized by the Growers for 2022-23 Crop in Sindh	17
15.	Input Use Level and Yield of Sugarcane in Sindh Vs Punjab: 2022-23 Crop	18
16.	Nominal Protection Coefficients (NPC) for Sugarcane in Punjab and Sindh	19
17.	Effective Protection Coefficient (EPC) for Sugarcane in Punjab and Sindh	20
18.	Domestic Resource Cost Coefficients (DRCs) for Sugarcane in Punjab and Sindh Provinces	21
19.	Estimation of Requirement Sugar for consumption year 2022-23	22
20.	Projected Domestic Requirement of Sugar for Consumption Year 2023-24	23
21.	World Balance Sheet of Sugar (Raw Equivalent) 2020-21 to 2022-23 (October-September)	23
22.	Import/Export Parity Prices of Sugarcane as worked back from Average fob (London) Prices of Sugar	25
23.	Province-Wise Estimated Cess Fund Generated on the Basis of Sugarcane Crushed during 2021-22	25
24.	Sugarcane Prices worked back from Expected Wholesale Prices of Sugar during 2022-23	26
25.	Varieties Developed by Pakistan Agriculture Research Council (PARC) National Sugar and Tropical Horticulture Research Institute (NSTHRI), Thatta in Last Ten Years with their Characteristics	27
26.	Varieties Developed by SRI, in Last Ten Years with their Characteristics	28
27.	Varieties Developed by Crops Research Institute (CRI) , Mardan in Last Ten Years with their Characteristics	29
28.	Major Sugarcane Producing Countries Area of the World 2021 Crop	33
29.	Major Sugarcane Producing Countries Production of the World	34
30.	Yield Per Hectare of Major Sugarcane Producing Countries in the world 2021 Crop	35

S.No.	ANNEXES	Page No.
I.	PROVINCE-WISE AREA, PRODUCTION AND YIELD OF SUGARCANE IN PAKISTAN: 2012-13 TO 2022-23	39
II.	PROVINCE-WISE AREA, PRODUCTION AND YIELD OF SUGARCANE IN PAKISTAN: 2012-13 TO 2022-23	40
III.	DISTRICT-WISE AREA, YIELD AND PRODUCTION OF SUGARCANE: AVERAGE OF 2020-21 TO 2022-23	41
IV.	AVERAGE FARMERS COST OF PRODUCTION ESTIMATES OF SUGARCANE IN PUNJAB	42
V.	ESTIMATES FOR AVERAGE FARMER'S COST OF PRODUCTION OF SUGARCANE IN SINDH	43
VI.	AVERAGE FARMERS COST OF PRODUCTION ESTIMATES OF SUGARCANE IN KHYBER PAKHTUNKHWA	44
VII.	ECONOMICS OF SUGARCANE AND COMPETING CROPS AT PRICES REALIZED BY THE GROWERS: 2021-22 CROPS	45
VIII.	GROSS REVENUE OF SUGARCANE, TRADED INPUTS AND DOMESTIC FACTOR COST IN PUNJAB ESTIMATED ON THE BASIS OF PRIVATE AND SOCIAL PRICES (BASIS – IMPORT PARITY PRICE OF SUGAR)	48
IX.	GROSS REVENUE OF SUGARCANE, TRADED INPUTS AND DOMESTIC FACTOR COST IN PUNJAB ESTIMATED ON THE BASIS OF PRIVATE AND SOCIAL PRICES (BASIS – EXPORT PARITY PRICE OF SUGAR)	49
X	GROSS REVENUE OF SUGARCANE, TRADED INPUTS AND DOMESTIC FACTOR COST IN SINDH ESTIMATED ON THE BASIS OF PRIVATE AND SOCIAL PRICES (BASIS – IMPORT PARITY PRICE OF SUGAR)	50
XI	GROSS REVENUE OF SUGARCANE, TRADED INPUTS AND DOMESTIC FACTOR COST IN SINDH ESTIMATED ON THE BASIS OF PRIVATE AND SOCIAL PRICES (BASIS – EXPORT PARITY PRICE OF SUGAR)	51
XII	PER CAPITA AVAILABILITY (CONSUMPTION) OF SUGAR: 2018-19 TO 2020-21 (OCTOBER-SEPTEMBER)	52
XIII	DOMESTIC AVERAGE WHOLESALE PRICES OF SUGAR IN MAJOR DOMESTIC MARKETS: 2022 AND 2023	53
XIV	AVERAGE WHOLESALE PRICES OF SUGAR IN MAJOR DOMESTIC MARKETS: 2011-12 TO 2022-23 (OCTOBER-SEPTEMBER)	54
XV	AVERAGE INTERNATIONAL PRICES OF SUGAR: 2011-12 TO 2022-23 (OCTOBER-SEPTEMBER)	55
XVI	IMPORT PARITY PRICES OF SUGARCANE AT MILL-GATE ON THE BASIS OF FOB (LONDON) PRICE OF WHITE SUGAR	56
XVII	EXPORT PARITY PRICES OF SUGARCANE AT MILL-GATE ON THE BASIS OF (FOB LONDON) PRICES OF WHITE SUGAR	57
XVIII	MILL-GATE PRICES OF SUGARCANE WORKED BACK FROM THE EXPECTED WHOLESALE MARKET PRICES OF SUGAR DURING 2020-21	58

**ABBREVIATIONS**

AARI	:	Ayub Agricultural Research Institute
API	:	Agriculture Policy Institute
BCR	:	Benefit Cost Ratio
C&R	:	Cost and Freight
CIF	:	Cost, Insurance and Freight
COP	:	Cost of Production
CPI	:	Consumer Price Index
DRC	:	Domestic Resource Cost
ECC	:	Economic Coordination Committee
E&M	:	Economics & Marketing
EPIC	:	Effective Protection Coefficient
FAO	:	Food and Agriculture Organization
FOB	:	Free on Board
FSC&RD	:	Federal Seed Certification and Registration Department
FYM	:	Farm Yard Manure
HIES	:	Household Integrated Economic Survey
GDP	:	Gross Domestic Product
NARC	:	National Agricultural Research Centre
NFS&R	:	National Food Security and Research
NPC	:	Nominal Protection Coefficient
NSC	:	National Seed Council
OLS	:	Ordinary Least Squares
PARC	:	Pakistan Agricultural Research Council
PBS	:	Pakistan Bureau of Statistics
PSMA	:	Pakistan Sugar Mills Association
SRDB	:	Sugarcane Research and Development Board
TCP	:	Trading Corporation of Pakistan
WTO	:	World Trade Organization

# **SUGARCANE POLICY ANALYSIS FOR 2023-24 CROP**

## **EXECUTIVE SUMMARY**

Sugarcane is one of the largest high-value cash crops of the country. During the period 2012-13 to 2022-23, sugarcane production in Pakistan increased @ 3.1 per cent per annum, mainly due to improvement in yield @ 2.3 per cent and area expansion @ 0.8 per cent. Sugarcane production in Sindh has increased by 0.3 percent per annum while it increased by 4.4 percent in Punjab, 1.7 percent per annum in KPK and 2.6 percent per annum in Balochistan.

According to final estimates of Provincial Agriculture Departments (Crop Reporting Service), sugarcane production at country level, 2022-23 crop, is reported at 87.981 million tons, reflecting a decrease of 0.8 per cent over the last year production of 88.650 million tons. Decrease in production is mainly due to 5.2 per cent downcast in yield, while the area increased @4.6 percent. Major factors considered for this decline in yield are the climate change and floods 2022, Sindh affected with spread.

Cost of Production is an important factor in evolving suggestions for indicative price of the sugarcane. The cost of production for 2023-24 crop year has been increased by 12 percent in Punjab, 14.6 percent in Sindh and 12 percent in KPK over 2022-23. Main reasons for rise in cost of cultivation in all provinces are, among others, the increase in land rent, high prices of seed, stripping, binding, loading operations, etc.

As far as the nominal market price of sugarcane is concerned, the Price has shown fluctuating throughout the period under consideration. The market price averaged at Rs. 310 per 40 kg in 2022-23, which is 29.16% greater than the last year. The real market price remains below the nominal market price during the entire period under review mainly due to higher inflationary trend.

Grower's returns to overall investment, based on the average market prices, remained lower for sugarcane than for the Cotton combinations. Cotton combinations out-competed



Sugarcane and performed better in terms of all the economic criteria adopted in the analysis for 2022-23. However, sugarcane out-competed both Basmati and Non- Basmati combination with wheat showing an edge over the later in terms of irrigation water in Punjab. In terms of revenue per day of crop duration and purchased inputs too, sugarcane falls at the bottom of all the alternative crop combinations in Punjab. While in Sindh, sugarcane lags behind the competing crops comprehensively in terms of entire economic criteria adopted for the analysis. Sugarcane is out-competed by all crop combination with a considerable difference. The primary factor is the low yield of sugarcane, farmers harvested during 2022-23.

The global sugar production scenario for 2022-23 was forecasted at 175.05 million tons which is 0.01 million tons, (0.006 per cent) lower than the last year's production. Accounting for the opening stocks of 112.60 million tons, global supply of sugar in 2022-23 was projected at 287.65 million tons, 0.28 per cent higher than the last year. The end of year stocks were projected to increase further to 113.80 million tons, or 1.0 percent, higher due to better opening stocks.

Although the middlemen are paying less than the sugar mills, ranging Rs 5 to 15 per 40 kg varying from farmer to farmer, the presence of middlemen has been rampant all over the country, especially in Punjab and Sindh. Many farmers have cultivated sugarcane on less than one acre, and it is not economical to sell it at the mill gate and wait for the payment. Therefore, they are happy in presence of middlemen.

Delayed payment to the growers is a persistent feature in the sugar marketing. The sugar industry, at the beginning of the season, generally made payments to growers within two weeks as mentioned in the Sugar Factor Control Act, 1950. However, as the season progresses to the end, the payments are delayed by months and, in some cases particularly, in bumper crops by season. Mills are of the view that this happens due to liquidity problem. Although, during 2022-23, the crop size was 87.98 million tons, all times higher in the history, however, prices, did not decrease significantly, hence the complaints regarding delayed payments were relatively low.

The main reason was the continuous supply of sugarcane from Punjab to Sindh due to high prices of sugarcane in Sindh, which offset the impact.

In view of the decreasing trend in the world prices of sugar and large-scale investment in the domestic sugar industry, it is imperative to improve the efficiency of resource use in sugarcane production and its processing. To improve productivity in sugar processing, the requirements is not only to improve efficiency but also value addition through vertical integration. In the wake of fast approaching globalization and WTO requirements, the sugar industry would also have to go into value-adding business and growers would also get their share of returns.

## PRICE POLICY FOR SUGARCANE, 2023-24 CROP

### 1. INTRODUCTION

Sugarcane originated in Papua New Guinea. It belongs to the Gramineae family and to the botanical genus *Saccharum*<sup>1</sup>, whose stalk has the particular capacity to store a crystallizable sugar/ sucrose. Sugar and rum markets have always been the prime outlets for the crop. It is a perennial crop, which grows back after each harvest. Sugarcane is grown in more than a hundred countries, by independent farmers and agro industrial firms.

2. Sugarcane is the fourth largest and second most important cash crop of Pakistan. It provides valuable by-product (sugarcane tops) as fodder for livestock during winter. Sugar industry of Pakistan comprising of more than 90 sugar mills depends on sugarcane farming for raw material. Located mainly in the country side, it provides not only employment opportunities for rural labour but also contributes to rural development through the provision of infrastructure and many other forward and backwards linkages. Moreover, sugarcane farming and sugar industry have significantly contributed to the public exchequer in the form of excise duty and other taxes. However, indiscriminate expansion in the sugar industry particularly towards cotton zone has not only led to uneconomic horizontal expansion in sugarcane cultivation but also posed a serious threat to the country's water resources and forex earnings from cotton crop.

3. Sugarcane accounts for 3.7 percent in agriculture's value addition and 0.9 percent in GDP<sup>2</sup>. During 2022-23, sugarcane was cultivated on 1.319 million hectares showing increase of 4.7 percent compared to 1.260 million hectares last year. The main factor which contributed to more area sown was the lucrative market price of cane during the last year. However, production decreased by 0.75 percent to 87.98 million tons over last year production of 88.650 million tons. Yield has also declined from 70.34 tons per hectare to 66.71 tons per hectare.

4. Being tropical crop sugarcane needs sunshine, water and heat; therefore, in Pakistan it is cultivated mainly in Punjab, Sindh and Khyber Pakhtunkhwa. It provides raw material to the 2<sup>nd</sup> largest agro-based sugar industry. It provides directly and/or indirectly employment to millions of rural farming and non-farming community. In addition, it is a major source of fodder during winter season.

5. The marketing of sugarcane particularly in the beginning of crushing season becomes a challenging task for the farmers. Sugarcane and sugar sub-sectors used to be in turmoil, suffering the problems associated with over supply, surplus stocks of sugar, liquidity problems, and accumulated arrears of growers. However, the situation has changed during the 2022-23 year. Relatively decreased cane production resulting in short supplies to the mills and rise in sugar prices in the international market led the prices up of sugarcane and sugar in the domestic market considerably.

6. Farmers have been reporting issues related to marketing particularly at the harvesting of crop including long waiting at the mills, short weight of the produce at weighing bridge both at the purchase centers as well as in the mills, excessive deductions on account of trash contents, variety and delayed payments forcing the growers to sell off the produce to the middlemen at low price. This situation was tens during the bumper harvest and depressed prices in International sugar market.

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<sup>1</sup> Wikipedia.

<sup>2</sup> Economic Survey of Pakistan, 2022-23.

7. In the global context, according to Food and Agriculture Organization (FAO) Statistics Year Book 2021, Pakistan ranks 4<sup>th</sup> in terms of acreage and production and almost at the bottom i.e. 30<sup>th</sup> in terms of per hectare yield. The analysis of economic indicators being discussed in this report suggests that horizontal expansion in cane production is neither desirable nor feasible, particularly under sugar exporting scenario. However, there is a considerable scope for increasing cane production through improving the productivity of resources committed to its farming. Similarly there exists a large potential for improving sugar recovery rate through improvement in the processing efficiency at the mills and cultivation of high sucrose varieties of cane. Efforts are also required to improve the efficiency of resources already committed to produce sugarcane and sugar so that cost of production of this farm enterprise could be reduced which ultimately make Pakistani sugar competitive in international sugar market.

## 2. SUGARCANE PLANTING AND HARVESTING SEASONS

8. Sugarcane, a tropical crop requires temperature of more than 20 °C 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 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 October
NWFP	15 <sup>th</sup> February to 3 <sup>rd</sup> week of March	September

**Source:** Official correspondence with Sugarcane Coordinator, NARC, Islamabad.

9. The planting time for the Autumn crop depending on the monsoon rains can be advanced to August and may last up-to November in some areas. The planting of spring crop continues upto April.

10. Harvesting of sugarcane generally commences in October and lasts up-to April, depending upon the crop size. In Sindh the crop matures a couple of weeks earlier than in the Punjab and Khyber Pakhtunkhwa.

## 3. PROVINCIAL SHARES

11. Provincial shares in area and production of sugarcane have been discussed below:

### 3.1 Comparison of Provincial Share in Area and Production

12. Shares of area and production of sugarcane during the period 2012-13 to 2014-15 and 2020-21 to 2022-23 and changes therein are presented in Table-2 below:

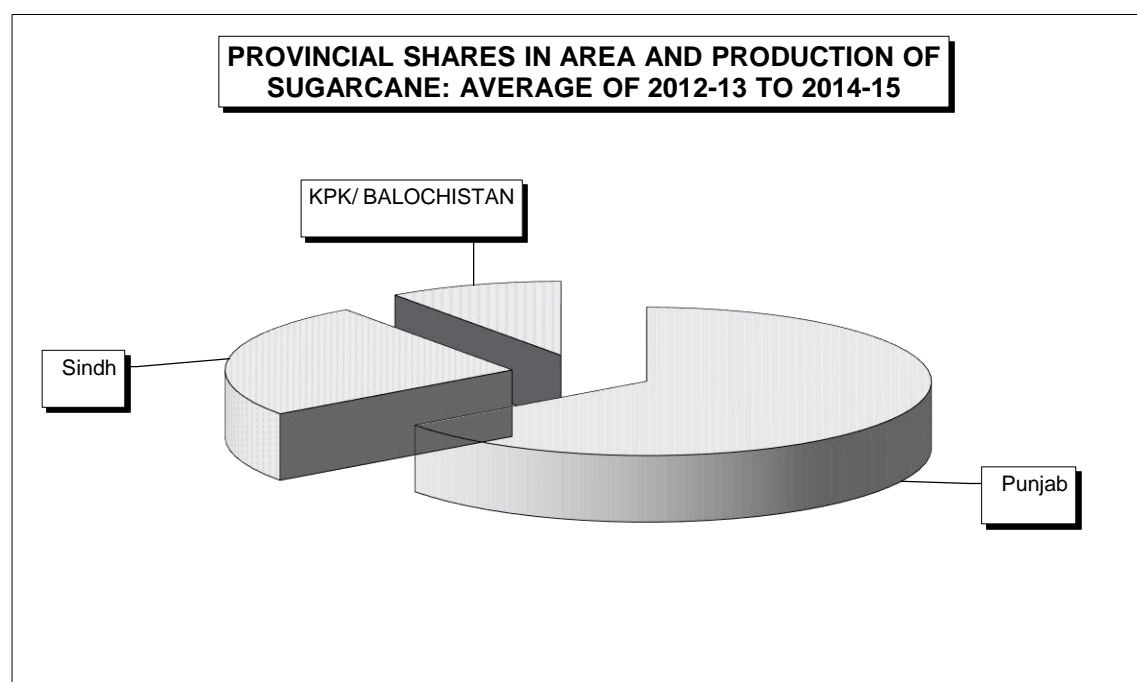
**Table-2: Comparison of Provincial Shares in Area and Production of Sugarcane: 2012-13 to 2014-15 and 2020-21 to 2022-23**

Country/Province	Area			Production		
	Average 2012-13 to 2014-15	Average 2020-21 to 2022-23	Change	Average 2012-13 to 2014-15	Average 2020-21 to 2022-23	Change
	----- Percent -----					
<b>Pakistan</b>	<b>100.00</b>	<b>100.00</b>	<b>-</b>	<b>100.00</b>	<b>100.00</b>	<b>-</b>
Punjab	64.94	69.02	6	65.84	73.04	11
Sindh	25.22	23.08	-9	26.25	20.95	-20
KP/Balochistan	9.84	7.89	-20	7.90	6.01	-24

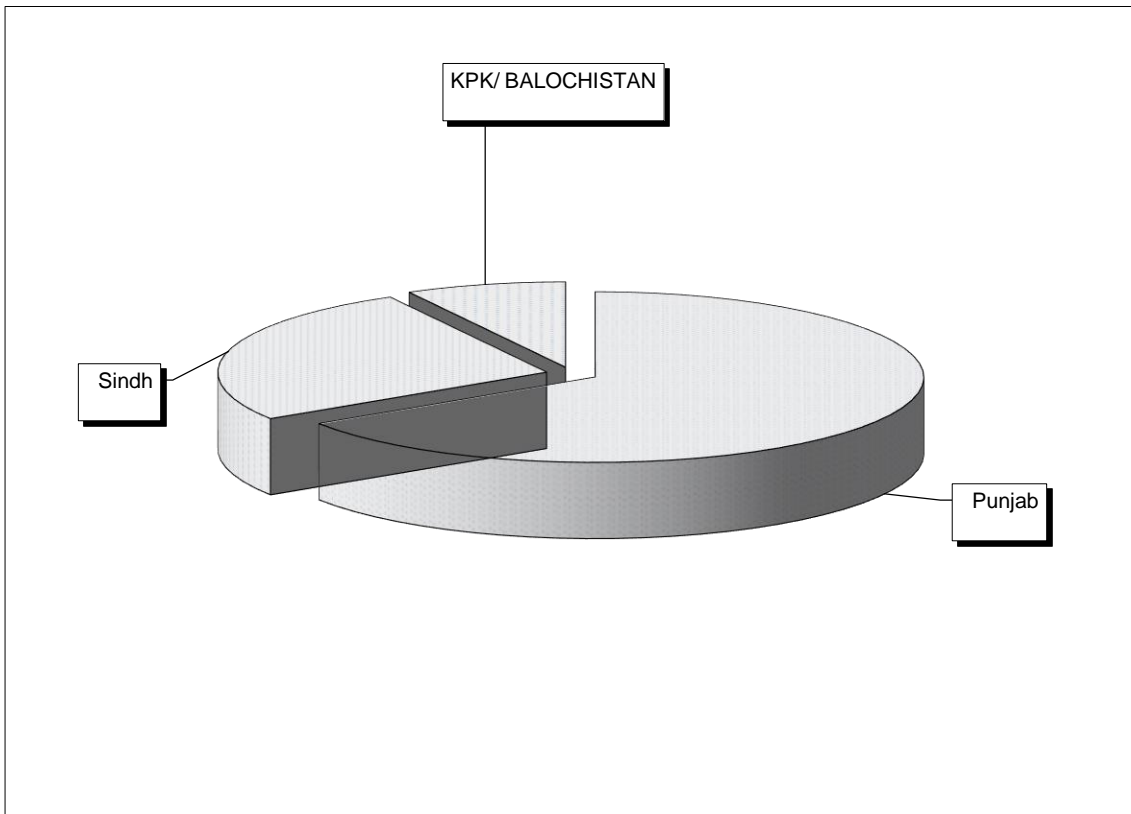
**Source:** Worked out from Annex-I.

