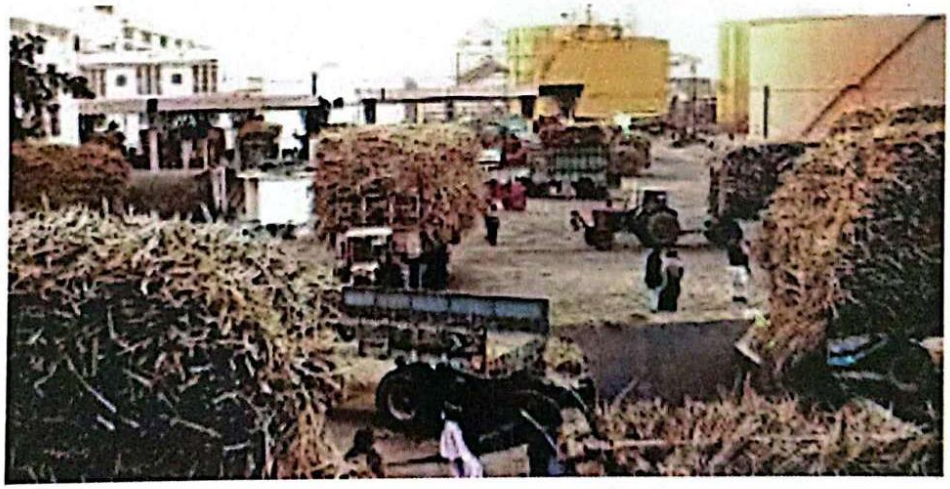
API SERIES NO. 269

SUGARCANE POLICY ANALYSIS FOR 2019-20 CROP



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

ABBREVIATIONS

AARI	:	Ayub Agricultural Research Institute
API	:	Agriculture Policy Institute
APTMA	:	All Pakistan Textile Mills Association
BCR	:	Benefit Cost Ratio
BPS	:	Basic Pay Scale
CFR	:	Cost and Freight
CIF	:	Cost, Insurance and Freight
CLCV	:	Cotton Leaf Curl Virus
COP	:	Cost of Production
CPI	:	Consumer Price Index
CRI	:	Cotton Research Institute
DAP	:	Di. Ammonium Phosphate
DRC	:	Domestic Resource Cost
ECC	:	Economic Coordination Committee
E&M	:	Economics & Marketing
EPC	:	Effective Protection Coefficient
FAO	:	Food and Agriculture Organization
FOB	:	Free on Board
FSC&RD	:	Federal Seed Certification and Registration Department
FYM	:	Farm Yard Manure
GDP	:	Gross Domestic Product
GOT	:	Ginning Out Turn
HSD	:	High Speed Diesel
ICAC	:	International Cotton Advisory Committee
ICPM	:	Integrated Crop Production Management
IPM	:	Integrated Pest Management
IPNS	:	Integrated Plant Nutrition System
IRRI	:	International Rice Research Institute
ITMF	:	International Textile Mills Forum
KCA	:	Karachi Cotton Association
KPK	:	Khyber Pakhtunkhwa
MOC	:	Ministry of Commerce
NARC	:	National Agricultural Research Centre
NCL	:	No Control Limit
NFS&RD	:	National Food Security and Research Division
NIAB	:	Nuclear Institute of Agriculture and Biology
NPC	:	Nominal Protection Coefficient
NSC	:	National Seed Council
OLS	:	Ordinary Least Squares
PAPA	:	Pakistan Agriculture Pesticides Association
PARC	:	Pakistan Agricultural Research Council
PBS	:	Pakistan Bureau of Statistics
PCCC	:	Pakistan Central Cotton Committee
PCGA	:	Pakistan Cotton Ginners Association
PCSI	:	Pakistan Cotton Standards Institute
PSC	:	Punjab Seed Corporation
SSC	:	Sindh Seed Corporation
TCP	:	Trading Corporation of Pakistan
WTO	:	World Trade Organization

SUGARCANE POLICY ANALYSIS 2019-20 CROP

EXECUTIVE SUMMARY AND RECOMENDATIONS

Sugarcane is a high value cash and contributes 0.5 per cent to gross domestic product (GDP). The sugar industry plays a pivotal in the national economy and provides sugar, besides biofuel fiber, organic fertilizer and myriad of byproducts / co-products.

Sugarcane production in the country is much lower than most of cane growing countries of the world. Amongst the many constraints responsible for low productivity, inappropriate plant population, substandard method of cultivation, poor nutrition management, inadequate irrigation water supply and lack of plant protection practices are the major ones and need immediate attention.

COST OF CULTIVATION

Total cost of cultivating one acre of sugarcane in Punjab is likely to be Rs 116,197. Major contributors to increase in cost of production during 2019-20 seem land rent, cost of harvesting, stripping/ binding and loading and irrigation (tube well water cost). Land rent would be the major cost component during 2019-20, followed by fertilizers 16%. Third major item may be cost of harvesting, stripping binding and loading of cane that may carry 13% of total cost of production.

Total cost of cultivating an acre of sugarcane in Sindh is expected to be Rs 109,227 which is lower than the last year. Land rent is about to make maximum part of total cost of production of sugarcane in Sindh i.e 26%. Next higher item is seed and sowing operations' cost (18%) followed by fertilizers (14.8%).

NOMINAL AND REAL INDICATIVE/MARKET PRICES

A consistent growth is observed in real indicative prices of sugarcane during 2010-11. Since then prices decreased continuously and reached at Rs.75 per 40 kgs. Nominal indicative prices in Sindh increased from Rs 125 per 40 kgs in 2010-11 to Rs 182 per 40 kgs in 2018-19, which counts to 45.6 per cent increase. Market prices usually observed higher than the indicative price except 2013-14 and 2017-18, when market price fell lower then were at par of indicative price.

ECONOMICS OF SUGARCANE AND COMPETING CROPS

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

In Punjab, growers' returns to overall investment, based on the indicative price announced by the provincial government, remained lower for sugarcane, against the cotton combinations for the entire criteria except purchased inputs. Sugarcane out-competed both Basmati and IRRI combinations in terms of irrigation water in terms of returns to overall investment and Irrigation Water with a big difference.

Sugarcane growers, in Sindh too, have been largely reported receiving the prices better than the indicative price announced for the year 2018-19. Presuming that the farmers received the indicative price, the analysis presents a favourable situation for Sugarcane performing better than the competing crops, especially in terms of output-input ratio and returns to purchased inputs.