13. A comparison of provincial share in area, average of 2012-13 to 2014-15 over 2020-21 to 2022-23, shows that area in Punjab has been increased by 6.3 percent, whereas in Sindh and Khyber Pakhtunkhwa/ Balochistan decreased by 8.5 and 19.8 percent respectively. Production has followed similar pattern; in Punjab increased by 10.9 percent, while it decreased in Khyber Pakhtunkhwa/Baluchistan by 20.2 and 23.9 percent, respectively. Provincial shares for the period 2012-13 to 2014-15 are depicted in Figures 1 and 2, while for 2020-21 to 2022-23 illustrated in figures 3 and 4 below:

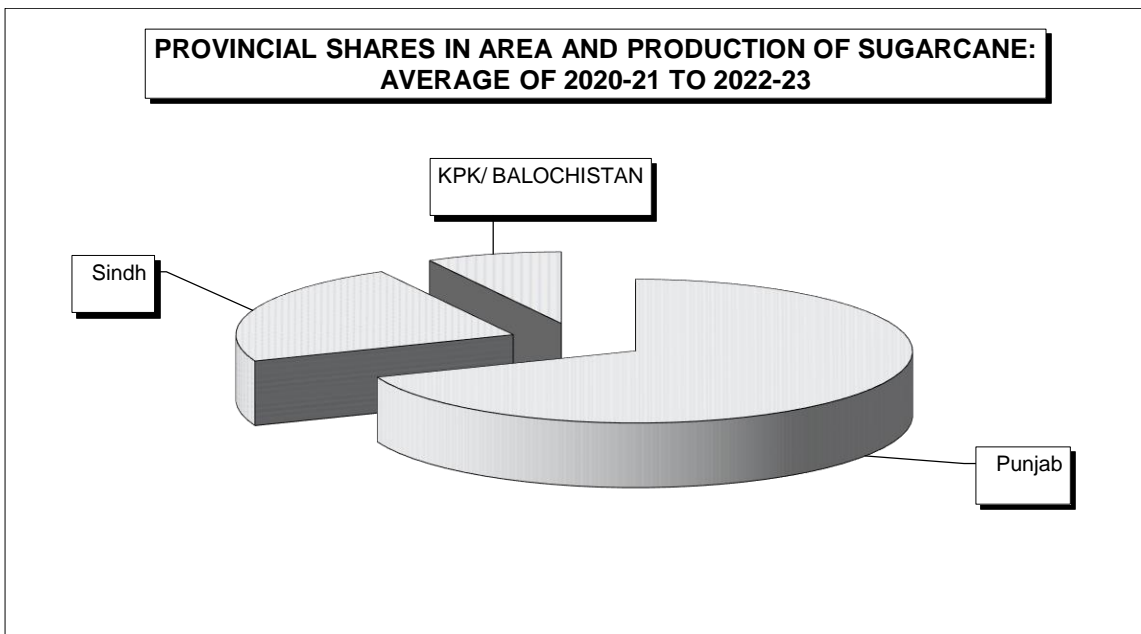
**Fig 1: Shares in Area**

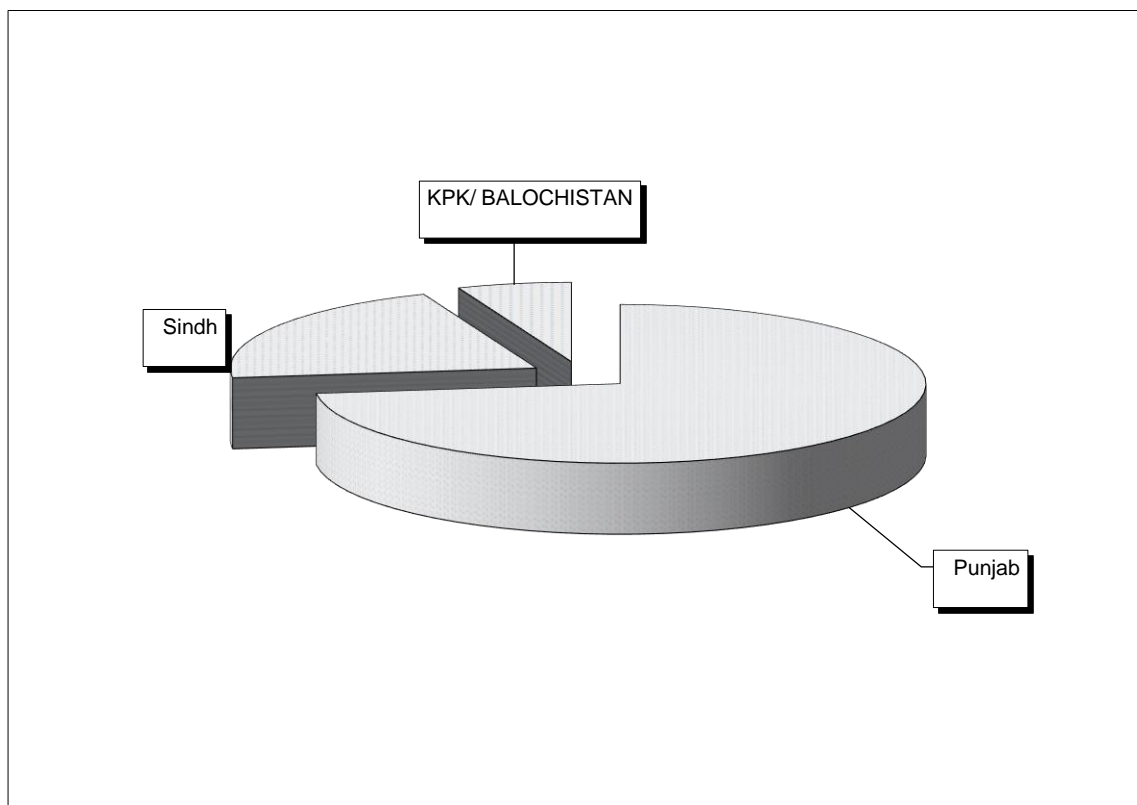


**Fig 2: Shares in Production**



**Fig 3: Shares in Area**



**Fig 4: Shares in Production**

#### 4. IMPORTANT SUGARCANE PRODUCING DISTRICTS

14. Sugarcane is a high delta crop and grown in irrigated conditions. Districts which grow 100 thousand tons or more of sugarcane are mentioned below:

##### **Punjab:**

R.Y.Khan, Faisalabad, Jhang, Sargodha, Rajanpur Chiniot , Muzaffargarh , T.T Singh, Bhakkar, Bahawalpur, M.B Din, Kasur, Vehari, Layyah, Bahawalnagar, Okara, Nankana Sahib, D.G.Khan, Khanewal, Khushab, Hafizabad, Mianwali, Lodhran, Multan, Sahiwal, Sheikhpura, Sialkot, Gujrat and Pakpattan.

##### **Sindh:**

Ghotki, Nawabshah, Thatta, Khairpur, Naushero Feroze, Tando Allahyar, Mirpur Khas, Matiari, Tando Muhammad Khan, Sanghar, Badin, Sukkur, Dadu ,Hyderabad and Umerkot.

##### **Khyber Pakhtunkhwa:**

Charsadda, D.I Khan, Mardan, Peshawar, Malakand and Nowshera.

The above mentioned 50 districts; 29 from the Punjab, 15 from Sindh and 6 from KP collectively account for 99 per cent of the sugarcane area and production (**Annex-III**).

##### **Balochistan:**

Sugarcane is cultivated also in Balochistan on 0.77 thousand hectares with yield ranging between 48.53 to 72.69. Production in Balochistan is lower than 50 thousand tons. However, this crop needs to be cultivated in marginal lands. It is suggested that a sugar mill may be shifted to the sugarcane growing area for expansion of crop.

## 5. CHANGES IN AREA, YIELD AND PRODUCTION DURING 2012-13 TO 2022-23

15. Throughout the decade ending 2022-23, the area under sugarcane at country level ranged between 1,039.8 to 1,341.8 thousand hectares (2,569.4 and 3,315.6 thousand acres) and production from 62.826 to 88.650 million tons. Yield of sugarcane fluctuated between 55.09 to 69.53 tons per hectare (Annex-II).

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

### 5.1 Long-term Changes (Growth rates): 2012-13 to 2022-23

17. During the above-mentioned period, sugarcane production in Pakistan increased @ 3.1 per cent per annum mainly due to improvement in yield @ 2.3 per cent and area expansion @ 0.8 per cent (Table-3).

**Table-3: Average Annual Growth Rate of Area, Yield and Production of Sugarcane: 2012-13 to 2022-23**

Country/Province	Area	Yield	Production
	Percent per annum		
Pakistan	0.8	2.3	3.1
Punjab	1.4	2.9	4.4
Sindh	-0.1	0.3	0.3
Khyber Pakhtunkhwa	-1.7	1.8	0.1
Baluchistan	2.1	0.5	2.6

**Source:** Worked out from Annex-I.

**Note:** Growth rates have been worked out by estimating the equation,  $Y = (1+r)^x$  (OLS) from the data given in Annex-I.

18. Sugarcane production in Punjab during the period under reference has increased @ 4.4 per cent per annum by virtue of 2.9 per cent improvement in yield and 1.4 per cent expansion in area. Sugarcane production in Sindh has increased by 0.3 percent due to 0.3 percent increase in yield while area decreased slightly by 0.1 percent.

19. In KP, sugarcane area decreased @ 1.7 while the yield has increased @ 1.8 percent per annum. In Balochistan, sugarcane production increased @ 2.6 percent supported by improvement in area and yield @ 2.1 and 0.5 percent respectively.

### 5.2 Short-term Changes: 2021-22 and 2022-23 Crops

20. According to final estimates of Provincial Agriculture Department (Crop Reporting Service) sugarcane production at country level 2022-23 crop is reported at 87.981 million tons, reflecting a decrease of 0.8 per cent over last year production of 88.650 million tons. Decrease in production is mainly due to 5.2 per cent downcast in yield, while the area increased @ 4.6 percent (Table-4). Major factor considered for this decline in yield the climate change – Floods 2022, Sindh being affected with spread.



**Table-4: Area, Yield and Production of Sugarcane: 2022-23 versus 2021-22 Crops**

Country/ Province	Area		Changes	Yield		Changes	Production		Changes
	2021- 22	2022- 23		2021- 22	2022- 23		2021- 22	2022- 23	
	000 ha		Per cent	tonnes per ha		Per cent	000 tonnes		Per cent
<b>Pakistan</b>	<b>1,260</b>	<b>1319</b>	<b>5</b>	<b>70</b>	<b>67</b>	<b>-5</b>	<b>88,650</b>	<b>8,7981</b>	<b>-0.8</b>
Punjab	869	938	8	74	71	-3	64,245	66,932	4
Sindh	295	289	-2	66	56	-15	19,461	16,172	-17
KP	95	91	-5	52	53	3	4,910	4,844	-1.3
Baloch.	0.70	0.70	0.0	50	47	-4	35	33	-5

**Source:** Annex-I.

21. Sugarcane production for 2022-23 in Punjab is reported at 66.932 million tons which shows an increase of 4.2 per cent higher than the last year. The increase mainly mounted due to 7.9 per cent expansion in area, as the yield has been decreased @ 3.4 percent.

22. In Sindh, sugarcane production for 2022-23 crop, decreased by 16.9 per cent as compared to previous year. This depreciation is attributed mainly due to 2.0 shrinking of area by a reduction and 15.2 percent in yield.

23. In Khyber Pakhtunkhwa, production also decreased by 1.3 per cent due to 4.6 percent declined in area, though, 3.4 per cent mounted in yield.

24. In Baluchistan, area remains stagnant at previous year level. However, production has been decreased by 4.9 per cent due to 4.9 per cent decline in yield.

## 6. TARGETS VS ACHIEVEMENTS: 2022-23 CROPS

25. The Federal Committee on Agriculture (FCA) has fixed the sugarcane production target for 2022-23 crop at 78.589 million tons. As per final estimates of the Provincial Agriculture Departments, sugarcane production from 2022-23 crop is reported at 87.981 million tons (12.0 per cent higher than the target). It is the effect of 11.6 and 0.3 per cent over achievement in area and yield, respectively (Table-5).

**Table-5: Targets and Estimated Achievements of Area, Yield and Production of Sugarcane: 2022-23 Crop**

Country/ Province	Area		Deviati on from the target	Yield		Deviati on from the target	Production		Deviation from the target
	Target	Achieve ment		Target	Achieve ment		Target	Achieve ment	
	--- 000 ha ----		Per cent	Tons/ha		Per cent	-- 000 tonnes --		Per cent
<b>Pakistan</b>	<b>1,181.9</b>	<b>1,318.8</b>	<b>11.6</b>	<b>66.5</b>	<b>66.7</b>	<b>0.3</b>	<b>78,589</b>	<b>87981</b>	<b>12.0</b>
Punjab	760.8	938.0	23.3	69.0	71.4	3.4	52,500	66932	27.5
Sindh	310.0	289.4	-6.6	64.4	55.9	-13.2	19,95	16172	-18.9
KPK	110.1	90.7	-17.6	55.3	53.4	-3.4	6,086	4844	-20.4
Balochistan	1.0	0.7	-30.0	52.5	47.4	-9.7	52.5	33.2	-36.8

**Sources:**

1. For targets: 18<sup>th</sup> meeting of FCA held on 19<sup>th</sup> May 2022, NFS&R, Islamabad
2. For achievements: Annex-II.

26. In Punjab, sugarcane area, yield and production surpassed the targets by 23.3, 3.4 and 27.5 percent, respectively. Sindh, Khyber Pakhtunkhwa and Balochistan could not achieve their targets in area, yield and production.

## 7. COST OF PRODUCTION ESTIMATES FOR SUGARCANE

27. Cost of production is an important factor in formulating proposals for indicative price of sugarcane crop. Its importance is well recognized due to the widespread impact of government policies on input prices. Different government policies can identify tax structures for inflation and agricultural inputs, which ultimately change the cost of production of crops.

28. The Agriculture Policy Institute collects primary data from the field on various components of farming every year to estimate the cost of production. These estimates provide guidance in determining the indicative price of the crop.

29. Cost of production of sugarcane for 2023-24 crops in the provinces of Punjab, Sindh and Khyber Pakhtunkhwa is estimated using the traditional input-output parameters adopted in the API.

30. This section analyses various inputs such as seeds, fertilizers, sprays, irrigation numbers (tube-wells and canals) soil preparation and seed sowing and hoeing, etc. To estimate the cost of production of the sugarcane crop for 2023-24, their physical use (quantity) for 2023-24 has been revised along with the corresponding prices and rental rates for the said tractor operations in major sugarcane producing districts/regions.

31. Consolidated summary of cost of production of sugarcane for 2023-24 crops for the provinces of Punjab, Sindh and Khyber Pakhtunkhwa is produced in Table-6 to Table-8 while background data is placed in Annex-IV, Annex-V and Annex-VI, respectively.

32. In the following paragraphs, peculiar features of the cost of production estimates, as mentioned above, are described for comparison with the previous crop estimates.

### **7.1 Cost of different inputs and operations in Punjab, Sindh and Khyber Pakhtunkhwa**

33. The following paragraphs provide a brief description of cost of production estimates and review the key components for the upcoming season 2023-24. Table-6 compiles the data for 2022-23 and possibly for 2023-24.

34. It is visible from data in Table-6 that in Punjab, land rent with 29.65% would be the major cost component during 2023-24, followed by fertilizers and farmyard manure including transportation and application at 16.50%. Third major item is Seed & sowing operations 15.72% while 'Other costs' including markup, management charges and land tax would make about 11.99% of total cost of cultivation. Cost of harvesting, stripping, binding and loading of cane stands at 10.67%, Irrigation is 6.20% while Land and seed bed preparation is about 5.97% and the interculture and plant protection make 3.30%.

35. Component wise cost of production in Sindh (Table-6) indicates that land rent is about to make maximum part of total cost of cultivation of sugarcane, estimated at 29.13%. Next higher item is 'seed and sowing operations with 17.85%, including application, followed by fertilizers and farmyard manure including transportation and application 16.62%, 'Other costs' which include mark-up on capital, management charges, land tax, land revenue, Road Cess, etc are likely to carry about 12.65% of the cost of cultivation in 2023-24 crop. Harvesting, stripping, binding and loading of cane are about 7.96%. Irrigation is about 7.25%. Rest of the components like Plant protection, Interculture show a share of approximately 3.57%, combined.

36. During 2023-24 crop year major constituents of cost of cultivation of sugarcane in Khyber Pakhtunkhwa are land rent 30.98 %, seed and sowing operation 19.37%, fertilizer and FYM including transportation and application 18.24 %. 'Other costs' would make about 12.53% of the total. Last column of Table-6 shows difference in each component over the last year, which also supports the above findings.

**Table-6: Cost on Major Items of Cultivating of Sugarcane: 2022-23 versus 2023-24 Crop**

<b>Summary of cost of production estimates for sugarcane in Punjab</b>					
<b>Major operation</b>	<b>2022-23</b>	<b>Share</b>	<b>2023-24</b>	<b>Share</b>	<b>Change over 2022-23</b>
	Rs/acre	%	Rs/acre	%	Rs/acre
1. Land and seed bed preparation	10,650.0	6.12	12,000	5.97	1,350
2. Seed and sowing operations	28,175.0	16.18	31,587	15.72	3,412
3. Plant protection and interculture	5,450.0	3.13	6,625	3.30	1,175
4. Irrigation	10,050.0	5.77	12,450	6.20	2,400
5. Fertilizer & FYM, incl TP & app	37,205.0	21.37	33,156	16.50	- 4,048
6. Land rent	48,750.0	27.99	59,583	29.65	10,833
7. Harvesting, stripping, binding, loading	19,000.0	10.91	21,450	10.67	2,450
8. Other costs	14,858.4	8.53	24,089	11.99	9,230
9. Gross cost of cultivation	174,138.4	100.00	200,941	100.00	26,802
10. Subsidy on DAP +value of tops	2,900.00		3,000		100
11. Net cost of cultivation	171,238.4	98.33	197,941	98.51	26,702
12 Yield (kgs/acre)	760		780		20
13 Cost of Production at mill gate (Rs/40 kgs)	245.31		274		30
<b>Summary of cost of production estimates for sugarcane in Sindh</b>					
<b>Major operation</b>	<b>2022-23</b>	<b>Share</b>	<b>2023-24</b>	<b>Share</b>	<b>Change over 2022-23</b>
	Rs/acre	%	Rs/acre	%	Difference
1. Land and seed bed preparation	8,550	5.23	9,750	5.04	1,200
2. Seed and sowing operations	31,300	19.14	34,525	17.85	3,225
3. Irrigation	12,050	7.37	14,020	7.25	1,970
4. Plant protection and interculture	5,642	3.45	6,790	3.51	1,148
5. Fertilizer & FYM inclu T&app	35,913	21.96	32,139	16.62	- 3,774
6. Land rent	43,333	26.50	56,333	29.13	13,000
7. Harvesting, stripping, binding, loading	11,560	7.07	15,400	7.96	3,840
8. Other costs	15,177	9.28	24,461	12.65	9,284
9. Gross cost of cultivation	163,524	100.00	193,418	100.00	29,893
10 Subsidy on DAP /value of tops	2,400		2,000		- 400
11 Net cost of cultivation	161,124	98.53	191,418	98.97	30,294
12 Yield (kgs/acre)	680		700		20
13 Cost of Production at mill gate (kgs/40 kgs)	256.95		294.45		37.5

<b>Summary of cost of production estimates for sugarcane in Khyber Pakhtunkhwa</b>					
<b>Major operation</b>	<b>2022-23</b>	<b>Share</b>	<b>2023-24</b>	<b>Share</b>	<b>Change over 2022-23</b>
	Rs/acre	%	Rs/acre	%	Difference
1. Land and seed bed preparation	8,737	6.44	9,844	6.25	1,106
2. Seed and sowing operations	27,575	20.32	30,488	19.37	2,913
3. Irrigation	3,750	2.76	4,800	3.05	1,050
4. Plant protection and interculture	1,650	1.22	1,850	1.18	200
5. Fertilizer & FYM inclu T & app	31,513	23.22	28,700	18.24	- 2,813
6. Land rent	37,917	27.94	48,750	30.98	10,833
7. Harvesting, stripping, binding, loading	12,100	8.92	13,225	8.40	1,125
8. Other costs	12,479	9.19	19,725	12.53	7,247
9. Gross cost of cultivation	135,720	100.00	157,381	100.00	21,661.3
10 Subsidy on DAP/value of tops	2,900		2,200		- 700
11 Net cost of cultivation	132,820	97.86	155,182	98.60	22,361
12 Yield (kgs/acre)	550		575		25
13 Cost of Production at mill gate (Rs/40 kgs)	255		285		30

**Source: Annex-IV,V,VI**

#### - Punjab

37. From the data presented in Table-7 below, it may be seen that the unit cost of cultivating one acre of sugarcane inclusive of land rent during 2023-24 in Punjab province is likely to be Rs.200,941. Incorporating the value of tops at Rs.3,000/acre, this ultimately ends in cultivation cost/40 kg at farm level as Rs.253.77/40 kg with land rent and Rs.177.38 without land rent. By adding marketing cost @ Rs.21.00/40 kg to these estimates, the cost of production per 40 kg of sugarcane at the mill gate estimates to Rs.274.77 with land rent and Rs.198.38/40 kg without land rent.

38. Main reasons for rise in cost of cultivation of sugarcane in Punjab include the increase in land rent and fertilizer prices.

**Table-7: Estimation of Average Farmer's Cost of Production in Punjab: 2022-23 versus 2023-24**

Sr.	Item	Unit	2022-23	2023-24
<b>Punjab</b>				
1.	Gross cost of cultivation	Rs/acre	174,138	200,940.65
	a) Subsidy on DAP	Rs/bag	900	-
	b) Value of tops	Rs/acre	2,000	3000
2.	Net cost of cultivation	Rs./ acre	171,238	197,940.65
3.	Yield	40 kg/ acre	760	780.00
4.	Cost of production at farm level			
	a) With land rent	Rs. / 40 kg	225.31	253.77
	b) Without land rent	“	161.17	177.38
5.	Marketing charges	“	20.00	21
6.	Cost of production at mill gate			
	c) With land rent	Rs./ 40 kg	245.31	274.77
	d) Without land rent	“	181.17	198.38

**Source: Annex-IV.**

- **Sindh**

39. For 2023-24 crop season, total cost of cultivating one acre of sugarcane in Sindh is expected to be Rs.193,418 (Table-8). During 2023-24 crop season, the major components of the cost of cultivation of sugarcane in Sindh, have followed the same pattern as of the Punjab.

40. In view of an average yield of 700 maunds per acre, farm level cost of production of sugarcane works out at Rs.273.45 per 40 kg. Adding marketing cost @ 21.00/40 kg, mill gate cost of production comes to Rs.294.45 per 40 kg. It is Rs.37.5 higher than the last year.

41. While without land rent, the costs comes to Rs.192.98 /40 kg at the farm level and Rs.213.98/40 kg at the mill gate in 2023-24.

**Table-8: Estimation of Average Farmer's Cost of Production in Sindh: 2022-23 versus 2023-24**

Sr.	Item	Unit	2022-23	2023-24
<b>SINDH</b>				
1.	Gross cost of cultivation	Rs/acre	163,524	193,418.10
	c) Subsidy on DAP	Rs/bag	900	-
	d) Value of tops	Rs/acre	1500	2,000.00
2.	Net cost of cultivation	Rs./ acre	161,124	191,418.10
3.	Yield	40 kg/ acre	680	700.00
4.	Cost of production at farm level			
	e) With land rent	Rs./ 40 kg	236.95	273.45
	f) Without land rent	“	173.22	192.98
5.	Marketing charges	Rs./ 40 kg	20.00	21.00
6.	Cost of production at mill gate			
	g) With land rent	Rs./ 40 kg	256.95	294.45
	h) Without land rent	“	193.22	213.98

**Source:** Annex-V

- **Khyber Pakhtunkhwa**

42. The total cost of cultivating of one acre of sugarcane in Khyber Pakhtunkhwa is expected to be Rs.157,381.69 (Table-9). During 2023-24 crops season, the major components of the cost of cultivation of sugarcane in Khyber Pakhtunkhwa, have followed the same pattern as of the Punjab and Sindh.

43. In view of an average yield of 575 munds per acre, farm level cost of production of sugarcane works out at Rs.269.88 per 40 kg (Table-9). Adding marketing cost @ 15.50/40 kg, mill gate cost of production comes to Rs.285.38 per 40 kg. It is Rs.30.39 higher than the last year.

44. While without land rent costs are concerned, these are estimated at Rs.185.10/40 kg at the farm level and Rs.200.60/40 kg at the mill gate in 2023-24.

**Table-9: Estimation of Average Farmer's Cost of Production in Khyber Pakhtunkhwa 2021-22 versus 2022-23**

Sr.	Item	Unit	2022-23	2023-24
<b>KHYBER PAKHTUNKHWA</b>				
1.	Gross cost of cultivation	Rs/acre	135,720.42	157,381.69
	a) Subsidy on DAP	Rs/bag	900.00	-
	b) Value of tops	Rs/acre	2000.00	2,200.00
2.	Net cost of cultivation	Rs./ acre	132,820	155,181.69
3.	Yield	40 kg/ acre	550	575
4.	Cost of production at farm level			
	a) With land rent	Rs./ 40 kg	241.49	269.88
	b) Without land rent	"	172.55	185.10
5.	Marketing charges	Rs./ 40 kg	13.50	15.50
6.	Cost of production at mill gate			
	a) With land rent	Rs./ 40 kg	254.99	285.38
	b) Without land rent	"	186.05	200.60

Source: Annex-VI

## 8. NOMINAL AND REAL INDICATIVE / MARKET PRICES OF SUGARCANE

45. The Real price of a commodity is the price achieved by removing the inflationary effect from its nominal price. The resultant price of that commodity reflects its real value. It reflects an increase or decrease in the purchasing power of the respective commodity against the base year level. In the following paragraphs, an analysis of the indicative and market prices of sugarcane has been carried out. This analysis is based on the prices of sugarcane during 2015-16 to 2022-23. The discussion below indicates province-wise trends in nominal and real terms.

### 8.1 Nominal and Real Indicative and Market Prices of Sugarcane in Punjab

46. Indicative and market prices of sugarcane for the Punjab province during 2015-16 to 2022-23 are given in the Table-10.

47. Nominal indicative price of sugarcane in the Punjab has been increased by 67 per cent from Rs 180 to Rs 300 per 40 kgs between 2015-16 and 2022-23. During the period under review, the Consumer Price Index (CPI), the most commonly used indicator for measurement of inflation in the economy, has escalated by 76.71 per cent. Thus consistently declining trend is observed in real indicative prices of sugarcane against the base year level. The real indicative price remained lower than the nominal indicative price since 2015-16, mainly due to this increasing CPI, dropping to Rs. 169.76/40 kg during 2022-23, a devaluation of 5.69% against the base year but 43.4 percent against the nominal value.

**Table-10: Nominal and Real Indicative & Market Prices of Sugarcane Realized by the Growers in the Punjab: 2015-16 to 2022-23**

Crop year	Nominal Prices		Consumer Price Index (CPI)***	Real Prices	
	Indicative *	Market **		Indicative	Market
	---- Rs per 40 kgs ----		2015-16=100	---- Rs per 40 kgs ----	
1	2	3	4	5=(2/4)x100	6=(3/4)x100
2015-16	180	180	100.00	180.00	180.00
2016-17	180	180	104.81	171.74	171.74
2017-18	180	145	109.72	164.05	132.15
2018-19	180	200	116.35	154.71	171.90
2019-20	190	220	130.33	145.78	168.36
2020-21	200	250	140.06	143.69	178.49
2021-22	225	240	158.00	142.40	151.90
2022-23	300	310	176.71	169.76	175.42

**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.

\*\*\*CPI Base year 2015-16.

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

2. Pakistan Economic Survey, 2022-23

48. As far the nominal market price of sugarcane is concerned, the price has shown fluctuating throughout the period under consideration. The market price averaged at Rs 310 per 40 kg in 2022-23, which is 29.16% greater than the last year. The real market price remained below the nominal market price during the entire period under review.

## 8.2 Nominal and Real Indicative Prices of Sugarcane in Sindh

49. The nominal and real indicative and market prices of sugarcane in Sindh for the period 2015-16 to 2022-23 are displayed in Table-11.

50. During the period, nominal indicative price in Sindh consistently increased from Rs 172 per 40 kg in 2015-16 to Rs 302 per 40 kg in 2022-23. However, the nominal market price dropped to the lowest level of Rs. 130/40 kgs in 2017-18, which was a market distortion. Between 2015-16 and 2022-23, the nominal indicative price increased by 75.58 percent. In aggregate, the real indicative price of sugarcane during 2016-21 presents a continuous downward trend. However, by virtue of 21% enhancement in nominal price, the real indicative price improved by 8% in 2022-23.

51. The nominal market price of sugarcane in 2022-23 has been increased by 71.72 per cent on the base year. Higher trend in CPI impacted the real market price of sugarcane estimated at 185.61 per 40 kgs in 2022-23. The indicator shows that real market price remained below the nominal market price throughout the period. The real market price improved 12 percent in 2022-23 as compared to previous year mainly due to a 25.19 percent increase in nominal market price.

52. It may be observed from the above data that CPI consistently increased during the reference period. This nominal price has also evidenced a continuous improvement, whereas higher CPI resulted in lower real value of the commodity. Hence, it may be concluded that to ensure smooth flow of returns to farmer, the inflationary trend needs to be controlled. Secondly, the indicative price of the produce should be determined keeping in view the inflation factor.

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

**Table-11: Nominal and Real Indicative & Market Prices of Sugarcane Realized by the Growers in Sindh: 2015-16 to 2022-23**

Crop year	Nominal Prices		Consumer Price Index (CPI)	Real Prices	
	Indicative*	Market**		Indicative	Market
	---- Rs per 40 kgs ----		2015-16=100	---- Rs per 40 kgs ----	
1	2	3	4	5=(2/4)x100	6=(3/4)x100
2015-16	172	191	100.00	172.00	191.00
2016-17	182	182	104.81	173.65	173.65
2017-18	181	130	109.72	164.97	118.48
2018-19	182	215	116.35	156.42	184.79
2019-20	192	220	130.33	147.32	168.80
2020-21	202	250	140.06	144.22	178.49
2021-22	250	262	158.00	158.22	165.82
2022-23	302	328	176.71	170.90	185.61

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

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

**Sources:** - 1. Price Policy Report for Sugarcane by API for market price.  
2. Pakistan Economic Survey, 2022-23 for (CPI).

53. Sugar is one of the Essential food items in the 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 the CPI. The impact of change in the price of sugar has been worked out against the CPI on the basis of three consumption patterns, i.e. Balance Sheet Method, HIES Consumption, and World average consumption. The summary of these results is given in Table-15.

### 9.1 Impact on CPI

54. 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.124.83 per Kg. It is evident from the Table-15 that every increase of Re 1 per kg over the average price of Rs.124.83 per kg is expected to raise the CPI by 0.01 percent, provided other things remaining the same. Accordingly, the CPI is likely to increase from 27.34 per cent to 27.38 per cent, if sugar price is increased by Rs.5 and Rs.10 per kg respectively.



**Table-12: Impact of Increase in Sugar Price on CPI and Household Expenditure**

Sugar price	Rise in CPI	Change in CPI	Increase in annual expenditure on the basis of average per capita consumption of sugar					
			Balance sheet method by API		HIES 2018-19		World average	
			26.45		15.36 kgs/annum		22.60 kgs/annum	
			Per person	Per household	Per person	Per household	Per person	Per household
Rs per kg		Per cent	----- Rupees -----					
Base price 124.83*June,2023								
124.83	27.30	-	26.45	166.64	15.36	96.77	22.60	142.38
125.83	27.31	0.01	52.90	333.27	30.72	193.54	45.20	284.76
126.83	27.32	0.02	79.35	499.91	46.08	290.30	67.80	427.14
127.83	27.32	0.02	105.80	666.54	61.44	387.07	90.40	569.52
128.83	27.33	0.03	132.25	833.18	76.8	483.84	113.00	711.90
129.83	27.34	0.04	158.70	999.81	92.16	580.61	135.60	854.28
130.83	27.35	0.05	185.15	1,166.4	107.52	677.38	158.20	996.66
131.83	27.35	0.05	211.60	1,333.1	122.88	774.14	180.80	1139.04
132.83	27.36	0.06	238.05	1,499.7	138.24	870.91	203.40	1281.42
133.83	27.37	0.07	264.50	1,666.4	153.6	967.68	226.00	1423.80
134.83	27.38	0.08	290.95	1832.985	168.96	1064.45	248.60	1566.18

**Note:** \* Average Price for the month of June,2023 was Rs.124.83 per kg .

Average size of household comprises 6.30 members PopulationCencus,2023

**Sources:** 1. For CPI, Pakistan Bureau of Statistics (PBS), Islamabad

2. Annex-XII (Per capita of availability of sugarcane)

3. For World average FAO, For balance sheet method.

## 9.2 Impact on Household Expenditure

55. According to the Population Census, 2023 by the PBS, average household in Pakistan consists of 6.30 members. On the basis of three scenarios as discussed earlier, the impact of selected increases in sugar price on the average Household expenditure has been presented in table above. It may be seen that every increase of Re 1 in sugar price over the average level of 124.83 per kg would raise the CPI by 0.01 percent. In addition, the per head expenditure would increase by Rs.26.45, and average household expenditure would increase by Rs 166.64 using the balance sheet method by API. While this increase would be Rs.15.36/person and Rs.96.77 per household, if the consumption pattern of the HIES are applied. However, based on global average consumption, this increase will be Rs.22.60 per person and Rs 142.38 per household, respectively, with rise in sugar price by Re 1 per kg, provided other things remaining same. Accordingly, an increase of Rs.2, 5 and Rs.7 over the base level would increase per capita expenditure by Rs.79.35, Rs.158.70, and Rs.211.60, respectively for the three scenarios. The household expenditure will accordingly increase by Rs.499.91, 999.81, and 1333.1, respectively.

## 10. COMPARATIVE ECONOMICS OF SUGARCANE AND COMPETING CROPS

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

57. 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 'kharif' and 'rabi' crops. Economics of sugarcane and competing crops/ crop combinations has been analyzed in terms of output prices received by growers and input prices paid by growers during the 2022-23 crop year. Detailed analysis is presented for the Punjab and Sindh provinces in Annex-VII,

while a brief summary pertaining to various economic indicators is shown in Table-13 and Table-14. The analysis is briefly discussed in the following paragraphs:

**Table-13: Economics of Sugarcane and Competing Crops at prices realized by the growers for 2022-23 crop in Punjab.**

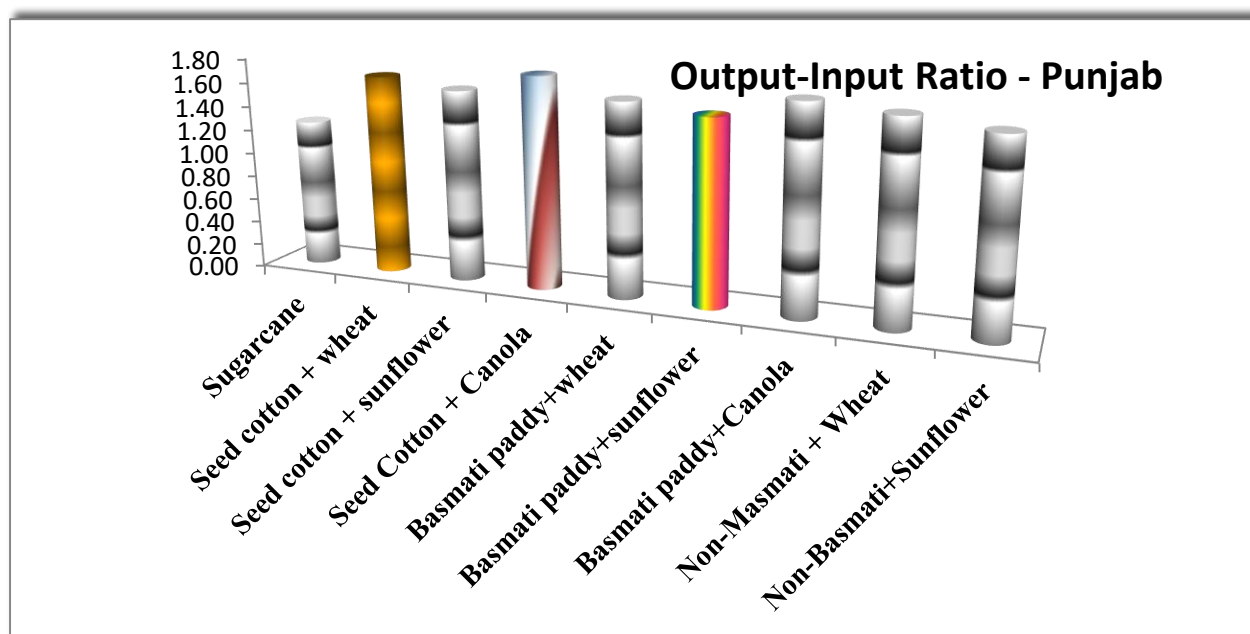
Sr. No.	Competing crops/ combinations	Output/ input ratio	Gross revenue per		
			Rupee of purchased inputs cost	Day of crop duration	Acre inch of irrigation water used
			----- Rupees -----		
1	Sugarcane	1.24	3.10	540	4433
2	Seed cotton + wheat	1.67	4.42	808	8555
3	Seed cotton + sunflower	1.60	4.03	778	6897
4	Seed Cotton + Canola	1.76	4.98	737	8215
5	Basmati paddy+wheat	1.60	3.51	766	3610
6	Basmati paddy+sunflower	1.53	3.25	737	3316
7	Basmati paddy+Canola	1.70	3.90	693	3512
8	Non-Basmati paddy + wheat	1.63	3.81	764	3407
9	Non-Basmati paddy+sunflower	1.56	3.50	735	3151
10	Non-Basmati paddy+Canola	1.73	4.28	691	3317

Source: Annex-VII

## Punjab

58. Table 13 above indicates that growers' returns to overall investment, based on the indicative price of sugarcane remained lower for Sugarcane than for the Cotton combinations. Cotton combinations by virtue of better market prices, out-competed Sugarcane and performed better in terms of all the economic criteria adopted in the analysis for 2022-23. However, Sugarcane out-competed both Basmati and Non-Basmati combinations with wheat, showing an edge over the later in terms of irrigation water. In terms of revenue per day of crop duration and purchased inputs, sugarcane falls at the bottom of all the alternative crop combinations.