MARKETING OF SUGARCANE

Sugarcane is one of the main cash crops sown on vast areas throughout the country and plays a pivotal role in the national economy. However, production and processing, sugarcane growers are facing is a number of distortions, and inefficiencies thus reducing returns from the crop.

DELAYED PAYMENTS UNDERWEIGHMENT AND PRESENCE OF MIDDLEMEN

In the beginning of the season, the payments are generally made within two weeks but as the season progresses to the end, the payments are delayed by months and in some cases by seasons. It has been noticed and reported by the farmers that they are facing the issue of underweighment of cane at the purchase centers and mills gate and undue deductions. Sugarmills are making deductions on the plea that poor quality cane with high trash contents is being supplied by the farmers. The role of middle man is increasing day by day in sugarcane business. This element is responsible of lower prices of cane in the wake of cash payment to growers.

USE OF SUGARCANE CESS FUND

On the repeated suggestion of farmers, the than Agriculture Prices Commission, presently Agriculture Policy Institute, in the Sugarcane Policy Reports has been re-iterating that the sugarcane cess fund which was utilized for the construction and improvement of roads in the sugar mills areas may be used for sugarcane research also. The government of Punjab has allocated 10 per cent of cess fund for research and development of sugarcane.

IMPROVING PRODUCTIVITY AND VARIETAL DEVELOPMENT

The raw material requirement of sugar industry, comprising of 89 sugar mills, with the crushing capacity of about 350 thousand tonnes per day, has been met through expanding acreage under sugarcane crop. Development of new varieties of sugarcane is a lengthy process requiring primarily the sugarcane fuzz either through its local production or imports from abroad. A robust R&D system needs to be established through public-private partnership.

PER CAPITA AVAILABILITY OF SUGAR

The sugar production from 2018-19 crop has been estimated at 5.27 million tonnes. Based on average per capita availability of sugar estimated at 24.01 kgs during 2018-19 on the basis of balance sheet method, total domestic requirement for a population of 219.37 million has been worked at 5.27 million tonnes for 2018-19.

The sugar sector, at present, is characterized by a number of distortions, and inefficiencies. The sugar mills and farmers should realize and make themselves competitive to meet the emerging issues in sugar sector. Mill can promote production of sugarcane through research and development and technical guidance to the farmers and the farmers at the same time must appreciate that healthy industry in long term is in their own interest.

Likely Price Policy Options

API conducted rigorous analysis for determining Indicative Price for Sugarcane 2019-20 Crop. Results of the analysis are given below:-

Indicative Price Policy Options Based on	Sugarcane Price at Mill-gate (Rs per 40 kgs)	
	Punjab	Sindh
1. Cost of production of sugarcane	186.74	192.63
2. Indicative price for 2019-20 crop assuming average wholesale prices of sugar:		
a) Rs 60,000 per ton	144.52	151.67
b) Rs 65,000 per ton	156.57	164.31
c) Rs 70,000 per ton	168.61	176.95
d) Rs 75,000 per ton	180.65	189.59
e) Rs 80,000 per ton	192.70	202.23
3. Average price received by cane growers for 2018-19 crop	200	215
4. Import Parity based on average fob London price of white sugar at US $ 317.48 (August 2019)	174.51	183.14
5. Export Parity based on: average fob London price of white sugar at US $ 317.48 (August 2019)	83.13	87.24

SUGARCANE POLICY ANALYSIS FOR 2019-20 CROP

INTRODUCTION

Sugarcane is a high value cash crop. Its production accounts for 2.9 percent in agriculture's value addition and 0.5 percent to country's Gross Domestic Product (GDP), total contribution of agriculture in overall GDP is 18.5 percent. During 2018-19, sugarcane crop production has been decreased by 19.4 percent (to 67.17 million tonnes) as compared to 83.33 million tonnes achieved last year. This decline in sugarcane production is due to decrease of area by 17.9 percent from 1,343 thousand of last year to 1,102 thousand hectares, mainly due to shortage of canal water. Low economic returns too discouraged the growers to bring more area under the sugarcane crop, disposal problem of cane and payment difficulties also restricted the acreage of sugarcane.

2. Sugarcane crop requires a tropical or subtropical climate, with a minimum of 600 mm annual rainfall. The climate of Pakistan is mainly subtropical arid to semiarid. In Pakistan sugarcane is cultivated mainly in the districts of Jhang, Faisalabad, Sargodha, Kasur, and T.T Singh of Punjab; Hyderabad, Badin and Thatta of Sindh; and Charsadda and Mardan of Khyber Pakhtunkhwa Climatic conditions of lower Sindh are more favourable having hot and semi-humid climate.

3. The sugar industry plays a pivotal role in the national economy. Sugarcane provides sugar, besides biofuel, fiber, organic fertilizer and myriad of byproducts/co-products with ecological sustainability. Molasses is the cheapest feed stock for the distilleries. The bagasse has been accepted as a viable alternative raw material to wood in the paper and pulp industry. The industry contributes considerably to the general sales tax and other indirect taxes levies in the exchequer. The industry employs over one million people, including management experts, technologists, engineers, financial experts, in addition to skilled and unskilled work force. Sugar industry contributes substantially to the rural economy as the mills are located in rural areas. The sugar mills also provide electricity to WAPDA during winter by using the waste material of sugarcane. It is also a major source of livestock fodder during winter.

4. Sugarcane production in the country is much lower than most of cane growing countries of sugar world. Amongst the many constraints responsible for low productivity, inappropriate plant population, substandard method of cultivation, poor nutrition management, inadequate irrigation water supply and lack of plant protection practices are the major ones and need immediate attention.

5. In view of the importance of sugarcane crop and sugar industry in the economy, the government in collaboration with sugar mills will have to work together and resolve the problems like price escalation, mail practices in its marketing, value addition and disposal of

sugar. To raise the sugar recovery level which helps in reducing the cost of production, there is a need of strict vigilance on variety evolution process at research level, no variety should go to the field level unless and until it is fully tested at the research level. The sugar mills should work hard to multiply and disseminate high sucrose variety to their contract growers in the surrounding areas.