**Fig-5: Output-Input Ratio of Sugarcane in Punjab**



Source: Annex-VII

## Sindh

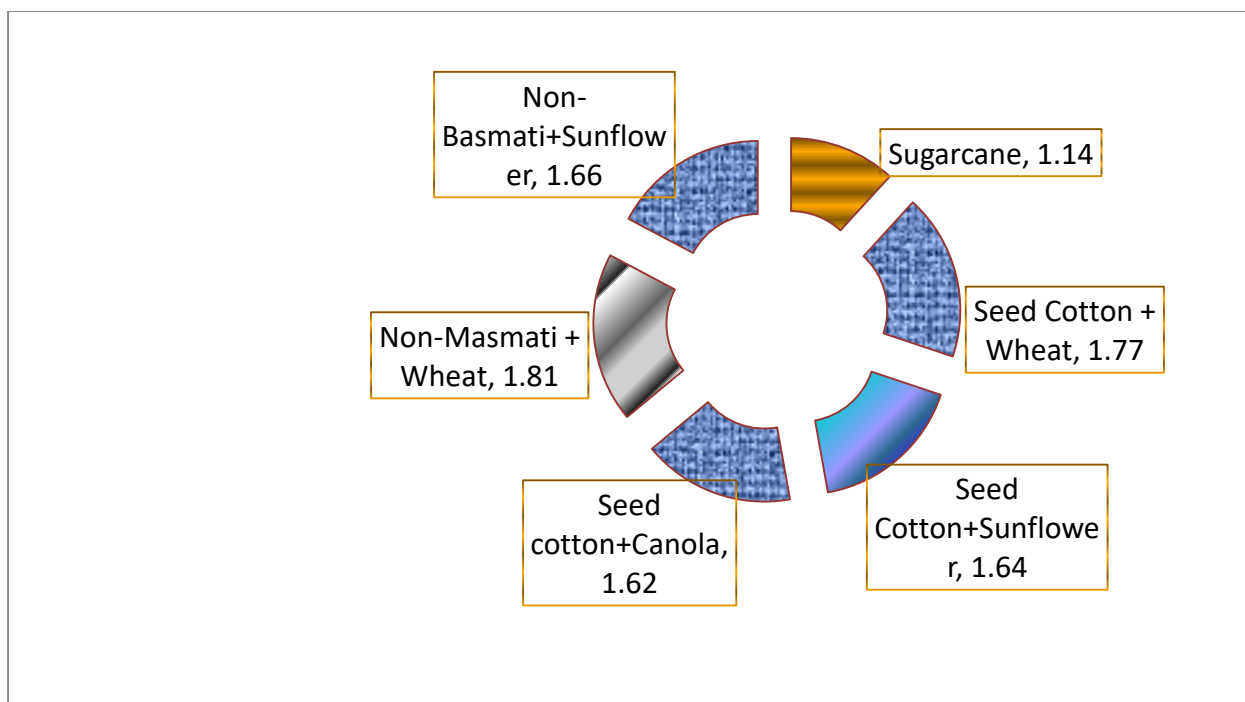
59. As in Punjab, Sugarcane in Sindh generally lags behind the competing crops comprehensively in terms of entire economic criteria adopted for the analysis. Sugarcane is out-competed by all crop combinations with a considerable difference. The primacy factor is the low yield of sugarcane, farmers harvested during 2022-23.

**Table-14: Economics of Sugarcane and Competing Crops at Prices Realized by the Growers for 2022-23 Crop in Sindh**

Sr. No.	Crop/ crop 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	1.14	2.94	393	2701
2	Seed Cotton + Wheat	1.77	4.94	893	10714
3	Seed Cotton+Sunflower	1.64	4.39	732	7136
4	Seed cotton+Canola	1.62	4.92	692	8707
5	Non-Basmati Paddy+Wheat	1.81	4.68	776	4108
6	Non-Basmati Paddy+Sunflower	1.66	3.96	676	3120
7	<u>Non-Basmati paddy+Canola</u>	1.63	4.61	633	3302

Source: Annex-VII

**Fig-6: Output-Input Ratio of Sugarcane in Sindh**



Source: Annex-VII

### 10.1 Economics of Sugarcane: Inter Provincial Comparison

60. In view of its longer duration, sugarcane crop in Sindh province requires more water and other inputs as compared to Punjab.

61. The cost incurred on purchased inputs other than chemical fertilizers is relatively lower in Sindh i.e., 3.35 percent as compared to the Punjab. However, irrigation water is applied on higher side in Sindh (48 percent). The crop duration is longer in Sindh by 24 percent as compared to Punjab.

62. Chemical fertilizers are used on a lower scale in Sindh by 6.38 percent in nitrogenous, however, more by 2.14 percent in phosphate ingredients. Despite increased input applications and resource allocation, Sindh's yield is lower than Punjab by approximately 8.6 percent. One of the major factors reported is climate change, which is impacting agricultural productivity adversely.

**Table-15: Input Use Level and Yield of Sugarcane in Sindh VS Punjab: 2022-23 Crop**

Item	Unit	Sindh	Punjab	Difference of the Sindh province over Punjab (%)
Crop duration	Crop day	488	394	23.86
Irrigation water	Acre inch	71	48	47.92
Purchased inputs other than fertilizer	Rs./ acre	37,492	38,750	(3.35)
Fertilizer Use:				
• N	Nutrients kg/acre	76.3	81.50	(-6.38)
• P	”	57.2	56	2.14
Crop yield	40 kg/ acre	700	760	(8.6)

Note: Annex-II and Annex-VII

### 11. ECONOMIC EFFICIENCY OF SUGARCANE PRODUCTION

63. Measurement of economic efficiency of a crop requires measurement of performance of different resources employed in production of that crop. Briefly, it helps assess justification for putting national resources in production of that crop.

64. There are three widely accepted measures of economic efficiency, namely, Nominal Protection Coefficient (NPC), Effective Protection Co-efficient (EPC) and Domestic Resource Cost Co-efficient (DRC). These efficiency measures are studied both in export as well as import perspectives. Analysis in export context is based on export parity price of the concerned crop while import substitution potential of the crop is analyzed using import parity price of that crop.

65. Sugar is an essential food item in Pakistan. Sugarcane provides raw material for manufacturing sugar. Accordingly, it is very necessary to study resource use efficiency of cultivating the crop, mainly to invest resources for the best returns to the economy.

66. In resource use efficiency, the cumulative effect of cost of production of the crop and its import and export parity prices are compared against the established economic efficiency

yardsticks i.e Nominal Protection Coefficient (NPC), Effective Protection Coefficient (EPC) and Domestic Resource Cost (DRC) Coefficients.

67. Efficiency is a comparison of crop revenues against its cost of production. Though profit is very important consideration from farmer's point of view to sustain in a crop but at the same time, viability of a crop to justify national resources (land, labour, capital, entrepreneurship skills) employed in its production is also equally important from social point of view. In the former case, the cost of production and domestic private market price of the crop are applied and the inputs used in its production while for the later, the private (market) prices are converted into social with the help of corresponding import and export parity prices of the crop.

68. In the following paragraphs, above-mentioned three parameters of efficiency i.e., NPC, EPC and DRC are described in more detail:

### 11.1 Nominal Protection Coefficient (NPC)

69. NPC is the ratio of the domestic market price to the social price of a commodity. It examines the impact of domestic market price of the crop ignoring distortions in the input prices. As a rule of thumb if NPC is greater than one it means that local producers are protected through produce pricing policy. If it is less than one, it implies implicit taxation to growers rather than protection to them. Implicit taxation to a crop indicates outflow of resources from that crop to other sectors of the economy.

70. Empirical estimates of NPCs for sugarcane are provided in Table-16 below. Before describing Nominal Protection Coefficients (NPCs) under import and export scenarios, it seems pertinent to refer to fundamental procedures of deriving price of sugarcane equivalent to international price.

71. For this analysis, NPC estimates are estimated under import and export scenarios for both Punjab and Sindh provinces. For import scenario analysis, corresponding import parity price and for export scenario analysis relevant export parity price of sugarcane in Pakistan is used.

72. Under import scenario, this price is worked out by converting cif (international price) at Karachi port into domestic currency and then by adding port handling charges and other incidentals to it to shift imported sugar to sugarcane producing districts of Punjab and Sindh.

**Table - 16 Nominal Protection Coefficients for Sugarcane in Punjab and Sindh**

Year	Punjab		Sindh	
	NPC		NPC	
	Under import scenario	Under export scenario	Under import scenario	Under export scenario
2017-18	1.31	1.77	1.26	1.70
2018-19	1.05	2.39	1.03	2.28
2019-20	0.96	1.77	0.92	1.69
2020-21	1.18	1.96	1.08	1.77
2021-22	0.66	1.04	0.70	1.09
2022-23	0.54	0.62	0.53	0.73

**Source:** For NPC, Annex-VIII to XI

73. It may be observed from data produced in Table-16 above that the NPCs for both Punjab and Sindh under import as well as export situations claim greater than one during the period except 2019-20, 2021-22 under import and 2022-23 under both import and export scenarios in both Punjab and Sindh. It implies that sugarcane growers are receiving relatively higher price for their cane than the corresponding parity price. It has been revealed during the field surveys that farmers sell their produce to mill gate relatively at higher price. Normally /middleman prices is 5-10% greater than the indicative price (Rs 300-302/40 kgs). One of the reason was that the sugarcane crop was short during 2022-23 in Sindh province. If NPC values are estimated on the basis of middleman price, NPC values would be around one which may approximate domestic sugar price to international price.

74. The above coefficients show that sugarcane growers seem price protected through the indicative price of sugarcane. The question that why sugarcane growers get this price protection can be well answered that sugar being an essential food item, needs to be adequately available in the domestic market. Indicative price helps not only to continue growing sugarcane rather expend the cultivation to achieve self-sufficiency. Another argument may be if Pakistan becomes dependent on imported sugar, occasional shifts in international price of sugar may increase Pakistan's import burden.

## 11.2 Effective Protection Coefficient (EPC)

75. Unlike NPC, EPC is the ratio of the difference between revenue and cost of tradable inputs at private prices and difference between revenue and tradable inputs cost at social prices. Thus, EPC is the indicator of net incentive or disincentive effect of all policies affecting prices of tradable (seed, fertilizer, pesticides, cost of tractor run operations, tube well irrigations etc.) inputs and output.

76. Same rule of thumb is for EPC as it is for NPC coefficients. If EPC is higher than one, it means domestic growers of the crop have some degree of protection/ support through prices of inputs or price of output. This implies growers' profit higher than it would be without government intervention (price support). On the other side, if EPC is less than one, it indicates that the net effect of input and output prices reduces grower profit. In the earlier case, the growers are policy-protected while in the later, they are implicitly taxed which discourages domestic production.

**Table-17: Effective Protection Coefficient for Sugarcane in Punjab and Sindh**

Year	Punjab		Sindh	
	EPC		EPC	
	Under the import scenario	Under the export scenario	Under the import scenario	Under the export scenario
2017-18	1.44	2.30	1.25	1.83
2018-19	1.06	11.27	0.97	2.98
2019-20	0.91	2.85	0.83	1.92
2020-21	1.24	2.85	1.03	1.97
2021-22	0.57	1.04	0.61	1.05
2022-23	0.49	0.57	0.47	0.62

Source: - Estimated from Annex-VIII.

77. Table-17 provides EPC values for Punjab and Sindh provinces under import and export scenarios. Largely, values are found higher than one except 2019-20, 2021-22 and 2022-23 in import scenario. Respective values of EPC higher than one means that input/output prices induce for producing more sugarcane in the country. From the referred EPC values, it may be concluded that domestic production of sugar is relatively better for domestic consumption than to export because EPC values under export scenario analysis are relatively higher than those derived under import scenario analysis.

### 11.3 Domestic Resource Cost Coefficient (DRC)

78. Domestic Resource Cost (DRC) coefficient shows the social cost of non-traded inputs (domestic resources like labour, interest on capital employed in the crop, management cost, harvesting charges, cost of farmyard manure, land rent etc.) used in producing the commodity. In DRC, the numerator is the opportunity cost of non-tradable factors at social prices while the denominator is the value-added (crop revenue) at social prices. If the value of DRC is less than one it indicates comparative advantage in domestic production of the crop. Its reason is that cost of non-tradable domestic factors like hired labour, interest on capital, farmyard manure, transportation, canal water, land rent, managerial services, land revenue and Drainage Cess is less than the corresponding import cost of these factors.

**Table-18. Domestic Resource Cost Coefficients (DRCs) for Sugarcane in Punjab and Sindh Provinces**

Year [1]	Under the import situation		Under the export situation	
	Punjab [2]	Sindh [3]	Punjab [4]	Sindh [5]
2017-18	0.56	0.81	0.90	1.18
2018-19	0.46	0.62	4.85	1.91
2019-20	0.40	0.54	1.26	1.23
2020-21	0.41	0.52	0.95	0.99
2021-22	0.23	0.35	0.41	0.57
2022-23	0.11	0.16	0.12	0.32

Sources: 1. Import situation estimates derived from Annex-VIII and Annex-X,  
2. Export situation estimates derived from Annex-IX and Annex-XI.

79. During 2022-23, average monthly wholesale prices ranged between Rs.7,700 to Rs.9,250 per 100 kgs in Hyderabad Market during month of April 2022 and Rs.9,250 per 100 kgs in Peshawar market during the months of January and February 2022. During 2023, average monthly wholesale prices reached the highest and dropped to the lowest price of Rs.8,250 and Rs.1,800, respectively in Faisalabad during January 2023 and Peshawar during August, 2023. The overall average of sugar price at country level ranged between Rs.8,224 to Rs.16,173 per 100 kgs during 2022-23, which is unprecedented in recent past.

80. It is observed from Table-18 that DRC values under import scenario are less than one throughout the analysis. However, these have a mixed trend under export scenario. Findings in the above table support that Punjab has an advantage in producing sugarcane for domestic consumption of sugar and we may save foreign exchange by substituting sugar import.

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

### 12.1 Domestic Demand, Supply and Stocks

81. The data regarding the estimation of domestic demand, supply and stock position for 2022-23 (Oct-Sept) is presented in Table 19. The country produced 6.74 MMT of sugar during 2022-23 (Oct-Sept) from the sugarcane crop. After accounting for the carryover stocks of 0.99 MMT and accounting for the imports and exports of sugar from (Oct-Aug) 2022-23, the total sugar availability for 2022-23 (Oct-Nov) is estimated at 7.487 MMT. Three sugar consumption patterns were used for the calculation of the domestic requirement. i) Based on an average of three years, i.e., 2019-20 to 2021-22, per capita availability of sugar is estimated at 26.45 kgs; ii) Sugar consumption is 15.36 kgs per annum based on the Household Integrated Survey (HIES) 2018-19; and iii) Sugar consumption is 22.60 kgs per annum based on the world average (for details see **Annex-XII**). On the basis of the balance sheet method, the total domestic requirement for a population of 249.76 million (estimated on the basis of Census, 2023, including AJK, GB and Afghan Refugees) has been worked out at 6.606 MMT for 2022-23. Thus, there is an estimated 0.881 MMT of surplus sugar will be available at the country level, while on the basis of HIES data, the domestic requirement comes to 3.836 MMT, and on the basis of World average consumption, the domestic requirement is calculated at 5.645 MMT. As a result, surplus stocks of 3.651 and 1.842 MMT were estimated to be available in 2022-23 (Oct-September).

**Table-19: Estimation of Domestic Requirement Sugar for Consumption Year 2022-23**

S.No.	Items	Per capita consumption of sugar kgs/annum		
		Balance Sheet Method	HIES Data	World Average consumption
		26.45	15.36	22.60
		----- Thousand tons-----		
1	Opening stocks as on October 2022	990	990	990
2	Production for 2022-23 crop	6,740	6,740	6,740
3	Imports (Oct-Aug) 2022-23	5	5	5
4	Export	248	248	248
5	Total availability	7,487	7,487	7,487
6	Population (Millions)	249.76	249.76	249.76
7	Requirement on the basis of per capita consumption	6,606	3,836	5,645
8	Surplus	881	3,651	1,842

Sources: i. For production and Stocks; Ministry of NFSR.  
ii. For import and export, PBS.  
iii. For Population, estimated on the basis of census, 2023, population of AJK, GB and Afghan refugees has also been included



## 12.2. Projected Domestic Requirement for 2023-24 on the Basis of Previous Data

**Table-20: Projected Domestic Requirement of Sugar for Consumption Year 2023-24**

S.No.	Items	Per capita consumption of sugar kgs/annum		
		Balance Sheet Method	HIES Data	World Average consumption
		26.45	15.36	22.60
		----- Thousand tons-----		
1	Projected Population (Millions) during 2023-24 *	256.09	256.09	256.09
2	Projected sugar requirement	6,774	3,933	5,788
3	Estimated Carryover stocks **	588	588	588
4	Net requirement	6,186	3,345	5,200

\* Projected at growth rate of 2.53 percent.

\*\* Sugar insight, December 27, 2023, M/o NFS&R.

82. As per the procedure discussed above, sugar requirement for 2023-24 (Oct-Sept) has been projected in the Table-20. The population during next consumption year is projected at 256.09 millions. Therefore, on the basis of three requirement slabs as explained in above paras and accounted for the estimated carryover stocks of 2022-23 season, the country would require 6.186, 3.345 and 5.200 MMT of sugar for human consumption.

## 12.3 Behavior of Sugar Prices in Domestic Market

83. The monthly average wholesale prices of sugar prevailing in major domestic markets of Lahore, Faisalabad, Karachi, Hyderabad and Peshawar markets during 2022 and 2023 (Jan - Mar) are presented **Annex-XIII**, while for the last 12 years in **Annex-XIV**.

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

### 13.1 Supply, Demand, Stocks and Trade

84. The data on world balance sheet of sugar (raw equivalent) for the period of 2020-21 to 2022-23 are presented in Table-21.

**Table-21: World Balance Sheet of Sugar ( Raw Equivalent ): 2020-21 to 2022-23 (October - September)**

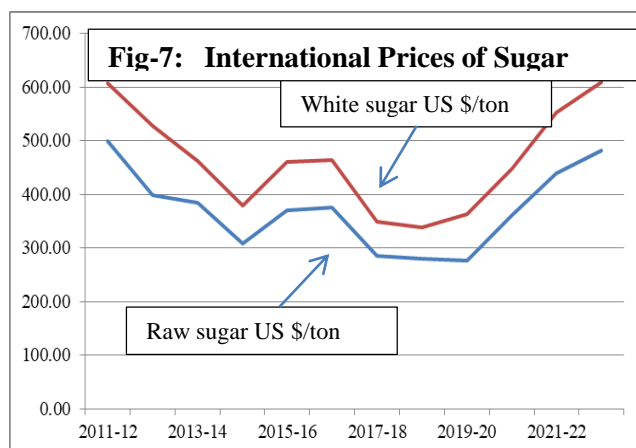
Item	2020-21	2021-22 Estimated	2022-23 Forecast
	-----Million tones-----		
1. Opening stocks	102.40	111.80	112.60
2. Production	169.10	175.06	175.05
3. Total supply ( item 1+2 )	271.50	286.86	287.65
4. Disappearance ( consumption )	170.00	174.50	176.10
5. Stock adjustment *	26.60	0.24	-2.25
6. End year stocks (3-4+5)	111.80	112.60	113.80
7. Trade ( Export)	60.80	61.30	60.70

Note: \* Including adjustment for unknown net trade.

Source: Food Outlook, FAO, June 2023.

85. According to the Food Outlook, June, 2023 by FAO, world sugar production was estimated at 175.06 million tons during 2021–22, which was 5.96 million tons (3.53 per cent) higher than the last year's level of 169.10 million tons. With the opening stocks of 111.80 million tons, global sugar supply in 2021–22 was estimated to be 286.86 million tons, 5.66 per cent higher than 2020-21. The world's consumption in 2021–22 was estimated at 174.50 million tons, 2.65 per cent higher than the last year's level of 170.00 million tons. End-of-year stocks in 2021-22 were estimated at 112.60 million tons, 0.72 per cent higher than last year due to higher opening stocks and production.

86. World sugar production during 2022-23 is forecasted at 175.05 million tons, which is 0.01 million tons, lower than last year's production. Accounting for the opening stocks of 112.60 million tons, global supply of sugar in 2022-23 has been projected at 287.65 million tons, 0.28 per cent higher than in 2021-22. World consumption in 2022-23 is projected at 176.10 million tons, 0.92 per cent higher than last year. The end-of-year stocks are projected to increase further to 113.80 million tons, or 0.72 percent, higher due to higher opening stocks and production.



### 13.2 International Prices of Sugar

87. International prices of raw (fob Caribbean ports) and white (fob London) sugar from 2011-12 to 2022-23 are presented in **Annex-XV** while their graphical movement shown in Fig-7.

88. Prices of both raw and white sugar have shown a volatile pattern and fluctuated widely during the period under review from 2011-12 to 2021-22. During 2011–12, the price of raw sugar (Caribbean port) averaged US \$499.96 per ton. However, the price of raw sugar started to decrease continuously and reached US \$307.69 per tons during 2015-16. The next year, prices increased slightly and averaged at US \$376.40, but again started decreasing and averaged at US \$276.23 per ton during 2019-20, touching the lowest level of price during the period under review. During the following years, 2020-21 to 2022-23, the price increased sharply and jumped to US\$ 482.47 per ton. The start of current season 2023–24 i.e. Oct, 2023, shows an upward trend and price has increased significantly to \$ 557.98 per ton the highest level of price under review.