6. In view of the importance of the sugarcane and sugar for the economy, the indicative price of sugarcane is annually reviewed by the Agriculture Policy Institute (API), Ministry of National Food Security and Research and provide to provinces for fixation and implementation of price. For the formulation of policy proposals for 2019-20 sugarcane crop, the following steps were taken by the API.

i) To update the cost of inputs and cultural operations, a field survey was conducted in the important sugarcane regions of Punjab and Sindh. During the course of survey detailed discussions were also held with the growers, crop experts and mill management on issues relating to production and marketing of sugarcane.

ii) Annual meeting of API Committee on sugarcane was held. The meeting attended by researchers, progressive growers, representative of farmers associations, sugar industry and senior officers of provincial agriculture extension departments. The participants discussed at length issues concerning with cultivation and marketing of sugarcane, current crises of sugar industry and future prospectus. The views expressed in the meeting have been dully considered in formulating proposal contained in this report.

iii) The data on area, yield, production and prices of sugarcane; domestic as well as world production, demand, stocks, prices and trade of sugar were collected from various relevant sources and analyzed.

7. The sugar sector, at present, is characterized by a number of distortions, and inefficiencies, both in production and processing of sugarcane. It is imperative not only to remove the inefficiencies affecting the sector but also to abridge the gulf between industry and farmers. The sugar mills and the sugarcane growers both are the main stakeholders of sugar production in the country. They must realize and make themselves competitive, to meet the challenges emerging issues in sugar sector.

8. The mill can promote production of sugarcane through research and development efforts and technical guidance to the farmers and the farmers at the same time must appreciate that healthy industry is in their interest as sick industry cannot play effective role in the crop development. It is in the interest of industry as well as the growers to stabilize sugarcane production in line with not only to meet the domestic requirement simultaneously, to have a comparative advantage in sugar export.

2. SUGARCANE PLANTING AND HARVESTING SEASONS

9. Sugarcane is a tropical crop which requires temperature 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. The recommended times of planting the spring and autumn crops of sugarcane, by province are given in Table-1.

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

Province	Planting Time	
	Spring Crop	**Autumn Crop**
Punjab	15th February to 3rd week of March	September
Sindh	1st February to 15th March	September to 15th October
Khyber Pakhtunkhwa	15th February to 3rd week of March	September
	Harvesting Time	
Punjab, Sindh, KP	15th October to 1st March	

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

3. PROVINCIAL SHARES IN AREA AND PRODUCTION OF SUGARCANE

10. Provincial shares in area and production of sugarcane are discussed below:

3.1 Area and Production

11. Shares of area and production of sugarcane during the periods 2008-09 to 2010-11 and 2016-17 to 2018-19 and changes therein are presented in Table-2 below:

Table-2: Comparison of Provincial Shares in Area and Production of Sugarcane: 2008-09 to 2010-11 and 2016-17 to 2018-19

Country/ Province	Area			Production		
	Average 2008-09 to 2010-11	Average 2016-17 to 2018-19	Change	Average 2008-09 to 2010-11	Average 2016-17 to 2018-19	Change
	---------- Percent ----------					
Pakistan	**100.00**	**100.00**	-	**100.00**	**100.00**	-
Punjab	65.75	64.33	-2.16	65.34	66.25	1.39
Sindh	24.47	25.34	3.56	26.22	25.47	-2.86
KPK	9.71	10.26	5.66	8.37	8.23	-1.67
Balochistan	0.070	0.066	-5.71	0.07	0.05	-28.57

Source: Worked out from Annex-I.

12. It is clear from Table-2 that the Punjab, Sindh and Khyber Pakhtunkhwa, share 64.33, 25.34 and 10.26% in area and 66.25%, 25.47% and 8.23% in production respectively. During the reference period, share of Punjab has gone down by 2.16% in area while production has gone up by 1.39%. In case of Sindh, area share has gone up by 3.56% and production gone down by 2.86%. In KP, area has gone up by 5.66% and production has decreased by 1.67%. Provincial shares are also depicted in Figures 1 to 4.

FIG-1: SHARES IN AREA

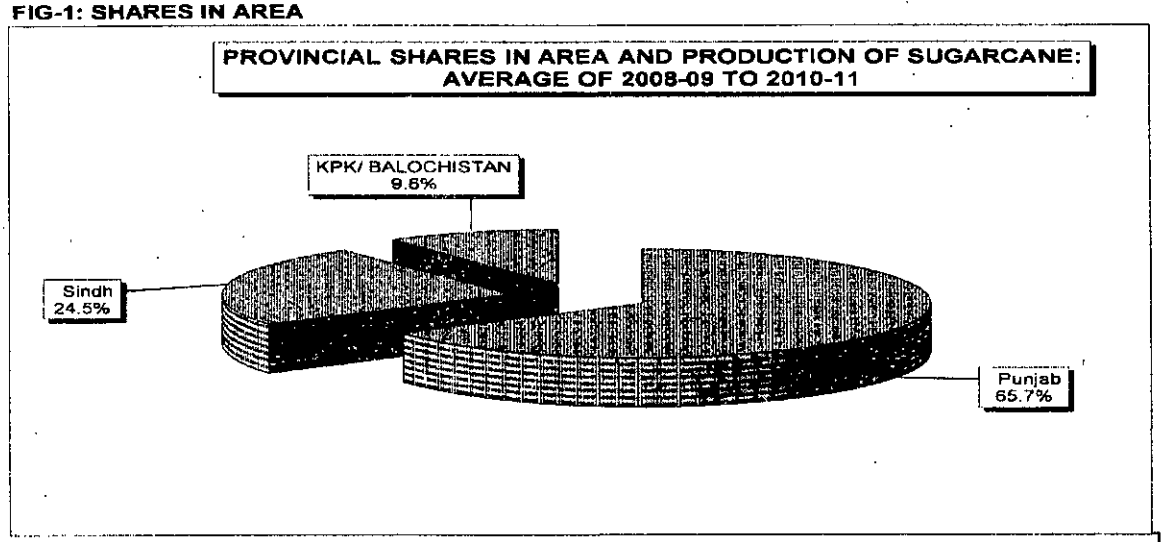
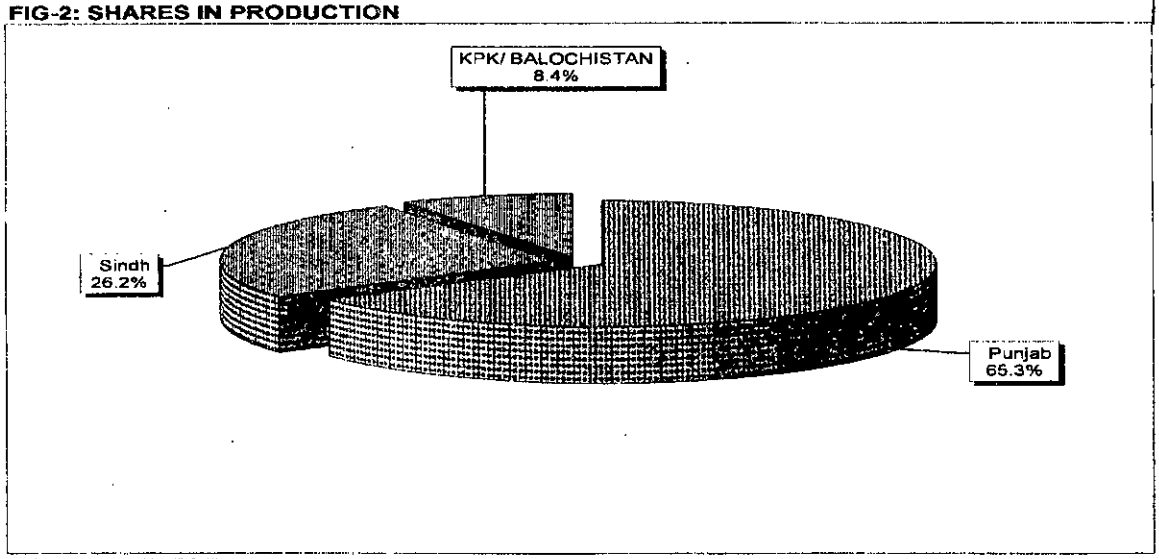


FIG-2: SHARES IN PRODUCTION



SOURCE: TABLE-2

FIG-3: SHARES IN AREA

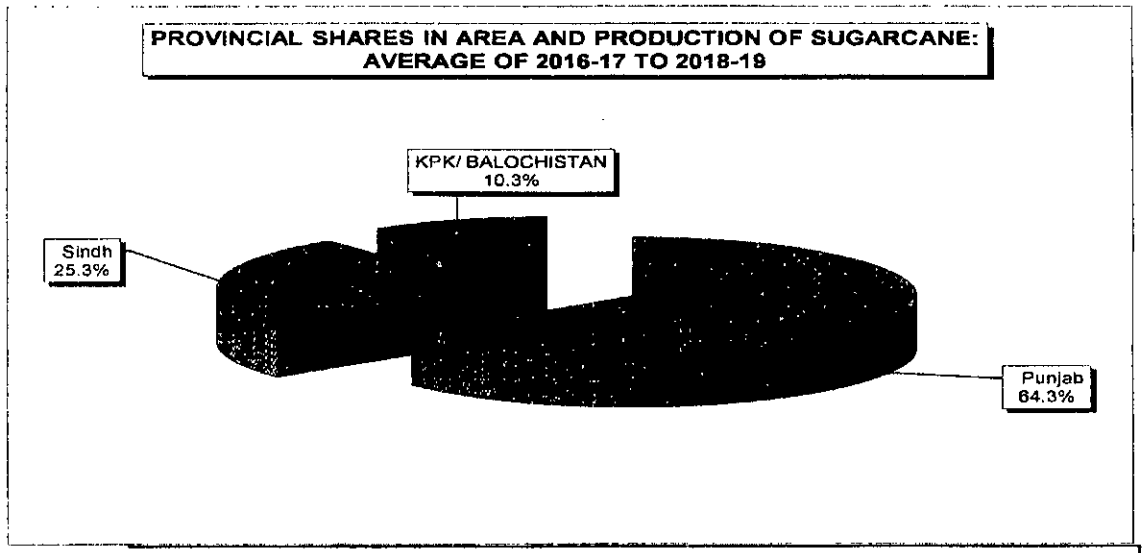
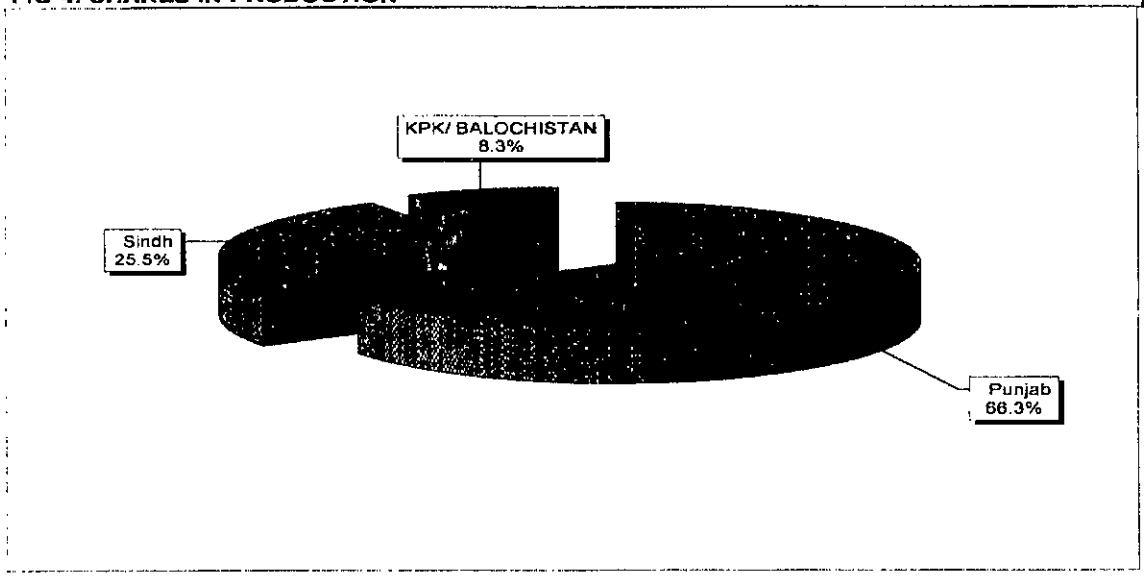


FIG-4: SHARES IN PRODUCTION



SOURCE: TABLE-2

4. IMPORTANT SUGARCANE PRODUCING DISTRICTS

13. Sugarcane is a high delta crop. It is grown in irrigated conditions. Districts which grow 100 thousand tonnes or more of sugarcane are R.Y.Khan, Faisalabad, Muzaffargarh, Sargodha, Jhang, Rajanpur, Chiniot, T.T Singh, Bahawalpur, Bhakkar, Kasur, M.B Din, Vehari, Bahawalnagar, Nankana Sahib, Layyah, Okara, Khanewal, Khushab, D.G.Khan, Sahiwal, Hafizabad, Multan, Pakpattan, Mianwali, Sheikhpura, Lodhran and Gujrat in Punjab and Ghotki Nawabshah, Badin, Thatta, Khairpur, N.Feroze, Tando Muhammad Khan, Sanghar, Mirpur Khas, Tando Allahyar, Matiari, Sukkur, Hyderabad, Dadu, and Umerkot in Sindh while D.I

Khan, Charsadda, Mardan, Peshawar, Nowshera, and Malakand from Khyber Pakhtunkhwa. These 48 districts; 27 from the Punjab, 15 from Sindh and 6 from Khyber Pakhtunkhwa collectively account for 99 per cent of the sugarcane area and production (Annex-III).