89. The pattern followed by the prices of white sugar during the period under reference has been similar to that of raw sugar, as described above. The difference between the average annual price of raw and white sugar ranged between \$57.37 per tons and \$ 146.17 per ton.

## 14. IMPORT AND EXPORT PARITY PRICES OF SUGARCANE

90. Estimation of the 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 an importer of sugar in some years and an exporter in others, both the import and export

parity prices of sugarcane have been worked out for analyzing price policy options for the next crop season.

91. 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 in **Annexes-XVI** and **XVII**, while the results are summarized in Table-22.

**Table-22: Import/Export Parity Prices of Sugarcane as Worked Back from Average fob (London) Prices of Sugar**

Average fob London prices of white sugar per tonnes	Sugarcane prices (Rs/40 kgs)	
	Punjab	Sindh
<b>Import parity</b>		
US \$ 720.53 (Oct 2022)	782.29	799.57
US \$ 618.43, 2022-23 ( Oct-Sept)	684.96	700.09
US \$ 536.84 ( 2020-21 to 2022-23)	607.18	620.59
<b>Export parity</b>		
US \$ 704.15 (Oct 2022)	565.68	577.51
US \$ 610.07, 2022-23 ( Oct-Sept)	485.93	496.67
US \$ 536.84 ( 2020-21 to 2022-23)	410.64	419.72

Source Annexes –XV and XVI

**15. MILL-GATE PRICES OF SUGARCANE BASED ON DIFFERENT SLAB OF SUGAR PRICE IN DOMESTIC WHOLESALE MARKETS OF THE COUNTRY DURING 2022-23.**

92. This analysis is based on actual sucrose recovery as reported by the provincial sugarcane commissioners; the ratio of the cost of cane to processing cost has been estimated at 80:20 for Punjab and Sindh and sales tax at 18 per cent. A summary of sugarcane prices estimated under this scenario from various slabs of wholesale prices of sugar is presented in Table-22 while the details are given in **Annex-XVIII**.

**Table-23: Sugarcane Prices worked back from Expected Wholesale Prices of Sugar during 2022-23**

Wholesale prices of sugar (Rs /Ton)	Sugarcane prices (Rs/40 Kgs)	
	Punjab	Sindh
Rs. 110,000	271.59	295.38
Rs.115,000	283.94	309.28
Rs.120,000	296.28	322.73
Rs. 120,000	308.63	336.17
Rs. 125,000	320.97	349.62

Source Annex-XVII

## 16. USE OF SUGARCANE CESS FUND

93. Sugarcane Development Cess Fund has been collected from sugarcane grower and sugar mills on equal basis. The province wise rate of sugarcane cess fund is as under:

Provinces	Growers	Sugar mills
	-----Rs per 40 kgs-----	
Punjab	1.5	1.5
Sindh	0.25	0.25
Khyber Puktunekhawa	0.50	0.50

94. The objective of this collection was aimed/ meant for the construction and improvement of roads in the sugar mills areas. They should also be utilized for research and development of sugarcane crop. The Province-wise estimated Sugarcane Development Cess Fund on the basis of cane crushed during 2022-23 as under:

**Table-24: Province-wise estimated Cess fund Generated on the basis of Sugarcane Crushed during 2021-22**

Province	Cane Crushed (Million tonnes)	Rate of Cess Fund (Rs.)	Total Cess (Million Rs.)
Punjab	39.76	3.0	298.20
Sindh	15.25	0.5	19.41
KP	3.32	1.0	8.30

95. The above mentioned table reveals that enormous amount of sugarcane Cess fund is being collected every year, which remained unutilized due to lack of proper coordination, planning and decision making. The Provincial Cane Commissioners are mainly responsible for regulating the affairs relating to development, marketing and processing of sugarcane in their respective provinces.

96. The former Agriculture Prices Commission (APCom) presently the Agriculture Policy Institute (API) has been suggesting in the Price Policy Reports that the sugarcane cess fund, which is aimed/meant for the construction and improvement of roads in the sugar mills areas, should also be utilized for research and development of the sugarcane crop.

97. To strengthen sugarcane research in the Punjab, the Government of Punjab has allocated 10% of the Sugarcane Cess Fund to the Sugarcane Research and Development Board (SRDB), Punjab. The SRDB is utilizing that cess fund for both sugarcane research & development and also includes operational expenditures of the SRDB. A brief description of SRDB's achievements and contributions in the field of sugarcane research is as under:

Description	Period	Amount (Rs)
CESS amount Received	2015-2018	780 million
Amount of CESS fund In-Process	2018-2020	700 million
Amount receive	2020-21	292 million

### 16.1 Key Achievements by Using the CESS Fund Received During 2022-23 by The SRDB:

- i. Import of Germplasm / Promising Clones / True Seed-Fuzz) from Brazil, Srilanka and China whereas import of germplasm from USA is under process.
- ii. 8 projects amounting to (Rs 82.72 million) awarded on sugarcane research and development.
- iii. Quarterly publication of Pakistan Sugar Journal
- iv. Draft Center of Excellence on sugarcane
- v. Input on Report of Sugar Sector Reforms Committee
- vi. Development of seed farm under Project of National Program for enhancing sugarcane profitability.
- vii. Recommendations for Growth and Equity Strategy (2021-23)-market development and reforms.

### 17. SUGARCANE CROP RESEARCH AND DEVELOPMENT IN PAKISTAN

#### - Sindh

98. The National Sugar and Tropical Horticulture Research Institute (NSTHRI), Thatta is an apex public sector organization working under umbrella of Pakistan Agriculture Research Council (PARC) on development and release of sugarcane varieties along with production technologies.

99. The Institute has developed 4 commercial sugarcane varieties for general cultivation in the Sindh. Varieties developed in the last ten years with characteristics are as under:

**Table-25: Varieties Developed by Pakistan Agriculture Research Council (PARC) National Sugar and Tropical Horticulture Research Institute (NSTHRI), Thatta in Last Ten Years with their Characteristics.**

S.No	Variety	Year of Release	Main characteristics
1	Thatta-10	2004	<ul style="list-style-type: none"> <li>▪ It is medium maturing variety</li> <li>▪ Avg. yield potential: 180-200 t ha<sup>-1</sup></li> <li>▪ Avg. yield: 150 t ha<sup>-1</sup></li> <li>▪ Sugar recovery: 12.15%</li> <li>▪ Ratooning ability: Good</li> </ul>
2	Thatta-2109	2016	<ul style="list-style-type: none"> <li>▪ It is early maturing variety</li> <li>▪ Avg. yield potential: 160-180t ha<sup>-1</sup></li> <li>▪ Avg. yield: 140 t ha<sup>-1</sup></li> <li>▪ Sugar recovery: 13.5%</li> <li>▪ Ratooning ability: Good</li> </ul>
3	Thatta-326	2016	<ul style="list-style-type: none"> <li>▪ It is early maturing variety</li> <li>▪ Avg. yield potential: 180-200t ha<sup>-1</sup></li> <li>▪ Avg. yield: 150 t ha<sup>-1</sup></li> <li>▪ Sugar recovery: 12.25%</li> <li>▪ Ratooning ability: Good</li> </ul>
4	YT-55-Thatta	2018	<ul style="list-style-type: none"> <li>▪ It is early maturing variety</li> <li>▪ Avg. yield potential: 160-180 t ha<sup>-1</sup></li> <li>▪ Avg. yield: 140 t ha<sup>-1</sup></li> <li>▪ Sugar recovery: 12.5%</li> <li>▪ Ratooning ability: Good</li> </ul>

Source: PARC.

- **Punjab**

100. Faisalabad's Sugarcane Research Institute (SRI) is an important public sector agency dedicated to the research and release of sugarcane varieties as well as production technologies.

101. The Institute has developed 24 commercial sugarcane varieties for general cultivation in the Punjab. These varieties occupied more than 95% of sugarcane cultivated area in the province. Varieties developed in the last ten years with characteristics are as under:

**Table-26: Varieties Developed by Sugar Research Institute (SRI) in Last Ten Years with their Characteristics**

S.No	Variety	Year of Release	Main characteristics
1	CPF 247	2011	<ul style="list-style-type: none"> <li>▪ It is medium maturing variety</li> <li>▪ Avg. yield potential: 1500 t ha<sup>-1</sup></li> <li>▪ Avg. yield: 1200 t ha<sup>-1</sup></li> <li>▪ Sugar recovery: 12.25%</li> <li>▪ Ratooning ability: Good</li> <li>▪ Also good for light soils and non-lodging variety</li> </ul>
2	CPF 248	2014	<ul style="list-style-type: none"> <li>▪ It is medium maturing variety</li> <li>▪ Avg. yield potential: 1500 t ha<sup>-1</sup></li> <li>▪ Avg. yield: 1200 t ha<sup>-1</sup></li> <li>▪ Sugar recovery: 12.71%</li> <li>▪ Ratooning ability: Good</li> </ul>
3	CPF 249	2016	<ul style="list-style-type: none"> <li>▪ It is medium maturing variety</li> <li>▪ Avg. yield potential: 1650 t ha<sup>-1</sup></li> <li>▪ Avg. yield: 1200 t ha<sup>-1</sup></li> <li>▪ Sugar recovery: 12.46%</li> <li>▪ Ratooning ability: Good</li> <li>▪ Also good for saline soils and having highest yield potential</li> </ul>
4	CPF 250	2019	<p>Early maturing variety, fast growing variety, well suited for early crushing season, Non lodging.</p> <ul style="list-style-type: none"> <li>▪ Sugar recovery: 14.1%</li> </ul>
5	CPF 251	2019	<p>Early maturing variety, well suited for early crushing season, fast growing variety</p> <ul style="list-style-type: none"> <li>▪ Sugar recovery: 14.3%</li> </ul>
6	CPF 252	2019	<p>Late maturing variety, Non lodging variety, Resistant to red rot disease, recommended for harvesting in second fortnight of January, Particularly recommended and suitable for September plantation and intercropping</p> <ul style="list-style-type: none"> <li>▪ Sugar recovery: 15.9%</li> </ul>
7	CPF 253	2019	<p>Medium maturing variety, resistant to red rot disease</p> <ul style="list-style-type: none"> <li>▪ Sugar recovery: 15.9%</li> </ul>

Source: SRI/PARC.

- **KPK**

102. The Crops Research Institute in Mardan a premier is public sector agency that works on sugarcane variety creation and release, as well as production technology.

103. The Institute has developed 4 new commercial sugarcane varieties for general cultivation in the Province. Varieties developed in the last ten years with characteristics are as under:

**Table-27: Varieties Developed by Crops Research Institute, Mardan in Last Ten Years with their Characteristics**

S.No	Variety	Year of Release	Main characteristics
1	IsrarShaheed SC	2017	<ul style="list-style-type: none"> <li>• Maturing: Early</li> <li>• Avg. yield potential: 97.23 t ha<sup>-1</sup></li> <li>• Avg. yield: 90.0 t ha<sup>-1</sup></li> <li>• Sugar recovery: 13.40%</li> <li>• Ratooning ability: Good</li> </ul>
2	Abdul Qayum	2017	<ul style="list-style-type: none"> <li>• Maturing: Early</li> <li>▪ Avg. yield potential: 113.73 t ha<sup>-1</sup></li> <li>▪ Avg. yield: 89.00 t ha<sup>-1</sup></li> <li>▪ Sugar recovery: 13.69%</li> <li>▪ Ratooning ability: Good</li> </ul>
3	Mardan 2021	2021	<ul style="list-style-type: none"> <li>▪ Maturing: Early</li> <li>▪ Avg. yield potential: 95.41 t ha<sup>-1</sup></li> <li>▪ Avg. yield: 87.00 t ha<sup>-1</sup></li> <li>▪ Sugar recovery: 12.71%</li> <li>▪ Ratooning ability: Good</li> </ul>
4	Gul Rehman	2021	<ul style="list-style-type: none"> <li>▪ Maturing: Early</li> <li>▪ Avg. yield potential: 1650 t ha<sup>-1</sup></li> <li>▪ Avg. yield: 85.00 t ha<sup>-1</sup></li> <li>▪ Sugar recovery: 12.46%</li> <li>▪ Ratooning ability: Good</li> </ul>

Source: PARC.

## 18. MARKETING OF SUGARCANE

104. Sugarcane is one of Pakistan's most important cash crops, planted across the country. As it cannot be stored after harvesting, it is to be processed either into gur/khandsari at the farms or crushed by sugar mills for sugar manufacture. Hence, its marketing plays an important role in this respect. In the meeting of API Committee on sugarcane held on 31<sup>st</sup> August, 2023, with stakeholders and representatives of farmers associations discussed various issues related to the crop and its marketing which are described below:-

### 18.1 Delayed Payments

105. Delayed payment to the growers is a persistent feature in the sugar cane marketing. The sugar industry, at the beginning of the season, generally made payments to growers

within two weeks as mentioned in the Sugar Factor Control Act. However, as the season progresses to the end, the payments are delayed by months and, in some cases, in bumper crops, they are delayed by seasons. Mills are of the view that this happens due to liquidity problems. Although, during 2021-22, the crop size was 88.76 million tons, all times higher in the history. However, in spite of bumper crop prices, they did not decrease significantly, and all the above-mentioned complaints of delayed payments were relatively low. The main reason is the continuous supply of sugarcane from Punjab to Sindh due to high prices of sugarcane in Sindh which offset the impact of the bumper crop. The second reason is the presence of middleman.

## **18.2 Presence of Middlemen**

106. Although the middlemen are paying less than the sugar mills, at Rs 5 to 15 per 40 kg varying from farmer to farmer, the presence of middlemen has been rampant all over the country, especially in Punjab and Sindh. Middleman is paying less than sugar mills but the farmers are satisfied with the prompt payment. Many farmers have cultivated sugarcane on less than one acre, and it is not economical to sell it at the mill gate and wait for payment. Therefore, they are happy in presence of a middleman. Common farmers are in favour of the presence of a middleman as a second buyer. However, it is reported by farmers that due to the volatile pattern of sugarcane prices in the early season, the middlemen have lost the money, especially those traders who have made contracts on advance payment before the start of season on high prices. As a result, they have lost the advance payment, which ranged between Rs 50,000 to 100,000 per acre.

## **18.3 Underweight and Undue Deductions**

107. Underweight of cane at the purchase centres and mill gates is the regular complaint of cane growers. The supervisory committees are also constituted by the government, comprising government officers, representatives of growers and representatives of sugarmill management. The complaints of underweight and unlawful deduction are regular complaints of growers. The weighbridges and scales installed at the purchase centres do not record the correct weight. Supervisory committees are expected to be effective and vigilant in combating these malpractices. The mechanism of farmers' complaints and action taken by the supervisory committees may be developed on scientific basis, and complaints and action taken by the committees may be published.

## **18.4 Contract between Farmers and Sugar Mills**

107. Sugarcane is an important cash crop and source of raw material to the second largest agro based industry. The relationship between farmer and sugar millers are always conflicting particularly the price of produce and weight has been observed contrary to the benefit of each other. It is necessary to develop a contract between growers and sugar mills for supply of sugarcane on prefixed price. The sugar mills may help the farmers in production of sugarcane in the form of cheap input supply.

## **18.5 Intercropping**

109. Sugarcane is being cultivated as intercropping with other crops like rape seed, maize, berseen (fodder) and wheat etc. During API survey in Punjab, a farmer Mr. MuhktiarGhuman informed the survey team the he cultivated 12 acre sugarcane with maiz (fodder) and sold at Rs 44000 per acre. He also cultivated berseen with sugarcane in 5 acres in the month of



February and sold at Rs 120,000 per acre. The wheat production with sugarcane is reported from 25 to 30 maund per acre. In Sindh Onion and tomatoes are widely intercropped with sugarcane. A specific survey for revenue generated by intercropping may be conducted and incorporated in the cost of production because the land rent is used for whole year for sugarcane crop estimations.

### **18.6 Provision of Seed of Approved Varieties**

110. The sugarcane seed is required in bulk quantity, its harvesting, transportation and planting is carried out at same time and cannot be stored/ packed. Its rate of multiplication is hardly 1:10 as compared to 1:40 for wheat. The production, multiplication and distribution of quality seed of high yielding varieties at Institute level was not exist. After de-zoning, sugar mills also have stopped their cane development activities including the supply of improved seed to the growers. Resultantly, farmers generally use their commercial crop as seed without its treatment against diseases.

111. In this regards, the API in its reports, continuously suggested to take the measure for growing cane of high sucrose varieties, the Provincial Agriculture Departments should launch an aggressive campaign for educating the growers regarding the sowing of improved varieties and discouraging the cultivation of unapproved varieties. Sugar mills should establish/ revive their Cane Development Programmes either individually or collectively. These centers in collaboration with the progressive growers and sugarcane researchers should develop the sugarcane seed according to climate change. The responsibility of production, multiplication and distribution of High Yielding Variety (HYV)/quality seed of sugarcane may be assigned to concerned authorities.

112. The availability of healthy seeds of approved sugarcane varieties to sugarcane growers is a big issue in the current prevailing yield gap. There was no seed standard for sugarcane seed production available prior to 2016. However, after the implementation of the Seed Act 2016, the Sugarcane Research Institute, Faisalabad (SRI) took up the matter and seed standards were approved with the consultation of the Federal Seed Certification & Registration Department, Islamabad.

113. The SRI is producing a limited quantity (about 10 acres annually) of quality seed (pre-basic/ basic) which is available for multiplication/ certified seed production by the sugar mills and seed farms. There is a dire need to strengthen extension activities by the government and sugar mills for cultivation of only approved varieties and discourage or ban un-approved or out-dated sugarcane varieties from provincial/national sugarcane agriculture. The sugar mills and research institutions may play their roles to enhance the production quality as mentioned above to improve the per acre yield at the country's level.

### **18.7 Low Plant Population**

114. Lack of an adequate plant population remains an important factor in the low productivity of sugarcane. Research on sugarcane has found that even good quality seed does not provide more than 60 per cent germination. In general, 80-100 maunds of seed of thin and 100-120 maunds of thick varieties of cane are recommended for cultivating one acre.

115. Sugarcane sowing and harvesting operations are still manual, labour intensive and time consuming operations which reduce the per acre sugarcane yield due to poor germination and less plant population in the acre. Manually harvesting of sugarcane affects the ratoon crop and also reduces the sugar content in sugarcane. The use of sugarcane planter and harvester will eliminate the ridger operation, increase the plant population and better germination thus results in increased in per acre yield. Sugarcane harvester will reduce harvesting time which will increase the sugar recovery. Both these implements are highly costly, especially the harvester. Therefore, it is suggested that the government, with the collaboration of the sugar industry, may purchase the implements and provide them to growers on a rent basis. The sugarcane cess fund may be allocated for three years to purchase these implements and provided to growers by constituting a committee.

### **18.8 Amendments in Sugar Factories Control Act, 1950**

116. After de-zoning and emerging issues, many changes have occurred in the cane marketing system and the functioning of Sugar Factories Control Act, 1950 has become less effective. Keeping in view the current needs, it is essential that the Act may be amended in the light of emerging issues, especially for the promotion of contract system between growers & the mills.

### **18.9 Value-Addition and Vertical Integration in Sugar Industry**

117. In view of the decreasing trend in the world prices of sugar and large-scale investments in the domestic sugar industry, it is imperative to improve the efficiency of resource use in sugarcane production and its processing. To improve productivity in sugar processing, the requirement is not only to improve efficiency but also value addition through vertical integration. In the wake of fast approaching globalization and WTO requirements, the sugar industry would also have to go into value-adding business and growers would also get their share of returns.

### **18.10 Balanced Use of Fertilizers**

118. Chemical fertilizers play an important role in enhancing crop productivity, but the real key to getting maximum returns from the investment in fertilizers is their balanced and timely application. Overtime, though fertilizer use has increased, due to the widening of the NP ratio, productivity gains have been sub-optimal. The survey reports on use of fertilizers have shown that only a small fraction of cane growers have adopted balanced use of fertilizers. This imbalance in nutrient application adversely affects the per hectare yield of sugarcane as well as the quality of the produce. The Agriculture Extension Department may be called in to educate the growers on the balanced use of fertilizer. It is imperative to use the fertilizer according to soil conditions.