14. However, 26 districts, namely, R.Y Khan, Faisalabad, Muzaffargarh, Sargodha, Jhang, Rajanpur, Chiniot, T.T Singh, Bahawalpur, Bhakkar, Kasur, M.B Din, Vehari, Ghotki Nawabshah, Badin, Thatta, Khairpur, N.Feroze, Tando Muhammad Khan, Sanghar, Mirpur Khas, Tando Allahyar, D.I Khan, Charsadda and Mardan collectively produce 83 per cent of the total sugarcane produced in the country.

5. CHANGES IN AREA, YIELD AND PRODUCTION OF SUGARCANE

15. During the decade ending 2018-19 area under sugarcane at country level ranged between 2329.8 and 3315.6 thousand acres and production from 49.373 to 83.333 million tonnes. Yield of sugarcane fluctuated between 19.67 to 25.13 tonnes per acre (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): 2008-09 to 2018-19

17. During the above referred period sugarcane production in Pakistan increased @ 4.5% per annum mainly due to improvement in yield @ 2.1% and area expansion @ 2.4% (Table-3).

18. Sugarcane production in Punjab during the period under reference has increased @ 4.5% per annum as a result of 2.5% improvement in yield and 1.9% expansion in area. Sugarcane production in Sindh has also increased @ 4.9 per cent due to 3.7% increase in area and 1.1% improvement in yield.

Table-3: Average Annual Growth Rate of Area, Yield and Production of Sugarcane: 2008-09 to 2018-19

Country/Province	Area	Yield	Production
	Percent per annum		
Pakistan	**2.4**	**2.1**	**4.5**
Punjab	1.9	2.5	4.5
Sindh	3.7	1.1	4.9
KP	3.0	1.3	4.3
Balochistan	1.8	-0.2	1.5

Source: Worked out from Annex-I.

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

19. In Khyber Pakhtunkhwa sugarcane production also increased @ 4.3% per annum. This is mainly attributed to 3.0% increase in area and 1.3% improvement in yield. Growth rates of Baluchistan are just negligible.

5.2 Short-term Changes: 2017-18 and 2018-19 Crops

20. According to final estimates of Provincial Agriculture Departments (Crop Reporting Service) sugarcane production at country level for 2018-19 crop is reported at 69.340 million tonnes reflecting a decrease of 16.8% over last year production of 83.333 million tonnes. Decrease in production is mainly due to 16.2 and 0.6 per cent decline in area and yield (Table-4).

Table-4: Area, Yield and Production of Sugarcane: 2017-18 versus 2018-19 Crops

Country/ Province	Area		Changes	Yield		Changes	Production		Changes
	2017-18	2018-19		2017-18	2018-19		2017-18	2018-19	
	000 ha		Per cent	tonnes per ha		Per cent	000 tonnes		Per cent
Pakistan	**1341.8**	**1124.3**	**-16.2**	**62.1**	**61.7**	**-0.6**	**83332.8**	**69339.8**	**-16.8**
Punjab	859.1	732.9	-14.7	64.1	63.4	-1.1	55067.5	46483.1	-15.6
Sindh	333.3	279.5	-16.1	61.8	61.8	0.0	20611.9	17280.4	-16.2
KP	148.5	111.0	-25.3	51.2	49.8	-2.7	7610.0	5532.0	-27.3
Balochistan	0.86	0.87	1.2	50.5	50.9	0.8	43.4	44.3	2.1

Source: Annex-I.

21. Sugarcane production for 2018-19 in Punjab is reported at 46.483 million tonnes which shows a decrease of 15.6 per cent over the last year. The decrease mainly happened due to 14.7 and 1.1 per cent decrease in area and yield respectively.

22. Similarly, production from Sindh during 2018-19 also decreased by 16.2% over the previous year (from 20.612 to 17.280 million tonnes). This reduction is attributed mainly to 16.1% decline in area.

23. In Khyber Pakhtunkhwa, production also decreased by 27.3% due to 25.3% decrease in area and 2.7% in yield.

24. Balochistan production increased by 2.1% due to 1.2% increase in area and 0.9% increase in yield.

6. TARGETS VS ACHIEVEMENTS: 2018-19 CROP

25. The Federal Committee on Agriculture (FCA) fixed sugarcane production target for 2017-18 crop at 68.157 million tonnes. As per final estimates of the Provincial Agriculture Departments sugarcane production from 2018-19 crop is reported at 69.340 million tonnes (1.7

per cent more than the target). This is net effect of 5.1% over achievement in yield and 3.2% decreased in area (Table-5).

Table-5: Targets and Estimated Achievements of Area, Yield and Production of Sugarcane: 2018-19 Crop

Country/ Province	Area		Deviation from the target	Yield		Deviation from the target	Production		Deviation from the target
	Target	Achieve-ment		Target	Achieve-ment		Target	Achieve-ment	
	--- 000 hec ----		Per cent	Tonnes/hec		Per cent	-- 000 tonnes --		Per cent
Pakistan	**1161.1**	**1124.3**	**-3.2**	**58.7**	**61.7**	**5.1**	**68157.0**	**69339.8**	**1.7**
Punjab	**728.4**	**732.9**	0.6	60.4	63.4	5.0	44000.0	46483.1	5.6
Sindh	**322.0**	**279.5**	-13.2	58.2	61.8	6.2	18752.0	17280.4	-7.8
KPK	**110.0**	**111.0**	0.9	48.8	49.8	2.1	5370.0	5532.0	3.0
Balochistan	**0.7**	**0.9**	28.6	50.0	50.9	1.8	35.0	44.3	26.6

Sources:
1. For targets: Targets have been fixed by FCA, NFS&R, Islamabad
2. For achievements: Annex-I.