## **19. SUGARCANE YIELD AMONG COMPETING COUNTRIES**

119. Global sugarcane, during 2021, occupied an area of around 26,350 thousand hectares with a total production of 1,859,390 thousand tons. The world top 24 producing countries contribute 92.6 per cent of total area and 94 per cent of total production as narrated in Table-28

**Table- 28: MAJOR SUGARCANE PRODUCING COUNTRIES AREA OF THE WORLD:2021 CROP**

S.No.	Country	Area (000)ha	Per cent Share in World area
1	Brazil	9971.0	37.8
2	<b>India</b>	5159.2	19.6
3	Thailand	1495.4	5.7
4	<b>Pakistan</b>	1260.3	<b>4.8</b>
5	China, mainland	1127.7	4.3
6	Mexico	813.8	3.1
7	Indonesia	448.0	1.7
8	Colombia	425.1	1.6
9	Philippines	420.2	1.6
10	Argentina	383.2	1.5
11	United States of America	379.4	1.4
12	Australia	362.3	1.4
13	Cuba	348.0	1.3
14	South Africa	278.9	1.1
15	Guatemala	241.9	0.9
16	Bolivia (Plurinational State)	184.4	0.7
17	Myanmar	178.3	0.7
18	Viet Nam	165.9	0.6
19	Cameroon	131.9	0.5
20	Cambodia	130.8	0.5
21	Ecuador	130.4	0.5
22	Egypt	128.3	0.5
23	Dominican Republic	128.3	0.5
24	Paraguay	105.0	0.4
<b>Total of 24 countries</b>		24397.9	92.6
<b>World Total 91 countries</b>		26349.55	100

Source: FAO statistics year 2021

120. In terms of sugarcane area, Brazil is on the top with 9,971 thousand hectares, followed by India with 5,159 thousand hectares and Thailand with 1,495. Pakistan cultivating 1260 thousand hectares, lies at 4<sup>th</sup> number in this regard with 4.8 percent in global sugarcane area share.

121. In terms of sugarcane **production**, Brazil is on the top with 715,659 thousand tonnes followed by India with 405,399 thousand tons and China, Pakistan with 106,664, 88,651 thousand tonnes. However, Pakistan retains 4<sup>th</sup> position in sugarcane production of the world. (Table-29)

**Table- 29: MAJOR SUGARCANE PRODUCING COUNTRIES PRODUCTION OF THE WORLD: 2021 CROP**

S.No.	Country	Production in (000)tonnes	Per cent Share in World area
1	Brazil	715,659.2	38.5
2	<b>India</b>	<b>405,399.0</b>	21.8
3	China, mainland	106,664.0	5.7
4	<b>Pakistan</b>	<b>88,650.6</b>	4.8
5	Thailand	66,278.5	3.6
6	Mexico	55,485.3	3.0
7	Indonesia	32,200.0	1.7
8	Australia	31,133.5	1.7
9	United States of America	29,964.3	1.6
10	Guatemala	27,755.3	1.5
11	Philippines	26,277.4	1.4
12	Colombia	24,031.7	1.3
13	Argentina	18,627.4	1.0
14	South Africa	17,991.0	1.0
15	Egypt	12,360.6	0.7
16	Myanmar	11,649.2	0.6
17	Ecuador	11,372.5	0.6
18	Cuba	11,205.3	0.6
19	Viet Nam	10,740.9	0.6
20	Bolivia (Plurinational State)	10,089.8	0.5
21	Peru	9,827.8	0.5
22	Iran (Islamic Republic of)	8,258.2	0.4
23	Kenya	7,783.3	0.4
24	El Salvador	7,507.8	0.4
<b>Total of 24 countries</b>		1,746,912.5	94.00
<b>World Total 91 countries</b>		1,859,390	100.00

Source: FAO Statistics Year 2021

122. In terms of yield, Peru lies at the top with 115.82 tons per hectare, followed by Guatemala 114.72 tons per hectare and Senegal and Malawi with 112.24, 107.99 tons per hectare respectively. It is an upsetting situation that Pakistan ranks at 30<sup>th</sup> in terms of yield at 70.34 tons per hectare, which is nearby the international average while far behind India which lies at 211<sup>th</sup> position with 78.58 tonnes per hectare.

**Table- 30: YIELD PER HECTARE OF MAJOR SUGARCANE PRODUCING COUNTRIES IN THE WORLD: 2021 CROP**

S.No.	Country	Yield (tons)ha	S.No.	Country	Yield (tons)ha
1	Peru	115.82	25	Mali	72.55
2	Guatemala	114.72	26	Indonesia	71.88
3	Senegal	114.24	27	Brazil	71.77
4	Malawi	107.99	28	United Republic of Tanzania	71.21
5	Chad	104.70	29	Burundi	70.71
6	Zambia	103.53	<b>30</b>	<b>Pakistan</b>	<b>70.34</b>
7	Burkina Faso	102.16	31	China, Taiwan Province of	69.98
8	Iran (Islamic Republic)	100.10	32	Sierra Leone	69.74
9	Eswatini	96.92	33	Uruguay	69.00
10	Egypt	96.34	34	Paraguay	68.77
11	China, mainland	94.59	35	Mexico	68.18
12	El Salvador	94.16	36	Panama	66.85
13	Nicaragua	93.32	37	Myanmar	65.32
14	French Polynesia	89.84	38	Lao People's D. Republic	65.14
15	Ecuador	87.21	39	Morocco	64.77
16	Australia	85.93	40	Viet Nam	64.74
17	Kenya	84.20	41	South Africa	64.50
18	Côte d'Ivoire	82.87	42	Haiti	63.80
19	Honduras	79.46	43	Mauritius	63.72
20	United States of America	78.98	44	Uganda	62.94
<b>21</b>	<b>India</b>	<b>78.58</b>	45	Philippines	62.53
22	Zimbabwe	73.40	46	Guyana	62.44
23	Costa Rica	73.30	47	Gabon	61.63
24	Sudan	72.67	48	Mozambique	59.87
<b>World average</b>					<b>70.56</b>

Source: World Statistics Year Book 2021.

## 20. MEASURES FOR IMPROVING PRODUCTIVITY

123. Sugarcane is an important cash crop of Pakistan. It is mainly grown for sugar and sugary production. It is an important source of income and employment for the farming community of the country. In view of high water requirement of sugarcane and increasing water shortages, horizontal expansion of this crop is not feasible. Hence, the enhanced productivity is the only way forward to maintain the regular supply of sugarcane as raw material to 2<sup>nd</sup> largest agro-based sugar industry of Pakistan. API has recommended the following productivity enhancement measures.

### 20.1 Varietal Development

124. The government should pursue the PSMA and provincial research institutes to emphasize on cane 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** Sugarcane is a deep-rooted crop and proper land preparation plays an important role in the development of cane root system, and achieving optimal growth of the crop. Provincial Departments of Agriculture Extension should take the following steps in this regard:

- Land should be prepared by deep ploughing at least after every two years. The soil should be disked.
- Modernizing technology for improving productivity and competitiveness in the sugar industry.
- Need for improvement in efficiency and productivity of irrigation water and fertilizer.
- Chemicals and bio-control agents for the management of pests and diseases be introduced.
- Promote use of deep tillage for seedbed preparation for sugarcane cultivation.
- Practice recommended ‘row to row’ distance in sugarcane fields for effective weed control.
- Use healthy seed of improved varieties of fresh crop of sugarcane and discourage cultivation of un-approved varieties.
- Motivate farmers for ‘Hot Water Treatment’ of sugarcane sets for disease control.
- To conserve water, there is a need for improvement in efficiency and productivity of irrigation water.
- Apprise the farmers for achieving the desirable plant population per acre.
- Awareness to the farmers for using press mud to improve soil fertility.
- Educate sugarcane growers for using different fertilizers in recommended dosage.
- Well decayed farmyard manure (FYM) should be applied prior to land preparation.
- Apprise the growers about use of weedicides for controlling weeds.

### **20.3. Biological Control**

125. The government should emphasize PSMA and provincial research institutes to establish Integrated Pest Management (IPM) labs for rearing predators for disease control in sugarcane crop.

### **20.4. Role of Sugar Industry in Cane Development**

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

- Take responsibility for a campaign against pest and plant diseases, but on a limited scale.
- Study soils in sugarcane producing areas and to relate these to crop management.
- Supply press mud free of cost 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
- Investigate the agronomic problems of sugarcane production and soil conditions
- 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.

## **20.5. Low Sugar Recovery**

127. Provincial 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. Even in farming conditions, potential sugar recovery is not achieved.

## 21. ACKNOWLEDGEMENT

119. The technical contribution and professional efforts of the following staff members are highly appreciated in completion of Sugarcane Policy Analysis Report for 2023-24 Crop:

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**Abdul Karim**  
**Director General**



## ANNEX-I

**PROVINCE-WISE AREA ,PRODUCTION AND YIELD OF SUGARCANE  
IN PAKISTAN : 2012-13 TO 2022-23**

<b>YEAR</b>	<b>PUNJAB</b>	<b>SINDH</b>	<b>KPK</b>	<b>BALUCHISTAN</b>	<b>PAKISTAN</b>
<b>AREA</b>	<b>----- 000 hectares -----</b>				
<b>2009-10</b>	<b>607.4</b>	<b>233.9</b>	<b>100.8</b>	<b>0.70</b>	<b>942.8</b>
2012-13	767.7	253.7	106.7	0.65	1128.8
2013-14	756.8	297.6	117.4	0.67	1172.5
2014-15	710.6	316.7	112.5	0.66	1140.5
2015-16	705.4	312.8	112.7	0.70	1131.6
2016-17	777.8	320.5	118.6	0.66	1217.6
2017-18	859.1	333.3	148.5	0.86	1341.8
2018-19	710.6	279.5	111.0	0.87	1102.0
2019-20	643.4	286.1	109.4	0.89	1039.8
2020-21	777.0	279.7	107.4	0.92	1165.0
2021-22	869.3	295.2	95.1	0.70	1260.3
2022-23	938.0	289.4	90.7	0.70	1318.8
<b>YIELD</b>	<b>----- Tons per hectare -----</b>				
<b>2009-10</b>	<b>51.57</b>	<b>57.74</b>	<b>44.72</b>	<b>50.86</b>	<b>52.37</b>
2012-13	55.99	62.93	44.71	48.46	56.48
2013-14	57.75	61.70	45.67	48.06	57.54
2014-15	57.80	52.46	45.40	47.42	55.09
2015-16	59.50	57.49	48.79	45.29	57.87
2016-17	63.79	63.05	47.46	47.88	61.99
2017-18	64.10	61.84	51.25	50.47	62.11
2018-19	63.19	59.72	49.84	50.92	60.96
2019-20	67.37	60.24	52.60	50.79	63.84
2020-21	73.36	65.55	52.40	50.22	69.54
2021-22	73.90	65.92	51.63	49.86	70.34
2022-23	71.36	55.88	53.41	47.43	66.71
<b>PRODUCTION</b>	<b>----- 000 Tons -----</b>				
2011-12	42893.0	10788.3	4684.3	31.4	58397.0
2012-13	42982.0	15966.2	4770.2	31.5	63749.9
2013-14	43704.0	18362.5	5361.4	32.2	67460.1
2014-15	41074.0	16613.8	5107.0	31.3	62826.1
2015-16	41968.2	17984.3	5498.3	31.7	65482.5
2016-17	49613.0	20208.9	5628.7	31.6	75482.2
2017-18	55067.5	20611.9	7610.0	43.4	83332.8
2018-19	44906.3	16691.3	5532.0	44.3	67173.9
2019-20	43346.6	17233.8	5754.0	45.2	66379.6
2020-21	57000.0	18335.5	5627.5	46.2	81009.2
2021-22	64244.7	19460.7	4910.0	34.9	88650.3
2022-23	66932.0	16171.7	4844.2	33.2	87981.1

**Sources:** Agricultural Statistics of Pakistan,NFS&R, Islamabad, various issues.  
For 2022-23,Final estimates provided by Provincial Agriculture Departments.

## ANNEX-II

**PROVINCE-WISE AREA ,PRODUCTION AND YIELD OF SUGARCANE  
IN PAKISTAN : 2012-13 TO 2022-23**

<b>YEAR</b>	<b>PUNJAB</b>	<b>SINDH</b>	<b>KPK</b>	<b>BALOCHISTAN</b>	<b>PAKISTAN</b>
<b>AREA</b> ----- 000 acres -----					
2012-13	1897.1	626.9	263.7	1.6	2789.2
2013-14	1870.1	735.4	290.1	1.7	2897.3
2014-15	1756.0	782.6	278.0	1.6	2818.2
2015-16	1743.1	773.0	278.5	1.7	2796.3
2016-17	1922.0	792.0	293.1	1.6	3008.7
2017-18	2122.9	823.6	367.0	2.1	3315.6
2018-19	1756.0	690.7	274.3	2.1	2723.1
2019-20	1589.9	707.0	270.3	2.2	2569.4
2020-21	1920.0	691.2	265.4	2.3	2878.8
2021-22	2148.1	729.5	235.0	1.7	3114.3
2022-23	2317.9	715.1	224.1	1.7	3258.9
<b>YIELD</b> ----- Tons per acre -----					
2012-13	22.66	25.47	18.09	19.61	21.46
2013-14	23.37	24.97	18.48	19.45	21.57
2014-15	23.39	21.23	18.37	19.38	20.59
2015-16	24.08	23.27	19.74	18.33	21.35
2016-17	25.81	25.52	19.21	19.38	22.48
2017-18	25.94	25.03	20.74	20.42	23.03
2018-19	25.57	24.17	20.17	20.61	22.63
2019-20	27.26	24.38	21.28	20.55	23.37
2020-21	29.69	26.53	21.20	20.32	24.44
2021-22	29.91	26.68	20.89	20.18	24.41
2022-23	28.88	22.61	21.61	19.19	23.07
<b>PRODUCTION</b> ----- 000 Tons -----					
2012-13	42982.0	15966.2	4770.2	31.5	63749.9
2013-14	43704.0	18362.5	5361.4	32.2	67460.1
2014-15	41074.3	16613.8	5107	31.6	62826.7
2015-16	41968.2	17984.3	5498.3	31.7	65482.5
2016-17	49613.0	20208.9	5628.7	31.6	75482.2
2017-18	55067.5	20611.9	7610.0	43.4	83332.8
2018-19	44906.3	16691.3	5532.0	44.3	67173.9
2019-20	43346.6	17233.8	5754.0	45.2	66379.6
2020-21	57000.0	18335.5	5627.5	46.2	81009.2
2021-22	64244.7	19460.7	4910.0	34.9	88650.3
2022-23	66932.0	16171.7	4844.2	33.2	87981.1

**Sources:** Agricultural Statistics of Pakistan,NFS&R, Islamabad, various issues.  
For 2022-23,Final estimates provided by Provincial Agriculture Departments.

## DISTRICT- WISE AREA, YIELD AND PRODUCTION OF SUGARCANE: AVERAGE OF 2020-21 TO 2022-23

Area: 000 ha  
Production: 000 tonnes  
Yield: Tonnes/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	196.40	16159.01	18.82	82.28	1	Charsadda	28.84	1698.21	1.98	58.88
2	Faisalabad	90.25	6377.00	7.43	70.66	2	D.I.Khan	21.77	1397.19	1.63	64.17
3	Jhang	75.67	5418.58	6.31	71.60	3	Mardan	28.60	1206.01	1.40	42.17
4	Sargodha	64.48	4573.63	5.33	70.93	4	Peshawar	6.94	347.95	0.41	50.11
5	Rajanpur	50.85	4103.45	4.78	80.69	5	Malakand	4.72	194.01	0.23	41.13
6	Chiniot	53.96	4041.07	4.71	74.89	6	Nowshera	2.89	148.09	0.17	51.22
7	Muzaffargarh	53.96	3888.40	4.53	72.07	7	Swabi	2.13	84.50	0.10	39.63
8	T.T.Singh	36.42	2528.80	2.94	69.43	8	Bannu	0.33	15.13	0.02	45.91
9	Bhakkar	37.23	2501.36	2.91	67.19	9	Tank	0.60	12.51	0.01	20.91
10	Bahawalpur	22.93	1538.21	1.79	67.08	10	Khyber AG.	0.51	12.17	0.01	24.10
11	M.B.Din	24.69	1382.68	1.61	56.01	11	Mohmand AG.	0.10	3.18	0.00	31.59
12	Kasur	23.07	1354.73	1.58	58.73	12	Bunir	0.07	2.28	0.00	32.82
13	Vehari	17.40	1235.88	1.44	71.01	13	Kohat	0.06	2.19	0.00	34.88
14	Layyah	17.94	1157.19	1.35	64.49	14	Haripur	0.04	1.31	0.00	31.39
15	Bahawalnagar	14.70	1039.40	1.21	70.69	15	F.R.D.I.Khan	0.08	0.90	0.00	10.80
16	Okara	11.47	923.88	1.08	80.57	16	Hangu	0.02	0.73	0.00	35.39
17	Nankana Sahib	11.06	710.05	0.83	64.18	17	F.R.Hasan Khel	0.01	0.30	0.00	27.27
18	D.G.Khan	9.58	692.69	0.81	72.33	18	Lakki Marwat	0.01	0.22	0.00	40.38
19	Khanewal	6.74	454.93	0.53	67.50	19	F.R.Bannu	0.02	0.22	0.00	13.46
20	Khushab	6.88	401.17	0.47	58.34	20	F.R.Peshawar	0.02	0.16	0.00	10.59
21	Hafizabad	5.53	378.33	0.44	68.41						
22	Mianwali	5.13	348.09	0.41	67.90						
23	Lodhran	4.45	342.04	0.40	76.81						
24	Multan	3.51	230.99	0.27	65.81						
25	Sahiwal	3.64	227.21	0.26	62.36						
26	Sheikhupura	2.56	156.16	0.18	60.92						
27	Sialkot	2.56	147.51	0.17	57.54						
28	Gujrat	2.97	127.63	0.15	43.02						
29	Pakpattan	1.89	110.95	0.13	58.81						
30	Narowal	1.75	70.76	0.08	40.36						
31	Gujranwala	1.08	62.04	0.07	57.62						
32	Lahore	0.67	41.87	0.05	62.18						
<b>Sub Total</b>		<b>861.42</b>	<b>62725.69</b>	<b>73.04</b>	<b>72.82</b>	<b>Sub Total</b>		<b>97.76</b>	<b>5127.25</b>	<b>5.97</b>	<b>52.45</b>
<b>SINDH</b>						<b>BALOCHISTAN</b>					
1	Ghotki	61.61	4035.97	4.70	65.51	1	Kharnai	0.45	32.59	0.04	72.69
2	Nawabshah	34.51	2400.70	2.80	69.57	2	Jaffarabad	0.09	4.95	0.01	53.04
3	Thatta	34.84	2197.22	2.56	63.07	3	Lasbela	0.01	0.55	0.00	48.53
4	Khairpur	21.35	1476.26	1.72	69.16	4	Sibi	0.22	0.00	0.00	0.00
5	N.Feroze	22.07	1339.65	1.56	60.70	5	Nasirabad	0.00	0.00	0.00	0.52
6	Tando Allahyar	19.58	1245.79	1.45	63.64						
7	Mirpurkhas	18.34	983.50	1.15	53.63						
8	Matiali	12.65	848.59	0.99	67.08						
9	Tando Muhamma	13.63	834.71	0.97	61.23						
10	Sanghar	13.09	792.20	0.92	60.51						
11	Badin	14.97	660.64	0.77	44.14						
12	Sukkur	6.95	406.11	0.47	58.43						
13	Dadu	6.42	313.40	0.36	48.79						
14	Hyderabad	4.34	249.07	0.29	57.38						
15	Unerkot	1.94	100.27	0.12	51.75						
16	Larkana	0.66	49.13	0.06	73.95						
17	Tharparkar	0.34	17.47	0.02	51.62						
18	Jamshoro	0.40	16.97	0.02	41.92						
19	Kashmore	0.16	9.73	0.01	59.47						
20	Shikarpur	0.14	8.13	0.01	59.62						
21	Shadadkot	0.04	2.10	0.00	54.71						
22	Jacobabad	0.07	1.72	0.00	24.98						
<b>Sub Total</b>		<b>288.10</b>	<b>17989.33</b>	<b>20.95</b>	<b>62.44</b>	<b>Sub Total</b>		<b>0.77</b>	<b>38.09</b>	<b>0.04</b>	<b>49.47</b>
<b>Pak Total</b>								<b>1248.05</b>	<b>85880.36</b>	<b>100.00</b>	<b>68.81</b>

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

**Sources:** Respected Agriculture Provincial Departments

## AVERAGE FARMER'S COST OF PRODUCTION ESTIMATES OF SUGARCANE IN PUNJAB

S.No	Operations / Inputs	Unit	Average No. of units/ acre	2022-23 crop		2023-24 crop		Change in 2023-24 over 2022-23
				Cost per unit	Cost per acre	Cost per unit	Cost per acre	
1	2	3	4	5	6=4*5	7	8=4*7	9=8-6
<b>1</b>	<b>Land preparation:</b>			.....Rupees.....				
	1.1 Deep ploughing	No.	0.500	3,000.00	1,500.00	3,250.00	1,625.00	125.00
	1.2 Rotavator/disc plough used	No.	1.000	3,000.00	3,000.00	3,250.00	3,250.00	250.00
	1.3 Ploughing	No.	3.000	1,500.00	4,500.00	1,750.00	5,250.00	750.00
	1.4 Planking	No.	1.000	750.00	750.00	875.00	875.00	125.00
	1.5 Levelling	Hour	0.500	1,800.00	900.00	2,000.00	1,000.00	100.00
<b>2</b>	<b>Seed bed preparation:</b>							
	2.1 Ploughing	No	0.750	1,500.00	1,125.00	1,750.00	1,312.50	187.50
	2.2 Ridge making with tractor	Hour	0.500	1,500.00	750.00	1,750.00	875.00	125.00
	2.3 Clearing soil at ends of ridges (labor charges)	M. day	1.000	800.00	800.00	900.00	900.00	100.00
<b>3</b>	<b>Seed and sowing operations:</b>							
	3.1 Seed used	Man/acre	10.000	2,000.00	20,000.00	2,250.00	22,500.00	2,500.00
	3.2 Contract sowing - including harvesting, stripping,	Rs./ acre	1.000	5,500.00	5,500.00	6,000.00	6,000.00	500.00
<b>4</b>	<b>Irrigation:</b>							
	4.1 Canal	Irrig/acre			250.00		250.00	
	4.2 Tubewell	Irrig/acre	7.000	1,000.00	7,000.00	1,300.00	9,100.00	2,100.00
	4.3 Mixed	Irrig/acre	2.000	600.00	1,200.00	650.00	1,300.00	100.00
	4.4 Labour for irrigation and water course cleaning	M. days/ acre	2.000	800.00	1,600.00	900.00	1,800.00	200.00
<b>5</b>	<b>Interculture/ hoeing:</b>							
	5.1 Manual hoeing on contract	No. of hoeings	1.000	1,500.00	1,500.00	1,800.00	1,800.00	300.00
	5.2 With tractor	Hour/acre	0.500	1,500.00	750.00	1,750.00	875.00	125.00
<b>6</b>	<b>Plant protection including application cost :</b>							
	6.1 weedicide	No. of appli	1.000	1,500.00	1,500.00	2,000.00	2,000.00	500.00
	6.2 Sprays	"	1.000	1,300.00	1,300.00	1,500.00	1,500.00	200.00
	6.3 Application cost	Rs./appli/acre	0.500	800.00	400.00	900.00	450.00	50.00
<b>7</b>	Farm Yard Manure including transport and application cost	No. of trolleys	0.250	4,500.00	1,125.00	5,000.00	1,250.00	125.00
<b>8</b>	<b>Fertilizers: (bags) :</b>							
	8.1 DAP	No. of bags	2.000	12,150.00	24,300.00	10,000.00	20,000.00	- 4,300.00
	8.2 Urea	"	2.000	2,250.00	4,500.00	2,800.00	5,600.00	1,100.00
	8.3 NP	"	0.250	8,200.00	2,050.00	5,900.00	1,475.00	- 575.00
	8.4 CAN	"	0.250	2,070.00	517.50	2,500.00	625.00	107.50
	8.5 SOP	"	0.250	16,000.00	4,000.00	13,500.00	3,375.00	- 625.00
	8.6 Fertilizer transport and application cost	"	4.750	150.00	712.50	175.00	831.25	118.75
<b>9</b>	Traded inputs' cost (Item 1 to 8 minus Item 4.1)	Rs./acre			91,280.00		95,568.75	4,288.75
<b>10</b>	Mark up on item 9 @ 20% per annum	"	1.083		11,866.40		20,706.56	8,840.16
<b>11</b>	<b>Land rent</b>	Rs/acre/13 months	1.083	45,000.00	48,750.00	55,000.00	59,583.33	10,833.33
<b>12</b>	<b>Other Costs:</b> i) Average weighted land tax	Rs/acre/13months	1.000		132.00		132.00	-
	ii) Management charges	Rs/acre/13months	1.083	2640	2,860.00	3000	3,250.00	390.00
<b>13</b>	<b>Crop harvesting, stripping, binding, loading, etc.</b>	Rs./40 Kg		25.00	19,000.00	27.50	21,450.00	2,450.00
<b>14</b>	<b>Gross cost of cultivation</b>	Rs./acre			174,138.40		200,940.65	26,802.25
<b>15</b>	Subsidy on DAP fertilizer	Rs/bag			900.00		-	900.00
<b>16</b>	Value of tops	Rs/acre			2,000.00		3,000.00	1,000.00
<b>17</b>	<b>Net cost of cultivation</b>	Rs/acre			171,238.40		197,940.65	26,702.25
<b>18</b>	<b>Yield</b>	40Kg/acre			760.00		780.00	20.00
<b>19</b>	<b>Cost of production</b>							
	19.1 At farm level including land rent	Rs./40 Kg			225.31		253.77	28.46
	19.2 At farm level excluding land rent	Rs./40 Kg			161.17		177.38	16.21
<b>18</b>	<b>Marketing cost :</b>							
	18.1 Transportation	Rs./40 Kg			18.50		19.50	1.00
	18.2 Road Cess	Rs./40 Kg			1.50		1.50	-
<b>19</b>	<b>Cost of production :</b>							
	19.1 At mill gate including land rent	Rs./40 Kg			245.31		274.77	29.46
	19.2 At mill gate Excluding land rent	Rs./40 Kg			181.17		198.38	17.21

Sources:

- 1 For rates/ prices of inputs, API field survey , 2022-23
- 2 For input rates, field surveys of API for respective years.

## AVERAGE FARMER'S COST OF PRODUCTION ESTIMATES OF SUGARCANE IN SINDH

S. No	Operations / Inputs	Unit	Average No. of units/used acre	2022-23 crop		2023-24 crop		Change in 2023-24 over 2022-23
				Cost per unit	Cost per acre	Cost per unit	Cost per acre	
				5	6=4x5	7	8 =7x4	
1	2	3	4	Rupees.....				
1	<b>Land preparation:</b>							
	1.1 Deep ploughing	No	0.500	3,000.00	1,500.00	3,250.00	1,625.00	125.00
	1.2 Ploughing	No	3.000	1,500.00	4,500.00	1,750.00	5,250.00	750.00
	1.3 Planking	No	1.000	750.00	750.00	875.00	875.00	125.00
	1.5 Laser Levelling	"	1.000	1,800.00	1,800.00	2,000.00	2,000.00	200.00
2	<b>Seed bed preparation</b>							
	2.1 Ploughing	No	1.000	1,500.00	1,500.00	1,750.00	1,750.00	250.00
	2.2 Ridge making with tractor	Hrs.	0.500	2,000.00	1,000.00	1,750.00	875.00	- 125.00
	2.3 Clearing soil at ends of ridges	M. day	1.000	800.00	800.00	900.00	900.00	100.00
3	<b>Seed and sowing operations:</b>							
	3.1 Seed used	40 Kgs	80.000	300.00	24,000.00	325.00	26,000.00	2,000.00
	3.2 Contract sowing including harvesting, stripping, making of	Rs./ acre			4,000.00		5,000.00	1,000.00
4	<b>Irrigation</b>							
	4.1 Canal	Irrigs./acre	18.000		250.00		250.00	-
	4.2 Private tubewell (RS/irrigation)	Irrigs./acre	1.000	1,200.00	1,200.00	1,500.00	1,500.00	300.00
	4.3 Mixed	Irrigs./acre	2.160	1,200.00	2,592.00	1,500.00	3,240.00	648.00
	4.4 Labour for irrigation and water course cleaning	M. day	2.000	800.00	1,600.00	900.00	1,800.00	200.00
5	<b>Interculture/ hoeing</b>							
	5.1 Manual	M. day	2.000	2,300.00	4,600.00	2,500.00	5,000.00	400.00
	5.2 Hoeing with tractor	No	1.800	2,000.00	3,600.00	2,200.00	3,960.00	360.00
6	<b>Plant protection including application cost</b>							
	6.1 weedicide	No. of sprays	1.000	1,500.00	1,500.00	1,800.00	1,800.00	300.00
	6.2 Sprays		1.200	1,500.00	1,800.00	1,800.00	2,160.00	360.00
	6.3 Application cost	Rs/acre	2.200	250.00	550.00	500.00	1,100.00	550.00
7	<b>Farm Yard Manure including transport &amp; application cost (50%)</b>	No	0.320	4,500.00	1,440.00	5,000.00	1,600.00	160.00
8	<b>Fertilizers: (bags)</b>							
	8.1 DAP	No	2.000	12,150.00	24,300.00	10,000.00	20,000.00	- 4,300.00
	8.2 Urea	"	2.000	2,250.00	4,500.00	2,800.00	5,600.00	1,100.00
	8.3 NP	"	0.250	8,200.00	2,050.00	5,900.00	1,475.00	- 575.00
	8.4 CAN	"	0.250	2,100.00	525.00	2,500.00	625.00	100.00
	8.5 SOP	"	0.150	16,000.00	2,400.00	13,500.00	2,025.00	- 375.00
	8.6 Fertilizer transport and application cost	"	4.650	150.00	697.50	175.00	813.75	116.25
9	<b>Traded inputs cost (Item 1 to 8-Item 4.1)</b>	Rs./acre			93,204.50		96,973.75	3,769.25
10	<b>Mark up on item 9 @ 20% per annum for 13 months</b>				12,116.59		21,010.98	8,894.39
11	<b>Land rent</b>	"	1.08	40,000.00	43,333.33	52,000.00	56,333.33	13,000.00
12	<b>Average weighted land tax</b>	Rs/acre	1.00		200.00		200.00	-
13	<b>Management charges</b>	"	1.08		2,860.00	3,000.00	3,250.00	390.00
14	<b>Crop harvesting, stripping, binding, loading, etc.</b>	Rs./ 40 Kg		17.00	11,560.00	22.00	15,400.00	3,840.00
15	<b>Total cost of cultivation</b>	Rs./ acre			163,524.42		193,418.06	29,893.64
16	<b>Sunsidy on DAP fertilizer</b>	Rs/bag			900.00			
17	<b>Value of tops</b>	Rs/acre			1,500.00		2,000.00	500.00
18	<b>Net cost of cultivation</b>	Rs/acre			161,124.42		191,418.06	30,293.64
19	<b>Yield</b>	40 Kg/acre			680.00		700.00	20.00
20	<b>Cost of production at farm level:</b>							
	20.1 Including land rent	Rs./ 40 Kg			236.95		273.45	36.51
	20.2 Excluding land rent	Rs./ 40 Kg			173.22		192.98	19.76
21	<b>Marketing cost :</b>							
	21.1 Transport	Rs./40 Kg			18.50		19.50	1.00
	21.2 Road Cess	Rs./40 Kg			1.50		1.50	-
22	<b>Cost of production at mill gate:</b>							
	22.1 Including land rent	Rs./ 40 Kg			<b>256.95</b>		<b>294.45</b>	37.51
	22.2 Excluding land rent	Rs./ 40 Kg			193.22		213.98	20.76

Sources:

- 1 For input usage, API field survey , 2022-23
- 2 For input rates, field surveys of API for respective years.

## AVERAGE FARMER'S COST OF PRODUCTION ESTIMATES OF SUGARCANE IN KHYBER PAKHTUNKHA

S. No	Operations / Inputs	Unit	Average No. of units/acre	2022-23 crop		2023-24 crop		Change in 2023-24 over 2022-23	
				Cost per unit	Cost per acre	Cost per unit	Cost per acre		
1	2	3	4	5	6 =4*5	7	8 =4*7	9=8-6	
1	Land preparation:			Rupees.....					
	1.1 Deep ploughing	No.	0.500	3,000.00	1,500.00	3,250.00	1,625.00	125.00	
	1.2 Rotavator/disc plough used	No.	0.500	3,000.00	1,500.00	3,250.00	1,625.00	125.00	
	1.3 Ploughing	No.	2.500	1,500.00	3,750.00	1,750.00	4,375.00	625.00	
	1.4 Planking	No.	0.250	750.00	187.50	875.00	218.75	31.25	
	1.5 Laser Levelling	Hour	1.000	1,800.00	1,800.00	2,000.00	2,000.00	200.00	
2	Seed bed preparation:								
	2.1 Ploughing	No	0.750	1,500.00	1,125.00	1,750.00	1,312.50	187.50	
	2.2 Ridge making with tractor	Hour	0.500	1,500.00	750.00	1,750.00	875.00	125.00	
	2.3 Clearing soil at ends of ridges (labor charges)	M. day	1.000	700.00	700.00	800.00	800.00	100.00	
3	Seed and sowing operations:								
	3.1 Seed used	Marlas/ acre	10.000	2,000.00	20,000.00	2,200.00	22,000.00	2,000.00	
	3.2 Contract sowing - including harvesting, stripping, making of sets for seed, transport and sowing	Rs./ acre	1.000	5,000.00	5,000.00	5,500.00	5,500.00	500.00	
4	Irrigation:								
	4.1 Canal	Irrig/acre			250.00		250.00		
	4.2 Tubewell	Irrig/acre	7.000	-	-	-	-	-	
	4.3 Mixed	Irrig/acre	2.000	-	-	-	-	-	
	4.4 Labour for irrigation and water course cleaning	M. days/ acre	2.000	700.00	1,400.00	800.00	1,600.00	200.00	
5	Interculture/ hoeing:								
	5.1 Manual hoeing on contract	No. of hoeings	1.000	1,400.00	1,400.00	1,800.00	1,800.00	400.00	
	5.2 With tractor	Hour/acre	0.500		-		-	-	
6	Plant protection including application cost :								
	6.1 weedicide	No. of appli	1.000	1,000.00	1,000.00	1,300.00	1,300.00	300.00	
	6.2 Sprays	"	1.000	1,000.00	1,000.00	1,300.00	1,300.00	300.00	
	6.3 Application cost	Rs./appli/acre	0.500	700.00	350.00	800.00	400.00	50.00	
7	Farm Yard Manure including transport and application cost	No. of trolleys	0.250	6,500.00	1,625.00	7,000.00	1,750.00	125.00	
8	Fertilizers: (bags) :								
	8.1 DAP	No. of bags	2.000	12,150.00	24,300.00	10,000.00	20,000.00	-4300	
	8.2 Urea	"	2.000	2,250.00	4,500.00	2,800.00	5,600.00	1,100.00	
	8.3 NP	"	0.250	-	-	-	-	-	
	8.4 CAN	"	0.250	-	-	-	-	-	
	8.5 Other	"	0.250	1,500.00	375.00	1,600.00	400.00	25.00	
	8.6 Fertilizer transport and application cost	"	4.750	150.00	712.50	200.00	950.00	237.50	
9	Traded inputs' cost (Item 1 to 8 minus Item 4.1)	Rs./acre			72,975.00		75,431.25	2,456.25	
10	Mark up on item 9 @ 20% per annum	"	1.083		9,486.75		16,343.44	6,856.69	
11	Land rent	Rs/acre/13 months	1.083	35,000	37,916.67	45,000	48,750.00	10,833.33	
12	Other Costs: i) Average weighted land tax	Rs/acre/13months	1.000		132.00		132.00	-	
	ii) Management charges	Rs/acre/13months	1.083	2,640.00	2,860.00	3,000.00	3,250.00	390.00	
13	Crop harvesting, stripping, binding, loading, etc.	Rs./40 Kg		22.00	12,100.00	23.00	13,225.00	1,125.00	
14	Gross cost of cultivation	Rs./acre			135,720.42		157,381.69	21,661.27	
15	Sunsidy on DAP fertilizer	Rs/bag			900.00			-900	
16	Value of tops	Rs/acre			2,000.00		2,200.00	200.00	
17	Net cost of cultivation	Rs/acre			132,820.42		155,181.69	22,361.27	
18	Yield	40Kg/acre			550.00		575.00	25.00	
19	Cost of production								
	19.1 At farm level including land rent	Rs./40 Kg			241.49		269.88	28.39	
	19.2 At farm level excluding land rent	Rs./40 Kg			172.55		185.10	12.55	
18	Marketing cost :								
	18.1 Transportation	Rs./40 Kg			12.00		14.00	2.00	
	18.2 Road Cess	Rs./40 Kg			1.50		1.50	-	
19	Cost of production :								
	19.1 At mill gate including land rent	Rs./40 Kg			254.99		285.38	30.39	
	19.2 At mill gate Excluding land rent	Rs./40 Kg			186.05		200.60	14.55	

Source:

- 1 For rates/ prices of inputs, API field survey , 2022-23
- 2 For input rates, field surveys of API for respective years.

ECONOMICS OF SUGARCANE AND COMPETING CROPS AT  
PRICES REALIZED BY THE GROWERS: 2022-23 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		
		Days	Acre inches	.....Rupees per acre.....					Ratio	Rupee of purchased inputs	Crop day	Acre inch of water used
				10=6/5	11=6/2	12=6/3						
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	170,988	68,618	212,800	144,183	41,812	1.24	3.10	540	4,433
2	Seed Cotton	210	22	98,321	38,544	162,770	124,226	64,449	1.66	4.22	775	7,399
3	Basmati Paddy	180	58	82,111	44,739	124,600	79,861	42,489	1.52	2.79	692	2,148
4	Non-Basmati	180	62	78,764	38,878	124,000	85,122	45,236	1.57	3.19	689	2,000
5	Wheat	150	12	75,554	27,333	128,100	100,767	52,546	1.70	4.69	854	10,675
6	Sunflower (spring)	180	22	91,416	36,774	140,700	103,926	49,284	1.54	3.83	782	6,395
7	Canola	180	13	64,930	19,250	124,763	105,512	59,832	1.92	6.48	693	9,597
8	Seed Cotton + Wheat	360	34	173,875	65,877	290,870	224,994	116,995	1.67	4.42	808	8,555
9	Seed Cotton+Sunflower	390	44	189,737	75,317	303,470	228,153	113,733	1.60	4.03	778	6,897
10	Seed Cotton + Canola	390	35	163,251	57,794	287,533	229,738	124,281	1.76	4.98	737	8,215
11	Basmati Paddy+Wheat	330	70	157,666	72,072	252,700	180,628	95,034	1.60	3.51	766	3,610
12	Basmati Paddy+Sunflower	360	80	173,528	81,513	265,300	183,787	91,772	1.53	3.25	737	3,316
13	Basmati paddy+Canola	360	71	147,042	63,990	249,363	185,373	102,321	1.70	3.90	693	3,512
14	Non-Masmati + Wheat	330	74	154,319	66,211	252,100	185,889	97,781	1.63	3.81	764	3,407
15	Non-Basmati+Sunflower	360	84	170,181	75,652	264,700	189,048	94,519	1.56	3.50	735	3,151
16	Non-Basmati+Canola	360	75	143,695	58,129	248,763	190,634	105,068	1.73	4.28	691	3,317

**Sindh**

1	Sugarcane	488	71	168,655	65,117	191,760	126,643	23,105	1.14	2.94	393	2,701
2	Seed Cotton	210	18	104,133	36,312	179,531	143,219	75,398	1.72	4.94	855	9,974
3	Non-Basmati	180	56	76,679	30,927	137,450	106,523	60,771	1.79	4.44	764	2,454
4	Wheat	150	12	77,727	28,766	141,900	113,134	64,173	1.83	4.93	946	11,825
5	Sunflower (spring)	180	22	69,596	30,520	105,900	75,380	36,304	1.52	3.47	588	4,814
6	Canola	180	13	62,716	18,530	90,400	71,870	27,684	1.44	4.88	502	6,954
7	Seed Cotton + Wheat	360	30	181,860	65,077	321,431	256,353	139,571	1.77	4.94	893	10,714
8	Seed Cotton+Sunflower	390	40	173,729	65,077	285,431	220,353	111,702	1.64	4.39	732	7,136
9	Seed cotton+Canola	390	31	166,848	54,842	269,931	215,088	103,082	1.62	4.92	692	8,707
10	Non-Masmati + Wheat	360	68	154,406	59,692	279,350	219,658	124,944	1.81	4.68	776	4,108
11	Non-Basmati+Sunflower	360	78	146,275	61,447	243,350	181,903	97,075	1.66	3.96	676	3,120
12	Non-Basmati+Canola	360	69	139,394	49,457	227,850	178,393	88,456	1.63	4.61	633	3,302

**Notes for Annex - VII:**

1. The economic analysis presented in the above exercise is based on the input-output prices applicable for 2022-23 crops.
2. The data regarding input-output parameters have been adopted from the API's price policy papers for sugarcane, seed cotton, rice paddy and wheat, 2022-23 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 2022-23 crops. To incorporate the escalations in input prices, which occurred during the growing period of 2022-23 crops, some marginal revisions/updates have been incorporated.
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. The following prices as realized by the growers for different crops are adopted for the analysis:
  - 4.1 The support price of Wheat is Rs 3,900 per 40 kgs, as maintained by the Punjab and Rs 4,000 by Sindh for 2022-23 crop, have been adopted for the current analysis.
  - 4.2 The wholesale market prices of basmati paddy and IRRI paddy during the post-harvest period in major producer area markets have averaged at Rs 3,000 and Rs 2,400 per 40 kgs, respectively. While, the average price of IRRI paddy in Sindh is reported at Rs 2,450 per 40 kgs.
  - 4.3 The intervention prices of seed cotton announced by the Government for 2022-23 at Rs 7,935 per 40 kgs in the Punjab and Rs 7,646 Sindh.
  - 4.4 The price of Sunflower crops has been reported hovering around Rs7,000/40 kgs and Rs 7,935/40 kgs for Canola during 2022-23.
  - 4.5 The minimum indicative prices of sugarcane as announced by provincial government have been taken for the analysis i.eRs 300 per 40 kgs in the Punjab and Rs 302 per 40 kgs 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 20 per 40 kgs in Punjab and Rs 21 for Sindh for sugarcane, Rs 45 for seed cotton in Punjab and Sindh, Rs 60 for rice paddy in Punjab and Sindh, and for wheat, Rs 45 in Punjab and Rs 50 in Sindh. For sunflower and canola, Rs 65 for Punjab and Rs 40 for Sindh has been applied.
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.