26. In Punjab province, sugarcane area and production surpassed the targets by 0.6% and 5.6%. While Sindh province fell short of these targets by 13.2% and 7.8%. KP exceeded targets in area and production by 0.9% and 3.0%. Balochistan also had the same trend exceeding area and production of sugarcane by 24.3% and 26.6% against the targets.

7. COST OF PRODUCTION OF SUGARCANE

27. Cost of production is an important factor in evolving suggestions for indicative price of a crop. Its importance is well acknowledged due to government policies effects on input prices. Different government policy initiatives may effect inflation and alter subsidy and tax structure for agricultural inputs which eventually tend to change cost of production of crops.

28. Agriculture Policy Institute every year collects field data on different elements to assess cost of production of the concerned crop. These estimates provide guidance in determining indicative price of the concerned crop.

29. Cost of production estimates of sugarcane for 2019-20 crop in Punjab and Sindh are determined using customary input-output parameters adapted within API.

30. In this section, different inputs like seed, fertilizer, no. of sprays, no. of irrigations (tube well and canal) and no. of tractor run operations made for preparing soil and sowing seed and no. of hoeings are used to forecast cost of production for 2019-20 sugarcane crop. Their physical usage (quantities) are those done during 2018. However, respective prices and hiring rates for the

above referred tractor operations are those prevailing during February, 2019 in major sugarcane producing zones of Punjab and Sindh.

31. Consolidated summary of cost of production of sugarcane for 2019-20 crop for Punjab and Sindh are produced in Table-6 and Table-7 while background data are placed in Annex-IV and Annex-V.

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

- **Punjab**

33. From the data presented in Table-6 it may be seen that total cost of cultivating one acre of sugarcane inclusive land rent in 2019-20 in Punjab province is likely to be Rs. 116197. This ultimately ends in production cost/40 kg as Rs 168.74/40 Kg with land rent and Rs 121.54 without land rent. By adding marketing cost @ Rs 18/40 kg to these estimates, cost of production per 40 kg of sugarcane at the mill gate estimates to Rs 186.74 with land rent and Rs 139.54/40 kg without land rent.

34. Main reasons for rise in cost of production of sugarcane in Punjab may be studied from data in Table-2. Column-6 of this table gives percentage change in different items of cost of production against the last year. It is clear from the percentage points here that major contributors to increase in cost of production during 2019-20 seem land rent, cost of harvesting, stripping/ binding and loading and irrigation (tube well water cost). Increase in tube well irrigation cost occurred due to increase in power tariff.

Table–6: Average Farmer's Cost of Production of Sugarcane in Punjab: 2018-19 and 2019-20

Item	Unit	2018-19	2019-20
Punjab			
1. Cost of production	Rs./ acre	105787	116197
2. Yield	40 Kg/ acre	659.5	688.63
Cost of production at farm level	Rs./ 40 Kg		
a) With land rent	"	160.41	168.74
b) Without land rent	"	119.34	121.54
4. Marketing charges	"	17.50	18.00
5. Cost of production at mill gate	"		
c) With land rent	"	177.91	186.74
d) Without land rent	"	136.84	139.54

Source: Annex-IV.

7.1 Cost of Different Inputs and Operations in Punjab

35. Following paragraphs present decomposition of cost of production into its constituent parts to assess main ingredients of cost of production during 2019-20. Table-7 produces the said data for 2018-19 and prospectively for 2019-20.

Table-7: Cost of Different Inputs/Operations in Sugarcane Production in Punjab: 2019-20 Crop

Cost item	2018-19 (Rs./ acre)	As % of Total cost	2019-20 (Rs./acre)	As % of Total cost	% Change over last year
1	2	3	4	5	6
1. Land rent	27083.3	25.60	32500	27.97	20.00
2. Fertilizer including application cost	19261.3	18.21	18859.3	16.23	-2.09
3. Harvesting, stripping, binding & loading cost	13190.0	12.47	15149.8	13.04	14.86
4. Seed and sowing operations	13500	12.76	14000.0	12.05	3.70
5. Other costs	11235.3	10.62	11634.8	10.01	3.56
6. Irrigation	7110	6.72	8320.0	7.16	17.02
7. Land preparation	7544	7.13	8063.4	6.94	6.88
8. Plant protection	2250	2.13	2472	2.13	9.87
9. Inter-culture (tractor & manual)	1800	1.70	2109.5	1.82	17.19
10. Seed bed preparation	1600	1.51	1788.5	1.54	11.78
11. Farm yard manure	1213.3	1.15	1300	1.12	7.15
12. Gross cost/ acre	105787.0	100.00	116197	100.00	9.84

Source: Annex-IV.

36. It is visible from data in Table-7 (column-5) that in Punjab, land rent would be the major cost component during 2019-20 which may be followed by fertilizers accounting for about 16%. Third major item may be cost of harvesting, stripping by, binding and loading of cane that may carry 13% of total cost of production. Seed & sowing costs may have 12% while 'other costs' would make about 10% of total cost of production. Irrigation and land preparation each approximately may be 7% and remaining costs collectively make 6.61%.

37. These findings imply that government has very limited scope to minimize cost of production of sugarcane. Because government can intervene only to affect prices of traded inputs through subsidy on fertilizer, diesel or pesticides. But these components relatively carry lesser weight in cost of production of sugarcane. This discussion is suggestive that any viable solution to farmers' returns from sugarcane may be value addition at the farm level. For example, farmers may extract sugarcane juice at their own and later sell this juice to sugar mills. Of course juice may fetch price higher than cane.

38. Last column of Table-7 shows per cent share in increased cost of production. These figures also support the above findings.

- **Sindh**

39. For 2019-20 crop season, total cost of cultivating an acre of sugarcane in Sindh is expected to be Rs 109227. This cost is lower than the last year cost Rs 109495. Its reason is lower cost estimated for 2019-20 for harvesting, stripping, binding and loading of sugarcane because yield of 2018-19 crop which is used for 2019-20 analysis is lower 625.49 Maund/ acre against the yield 700 Maund/ acre used for the last year. Accordingly cost of harvesting, stripping, binding and loading of sugarcane would also be less than the previous year which is about to reduce total cost of production per acre for 2019-20.

40. In view of an average yield of 625.49 kg per acre, farm level cost of production of sugarcane works out at Rs 174.63 per 40 kg (Table-8). Adding marketing cost @ 18/40 kg, mill gate cost of production comes to Rs 192.63 per 40 kg. It is Rs 18.00 higher than the last year.

41. So far as without land rent costs are concerned, these are Rs 129.59/40 Kg at the farm level and Rs 147.59 at the mill gate.

Table–8: Average Farmer's Cost of Production of Sugarcane in Sindh: 2018-19 versus 2019-20

Item	Unit	2018-19	2019-20
Sindh			
1.Cost of production	Rs./ acre	109495	109227
2.Yield	40 Kg/ acre	700	625.49
3.Cost of production at farm level	Rs./ 40 Kg		
a) With land rent	"	156.42	174.63
b) Without land rent	"	116.18	129.59
4.Marketing charges	"	17.50	18.00
5.Cost of production at mill gate	"		
a) With land rent	"	173.92	192.63
b) Without land rent	"	133.68	147.59

Source: Annex-V

42. Table-9 describes component wise cost of production in Sindh. It is indicated from the data in this table that land rent is about to make maximum part of total cost of production of sugarcane in Sindh. It is estimated to take about 26% of total cost of production. Next higher item of cost of production would be 'seed and sowing operations' cost (18%) followed by fertilizer cost including cost of its application to the crop (14.8%). 'Other costs' which include mark-up on capital, management charges, land tax, land revenue, Road Cess etc are likely to carry about 11% of the cost of production in 2019-20 total cost. Harvesting, stripping, binding

and loading of cane is to make about 9.7% and land preparation 7.4%. Rest of the cost items inter-culture, irrigation, seed bed preparation, plant protection and farm yard manure look carrying approximately 13% of total cost of production.

Table – 9: Cost of different inputs/ operations in sugarcane production in Sindh: 2019-20 crop

Cost item	2018-19 (Rs./ acre)	As % of Total cost	2019-20 (Rs./acre)	As % of Total cost	% Change over last year
1. Land rent	28167	25.72	28167	25.79	0.00
2. Seed and sowing operations	19698	17.99	19698	18.03	0.00
3. Fertilizer including application cost	16150	14.75	16150	14.79	0.00
4. Other costs	11817	10.79	11948	10.94	1.11
5. Harvesting, stripping, binding & loading cost	11900	10.87	10633	9.74	-10.65
6. Land preparation	7954	7.26	8098	7.41	1.81
7. Inter-culture (tractor & manual)	5960	5.44	6160	5.64	3.36
8. Irrigation	3091	2.82	3370	3.07	9.03
9. Seed bed preparation	2200	2.01	2300	2.11	4.55
10. Plant protection	2046	1.87	2190	2.01	7.04
11. Farm yard manure	512	0.48	512	0.47	0.00
12. Gross cost/ acre	109495	100.00	109227	100.00	-0.24

Source: Annex-V.

8. NOMINAL AND REAL INDICATIVE / MARKET PRICES OF SUGARCANE

43. 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 represents increase or decrease in purchasing power of the respective commodity against the base year level. In the following text, an analysis of the indicative and market prices of sugar has been carried out. This analysis is based on the prices of sugarcane during 2010-11 to 2018-19. Discussing below indicates the province-wise trends in nominal and real terms.

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

44. The analysis of indicative and market prices of sugarcane for the Punjab province during 2010-11 to 2018-19 is given in the Table-10.

45. The nominal indicative price of sugarcane in the Punjab increased by 44 per cent from Rs 125 to Rs 180 per 40 kgs between 2010-11 and 2018-19. During the analysis period, the Consumer Price Index (CPI), the most commonly used measure of inflation in the economy, escalated by 63.9 per cent. A consistent growth is observed in real indicative prices of sugarcane

upto 2012-13. During 2013-14, the real indicative price decreased to Rs 90.39 per 40 kgs but recovered in next year at Rs.91.03. Since than prices decreased continuously and reached at Rs.75 per 40 kgs, the lowest during entire period under review. The real indicative price was lower than the nominal indicative price since 2010-11 mainly for higher CPI.

Table-10: Nominal and Real Indicative & Market Prices of Sugarcane Realized by the Growers in the Punjab: 2010-11 to 2018-19

Crop year	Nominal Prices		Consumer Price Index (CPI)	Real Prices	
	Indicative *	Market **		Indicative	Market
	---- Rs per 40 kgs ----		2007-08=100	---- Rs per 40 kgs ----	
1	2	3	4	5=(2/4)x100	6=(3/4)x100
2010-11	125	175	146.45	85.35	119.49
2011-12	150	148	162.57	92.27	91.04
2012-13	170	170	174.53	97.40	97.40
2013-14	170	170	188.07	90.39	90.39
2014-15	180	180	197.74	91.03	91.03
2015-16	180	180	202.73	88.89	88.89
2016-17	180	180	211.57	85.07	85.07
2017-18	180	145	219.01	82.18	66.20
2018-19	180	200	240.00	75.00	83.34

Notes: * Indicative price of sugarcane at mill-gate fixed by the Provincial Government.
**Prices of sugarcane actually realized by the growers reported during the API's field survey.
Sources: - 1. Price Policy Report for Sugarcane by API (various issues).
2. Pakistan Economic Survey, 2018-19

46. As far as the nominal market price of sugarcane is concerned, it has declined from Rs 175 per 40 kgs in 2010-11 to Rs 148 per 40 kgs in 2011-12, though, it increased in next five years till 2016-17,once again the nominal market price dropped to Rs 145 per 40 kgs in 2017-18. During 2018-19 the nominal market price increased sharply to Rs 200 per 40 kgs .However, the real market price convey also a depressing situation which remained below the nominal market price all the way through the period under review.

8.2 Nominal and Real Indicative Prices of Sugarcane in Sindh

47. The nominal and real indicative and market prices of sugarcane in Sindh for the period 2010-11 to 2018-19 are displayed in Table-11.

48. Nominal indicative prices in Sindh increased from Rs 125 per 40 kgs in 2010-11 to Rs 182 per 40 kgs in 2018-19. This counts to 45.6 per cent increase. Market price usually higher than the indicative price except 2011-12 and 2016-17, when market price were at par of indicative price. During 2015-16 market price was higher than the indicative price. Real

indicative price of sugarcane during the period under study followed the similar pattern of nominal indicative price and however it declined to 75.93 per 40 kgs in the 2018-19.