## Annex-VIII

**GROSS REVENUE OF SUGARCANE, TRADED INPUTS AND DOMESTIC FACTOR GOST IN PUNJAB ESTIMATED ON THE BASIS OF PRIVATE AND SOCIAL PRICES (BASIS-IMPORT PARITY PRICE OF SUGAR)**

Description	Revenue	Traded Inputs Cost	Domestic Factor Cost	Profit
	----- Rupees per acre -----			
<b>2018-19</b>				
Private Prices	118710	44975	60812	12923
Social Prices	112768	43173	31731	37864
Transfers	5942	1802	29081	-24941
<b>2019-20</b>				
Private Prices	130840	46475	69712	14652
Social Prices	136741	44217	37191	55334
Transfers	-5902	2259	32521	-40682
<b>2020-21</b>				
Private Prices	175000	46884	75902	52214
Social Prices	148162	44491	42742	60929
Transfers	26838	2393	33160	-8715
<b>2021-22</b>				
Private Prices	172800	52803	80233	39764
Social Prices	260582	50656	47565	162361
Transfers	-87782	2147	32668	-122597
<b>2022-23</b>				
Private Prices	304000	59598	87616	156786
Social Prices	558722	57283	53305	448134
Transfers	-254722	2315	34312	-291348

**GROSS REVENUE OF SUGARCANE, TRADED INPUTS AND DOMESTIC FACTOR GOST IN SINDH ESTIMATED ON THE BASIS OF PRIVATE AND SOCIAL PRICES (BASIS-IMPORT PARITY PRICE OF SUGAR)**

Description	Revenue	Traded Inputs Cost	Domestic Factor Cost	Profit
2018-19	-----Rupees per acre-----			
Private Prices	140590	44029	61758	34803
Social Prices	136628	36742	62026	37860
Transfers	3962	7287	-268	-3057
<b>2019-20</b>				
Private Prices	145106	46429	63544	35132
Social Prices	157209	38760	63376	55073
Transfers	-12103	7670	168	-19941
<b>2020-21</b>				
Private Prices	186220	47201	68895	70124
Social Prices	173760	39414	69394	64952
Transfers	12460	7788	-499	5172
<b>2021-22</b>				
Private Prices	186825	52753	75239	58833
Social Prices	262864	44054	75994	142816
Transfers	-76039	8699	-755	-83983
<b>2022-23</b>				
Private Prices	299060	60358	80078	158624
Social Prices	555760	50385	80670	424705
Transfers	-256700	9973	-592	-266080

**GROSS REVENUE OF SUGARCANE, TRADED INPUTS AND DOMESTIC FACTOR GOST IN PUNJAB ESTIMATED ON THE BASIS OF PRIVATE AND SOCIAL PRICES (BASIS-EXPORT PARITY PRICE OF SUGAR)**

Description	Revenue	Traded Inputs Cost	Domestic Factor Cost	Profit
	----- Rupees per acre -----			
<b>2018-19</b>				
Private Prices	<b>118710</b>	<b>44975</b>	<b>60812</b>	<b>12923</b>
Social Prices	<b>49713</b>	<b>43173</b>	<b>31731</b>	<b>-25191</b>
Transfers	<b>68997</b>	<b>1802</b>	<b>29081</b>	<b>38114</b>
<b>2019-20</b>				
Private Prices	<b>130840</b>	<b>46475</b>	<b>69712</b>	<b>14652</b>
Social Prices	<b>73842</b>	<b>44217</b>	<b>37191</b>	<b>-7566</b>
Transfers	<b>56998</b>	<b>2259</b>	<b>32521</b>	<b>22218</b>
<b>2020-21</b>				
Private Prices	<b>175000</b>	<b>46884</b>	<b>75902</b>	<b>52214</b>
Social Prices	<b>89474</b>	<b>44491</b>	<b>42742</b>	<b>2241</b>
Transfers	<b>85526</b>	<b>2393</b>	<b>33160</b>	<b>49973</b>
<b>2021-22</b>				
Private Prices	<b>172800</b>	<b>52803</b>	<b>80233</b>	<b>39764</b>
Social Prices	<b>166262</b>	<b>50656</b>	<b>47565</b>	<b>68041</b>
Transfers	<b>6538</b>	<b>2147</b>	<b>32668</b>	<b>-28277</b>
<b>2022-23</b>				
Private Prices	<b>304000</b>	<b>59598</b>	<b>87616</b>	<b>156786</b>
Social Prices	<b>488870</b>	<b>57283</b>	<b>53305</b>	<b>378282</b>
Transfers	<b>-184870</b>	<b>2315</b>	<b>34312</b>	<b>-221497</b>

**GROSS REVENUE OF SUGARCANE, TRADED INPUTS AND DOMESTIC FACTOR GOST IN SINDH ESTIMATED ON THE BASIS OF PRIVATE AND SOCIAL PRICES (BASIS-EXPORT PARITY PRICE OF SUGAR)**

Description	Revenue	Traded Inputs Cost	Domestic Factor Cost	Profit
	----- Rupees per acre -----			
<b>2018-19</b>				
Private Prices	140590	44029	61758	34803
Social Prices	69169	36742	62026	-29599
Transfers	71421	7287	-268	64402
<b>2019-20</b>				
Private Prices	145106	46429	63544	35132
Social Prices	90107	38760	63376	-12029
Transfers	54999	7670	168	47161
<b>2020-21</b>				
Private Prices	186220	47201	68895	70124
Social Prices	109836	39414	69394	1028
Transfers	76384	7788	-499	69096
<b>2021-22</b>				
Private Prices	193375	52753	75239	65383
Social Prices	177471	44054	75994	57423
Transfers	15904	8699	-755	7960
<b>2022-23</b>				
Private Prices	239660	77100	84025	78536
Social Prices	325676	64389	84220	177068
Transfers	-86016	12711	-195	-98532

PER CAPITA AVAILABILITY (CONSUMPTION OF SUGAR: 2019-20 TO 2021-22  
( October - September )

S. No	Items	2019-20	2020-21	2021-22
		-----Thousands tons-----		
1	Opoeing stocks as on Ist October	2060	68.00	95
2	Production	4875	5601	6635
3	Imports	36	415	261
4	Export	73	0	0
5	Closing stocks as on 30th September	68	95	990
6	Net availability (item 1+2+3-4-5)	6830	5989	6001
		-----Million-----		
7	Population (a)	231.65	237.52	243.54
		-----Kgs per annum-----		
8	Per capita availability ( consumption)	29.48	25.21	24.64
9	Average per capita availability Average (2019-20 to 2021-22)		26.45	

Note: The papulation has been estimated on the basis of Census, 2023.

a). It includes the population of Pakistan, AJ&K, GB and Afghan Refugees.

Sources:

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: PBS Sensus 2023

**DOMESTIC AVERAGE WHOLESALE PRICES OF SUGAR IN MAJOR  
DOMESTIC MARKETS: 2022 AND 2023**

Month	Lahore	Fasilabad	Karachi	Hyderabad	Peshawar	Average
-------	--------	-----------	---------	-----------	----------	---------

**2022**

----- Rupees per 100 kgs-----

January	8700	8786	8700	8400	9250	<b>8767</b>
February	8700	8389	8200	7900	9250	<b>8488</b>
March	8700	8217	8100	7900	9000	<b>8383</b>
April	8371	8067	8100	7900	8750	<b>8238</b>
May	8250	8058	7900	7700	-	<b>7977</b>
June	8200	8258	8300	8100	-	<b>8214</b>
July	8325	8273	8000	8000	9000	<b>8320</b>
August	8500	8235	8200	8000	8200	<b>8227</b>
September	8500	8234	8400	8000	8320	<b>8291</b>
October	8500	8335	8400	8000	9000	<b>8447</b>
November	8500	8626	8300	8200	9000	<b>8525</b>
December	8500	8854	8500	8600	9000	<b>8691</b>
<b>Average</b>	<b>8479</b>	<b>8361</b>	<b>8258</b>	<b>8058</b>	<b>8877</b>	<b>8381</b>

**2023**

January	8500	8520	8800	8400	8400	<b>8524</b>
February	8500	8770	8800	8600	8860	<b>8706</b>
March	9411	9704	9200	9700	9960	<b>9595</b>
April	10000	11426	11600	11100	11600	<b>11145</b>
May	10900	11671	11800	11400	11700	<b>11494</b>
June	11400	11671	12300	11800	8000	<b>11034</b>
July	12863	13140	13900	13400	13500	<b>13361</b>
August	14186	14519	15000	14900	18000	<b>15321</b>
September	17721	15945	16000	15200	16000	<b>16173</b>
October	15600	14540	14700	14100	14000	<b>14588</b>
<b>Average</b>	<b>11908</b>	<b>11991</b>	<b>12210</b>	<b>11860</b>	<b>12002</b>	<b>11994</b>

Source: i Agriculture Marketing Information Services, Lahore, Punjab  
 ii Bureau of Supply and Prices, Karachi  
 iii Agriculture Marketing Services, K.P

## ANNEX - XIV

**AVERAGE WHOLESALE PRICES OF SUGAR IN MAJOR DOMESTIC MARKETS:  
2011-12 TO 2022-23 ( October- September)**

Year	Lahore	Fasilabad	Karachi	Hyderabad	Peshawar	Average	Increase(+) decrease(-) in average price over Percent
----- Rupees per 100 kgs-----							
2011-12	5326	5256	5055	5374	5350	5272	-
2012-13	5117	5084	4977	4947	4772	4979	-5.56
2013-14	4942	4949	5050	5314	5113	5074	1.89
2014-15	5726	5634	5463	5529	5564	5583	10.04
2015-16	5278	5231	5136	5291	5200	5227	-6.38
2016-17	6032	5889	6044	6006	6419	6049	15.72
2017-18	4969	5057	5029	4951	4942	4990	-17.51
2018-19	5600	5883	5935	5835	6127	5876	17.76
2019-20	7737	7734	7671	7515	6578	7447	26.74
2020-21	9404	9163	8933	8694	8130	8865	19.04
2021-22	8713	8639	8319	8085	9533	8658	-2.34
2022-23	11122	11209	11331	11031	11309	11200	29.37

Sources: 1. Agruculture Marketing Information Services, Punjab, Lahore.  
2. Agriculture Marketing Services, Sindh, Hyderabad.  
3. Agriculture Marketing Services, Peshawar, KPK.



**AVERAGE INTERNATIONAL PRICES OF SUGAR: 2011-12 to 2023-23 (OCT-SEP)**

Years	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
2011-12	22.68	499.96	27.54	607.20	4.86	107.23	17.66
2012-13	18.12	399.56	23.96	528.15	5.83	128.58	24.35
2013-14	17.42	384.02	20.96	461.99	3.54	77.97	16.88
2014-15	13.96	307.69	17.19	378.98	3.23	71.29	18.81
2015-16	16.56	370.19	20.89	460.45	3.23	71.29	18.81
2016-17	17.07	376.40	20.76	464.16	3.68	87.75	17.75
2017-18	12.96	285.62	15.84	349.12	2.88	63.50	18.19
2018-19	12.72	280.46	15.32	337.84	2.60	57.37	16.98
2019-20	12.53	276.23	16.46	362.80	3.93	86.56	23.86
2020-21	16.36	360.74	20.32	448.07	3.96	87.33	19.49
2021-22	19.71	440.05	25.06	552.37	5.34	112.32	21.33
2022-23	21.89	482.47	27.67	610.07	5.79	127.59	20.91
<b>2023-24</b>	<b>25.31</b>	<b>557.98</b>	<b>31.94</b>	<b>704.15</b>	<b>6.63</b>	<b>146.17</b>	<b>20.76</b>
Oct	25.31	557.98	31.94	704.15	6.63	146.17	20.76

Note: Prices of Oct 2022 are up to 12th Oct

Source: International Sugar Organization (ISO), London.

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

**PRICE OF WHITE SUGAR**

S.No	Item	During							
		2023-24 (Oct)		2022-23 (Oct-Sept)		2021-20 to 2022-23			
		----- US \$ per tonne-----							
1.	Average fob (London) price	720.53		618.43		536.84			
2.	Freight charges upto Karachi	60		60		60			
3.	C & f cost at Karachi port	780.5		678.4		596.8			
4.	Exchange rate (Rs/\$) as on Oct 30, 2023	280.50		280.50		280.50			
		----- Rs per tonne-----							
5.	C & f cost at Karachi port (Pak rupees)	218939		190300		167414			
6.	Marine insurance @ 0.2 % of c & f cost	438		381		335			
7.	<b>Cif cost at Karachi port</b>	<b>219377</b>		<b>190680</b>		<b>167748</b>			
8.	Landing charges @1% of Cif Value	2194		1907		1677			
9.	L.C opening charges @0.02% of C&f Value	44		38		33			
10.	Stevedoring Charges	1300		1300		1300			
11.	Provision of shortage & unforeseen losses @0.05% of C&F	109		95		84			
12.	Survey & lab testing, weight ment wharfage and Clearing & forwarded charges	163 8		163 8		163 8			
13.	TCP's Commission @ 0.75 % of C&F	1642		1427		1256			
14.	Transport charges for up country	10000		10000		10000			
15.	<b>Incidental charges incurred on imported sugar</b>	<b>15460</b>		<b>14938</b>		<b>14521</b>			
16.	Ex-mill/ market cost of imported sugar	234837		205618		182270			
		<b>Punjab</b>		<b>Sindh</b>		<b>Punjab</b>		<b>Sindh</b>	
17.	Processing cost of sugar (a)	46967	45370	41124	39725	36454	35215		
18.	Value of cane to produce one tonne of sugar (item 16-item 17)	187869	189466	164495	165893	145816	147055		
19.	Provincial base sugar recovery <b>(Percent) (b)</b>	10.41	10.64	10.41	10.64	10.41	10.64		
20.	Quantity of cane in tonnes required to produce one tonne of sugar ((100/ item 19)	9.61	9.40	9.61	9.40	9.61	9.40		
21.	Price of one tonne of sugarcane (item 18/item 20)	19557.19	20159.20	17123.91	17651.01	15179.42	15646.67		
22.	<b>Price of 40 kgs of cane</b>	<b>782.29</b>	<b>806.37</b>	<b>684.96</b>	<b>706.04</b>	<b>607.18</b>	<b>625.87</b>		

Note

(a) Ratio of cost of cane to processing cost has been estimated at 80:20.20 for Punjab and 80.68:19.32 for Sindh as calculated in the S.R.O No 1259(I) 2021 by NFS&R.

(b) Respective Provincial Cane Commissioners.

Sources:

- For average fob (London) price: International sugar Organisation.
- For freight, incidentals and duties: Trading Corporation of Pakistan, Karachi.

## ANNEX-XVII

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

S.No	Item	During					
		2023-24 (Oct)		2022-23		2021-20 to 2022-23	
		-----US \$ per tonne-----					
1.	Average fob (London) price	720.53		618.43		536.84	
2.	Exchange rate (Rs/\$) as on Oct 30, 2023	250.50		280.50		280.50	
		-----Rs. per tonne-----					
3.	Average fob Karachi price (assuming equivalent to fob London price)	180493		173470		150584	
4.	Transport charges from interior Sindh to port, special packing, inspection transit insurance, loading and unloading, clearing and forwarding and port terminal charges	25000		25000		25000	
5.	Bank commission @ 1.25 % of fob price	2256		2168		1882	
6.	Inspection charges	429		429		429	
7.	Ex-mill price of sugar ( item 3 minus items 4 through 6)	152808		145872		123272	
		Punjab	Sindh	Punjab	Sindh	Punjab	Sindh
8.	Processing cost of sugar (a)	30562	30562	29174	29174	24654	24654
9.	Value of cane to produce one tonne of sugar (item 7- item 8)	122246	122246	116698	116698	98618	98618
10.	Provincial base sugar recovery <b>(Percent) (b)</b>	10.41	10.64	10.41	10.64	10.41	10.64
11.	Quantity of cane in tonnes required to produce one tonne of sugar ((100/ item 10)	9.61	9.40	9.61	9.40	9.61	9.40
12.	Price of one tonne of sugarcane (item 9/ item 11)	12726	13007	12148	12417	10266	10493
13.	<b>Price of 40 kgs of cane</b>	<b>509.03</b>	<b>520.28</b>	<b>485.93</b>	<b>496.67</b>	<b>410.64</b>	<b>419.72</b>

(a) Ratio of cost of cane to processing cost has been estimated at 80:20. as calculated in the S.R.O No 1259(I) 2021 by NFS&R.

(b) Respective Provincial Cane Commissioners. Sources:

i) For average fob (London) price: International sugar Organization.

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

## ANNEX-XVIII

**MILL-GATE PRICES OF SUGARCANE WORKED BACK FROM THE EXPECTED WHOLESALE MARKET PRICES OF SUGAR DURING 2023-24**

S.No	Item	WORKED BACK PRICES OF SUGARCANE									
		-----Rupees per tonne-----									
1.	Average wholesale market prices of sugar	110,000		120000		130000		140000		150000	
2.	Wholesale dealer margin @5% on net price	4867		5310		5752		6195		6637	
3.	Sales Tax @ 18%	17522		19115		20708		22301		23628	
4.	Net price of sugar (items 1-2-3)	97345		106195		115044		123894		132743	
		Punjab	Sindh	Punjab	Sindh	Punjab	Sindh	Punjab	Sindh	Punjab	Sindh
5	Processing cost of sugar	19469	18807	21239	20517	23009	22227	24779	23936	26549	25646
6	Value of cane to produce one tonne of sugar (item 4-item 5)	77876	78538	84956	85678	92035	92818	99115	99958	106195	107097
7	Provincial base sugar recovery (%) (a)	9.30	10.13	9.30	10.13	9.30	10.13	9.30	10.13	9.30	10.13
8	Quantity of cane in tonnes required to produce one tonne of sugar ((100/ item 7)	10.75	9.87	10.75	9.87	10.75	9.87	10.75	9.87	10.75	9.87
9	Price of one tonne of sugarcane (item 6/item 8)	7242	7956	7901	8679	8559	9402	9218	10126	9876	10849
10	<b>Price of 40 kgs of cane</b>	<b>289.70</b>	<b>318.24</b>	<b>316.04</b>	<b>347.17</b>	<b>342.37</b>	<b>376.10</b>	<b>368.71</b>	<b>405.03</b>	<b>395.04</b>	<b>433.96</b>

For FED: FBR, Islamabad.

(a) Ratio of cost of cane to processing cost has been estimated at 80:20.20 for Punjab and 80.68:19.32 for Sindh as calculated in the S.R.O No 1259(I) 2021 by NFS&R.