49. As far as the nominal market price of sugarcane is concerned, it declined gradually from Rs.185 per 40 kgs in 2010-11 to Rs 169 per 40 kgs in 2013-14 but increased again in 2015-16 to Rs 191 per 40 kgs mostly in upper Sindh. However, in 2018-19 increased as 215 per 40 kgs, the real market price shows also a depressing situation which remained below the nominal market price throughout the period, under review.

Table–11: Nominal and Real Indicative & Market Prices of Sugarcane Realized by the Growers in Sindh: 2010-11 to 2018-19

Crop year	Nominal Prices		Consumer Price Index (CPI)	Real Prices	
	Indicative *	Market**		Indicative	Market
	---- Rs per 40 kgs ----		2007-08=100	---- Rs per 40 kgs ----	
1	2	3	4	5=(2/4)x100	6=(3/4)x100
2010-11	125	185	146.45	85.35	126.32
2011-12	154	154	162.57	94.73	94.73
2012-13	172	174	174.53	98.55	99.70
2013-14	172	169	188.07	91.46	89.86
2014-15	182	180	197.74	92.04	91.02
2015-16	172	191	202.73	84.94	94.21
2016-17	182	182	211.57	86.02	86.02
2017-18	181	130	219.01	82.18	59.35
2018-19	182	215	240.00	75.93	89.58

Notes: * Indicative price of sugarcane at the mill gate fixed by the Provincial Govt.
** Prices of sugarcane actually realized by the growers collected through the API field survey.

Sources: - 1. Price Policy Report for Sugarcane by API (various issues).
2. Pakistan Economic Survey, 2018-19

50. It may be observed from the above data that CPI consistently increased during the reference period. Nominal prices have also evidenced a continuous improvement. One striking feature of market prices is that it declined by 0.55 per cent in 2018-19 as compared to 2017-18, which reflects that market is not perfect and the growers may face a higher risk factor for losing returns from their produce. The higher of CPI, the lower the real value of the commodity whether at indicative or the Market price .Hence ,it may be concluded that to ensure flow of smooth return to farmer, the inflationary trend need to be arrested

9. COMPARATIVE ECONOMICS OF SUGARCANE AND COMPETING CROPS

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

52. 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 2018-19 crop year. Detail of the analysis is presented for the Punjab and Sindh provinces in Annex-VI. A summary of analysis against various economic indicators is provided in Table-12 and Table-13 and results of the analysis are briefly discussed in the following paragraphs.

Table-12: Economics Of Sugarcane And Competing Crops At Prices Realized By The Growers In Punjab: 2018-19 Crops

Province / crops / crop combination	Output-Input ratio	Revenue per		
		Rupee of purchased inputs	Crop Day	Acre inch of water used
		.....Rupees.....		
Punjab				
1 Sugarcane	1.16	4.90	260	2133
2 Seed cotton + wheat	1.21	3.93	309	3814
3 Seed cotton + sunflower	1.21	3.71	313	2984
4 Basmati paddy+wheat	1.05	2.62	309	1590
5 Basmati paddy+sunflower	1.05	2.51	314	1411
6 IRRI paddy + wheat	0.93	2.47	277	1346
7 IRRI paddy+sunflower	0.94	2.37	281	1205

- **Punjab**

53. The Table-12 above indicates that growers' returns to overall investment, based on the indicative price announced by the provincial government, remained lower for sugarcane, against the cotton combinations for the entire criteria except Purchased inputs. Cotton combinations out competed Sugarcane in terms of all the criteria except returns to purchased inputs. However, Sugarcane out-competed both Basmati and IRRI combinations in terms of irrigation water in terms of returns to overall investment and Irrigation water with a big difference. IRRI combinations, however, remained far below the sugarcane in entire criteria analyzed in this case, except crop duration.

54. During 2018-19, sugarcane farmers were reported receiving relatively better prices. The Government and the Courts of Law have been intervening at various levels for resolving the issue.

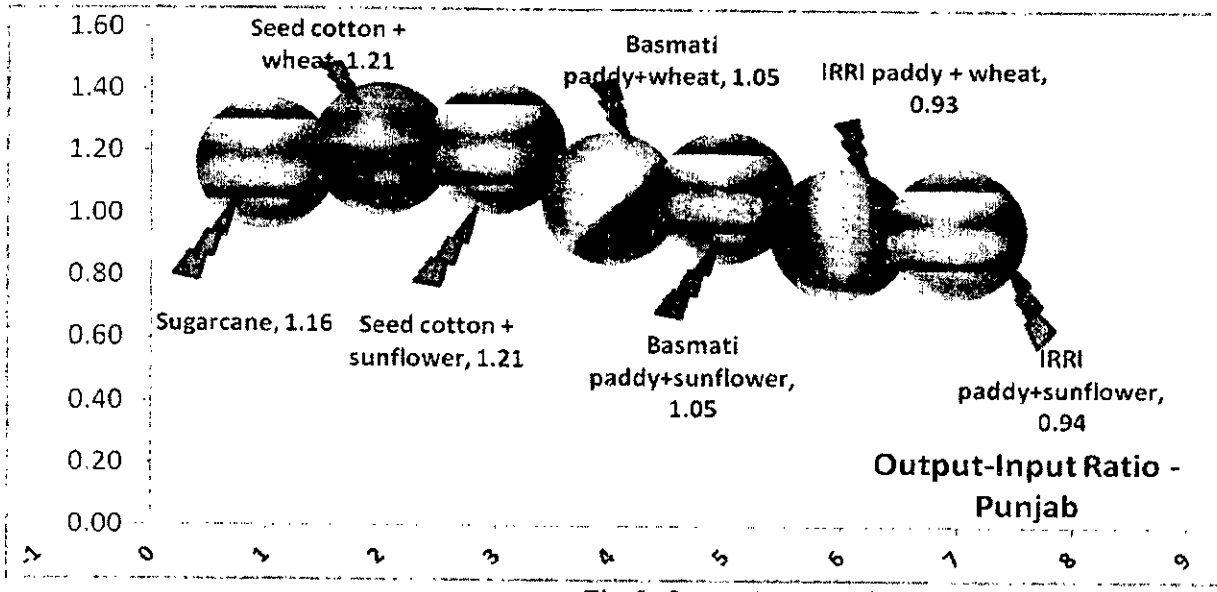


Fig-5: Output-Input Ratio of Sugarcane in Punjab

- **Sindh**

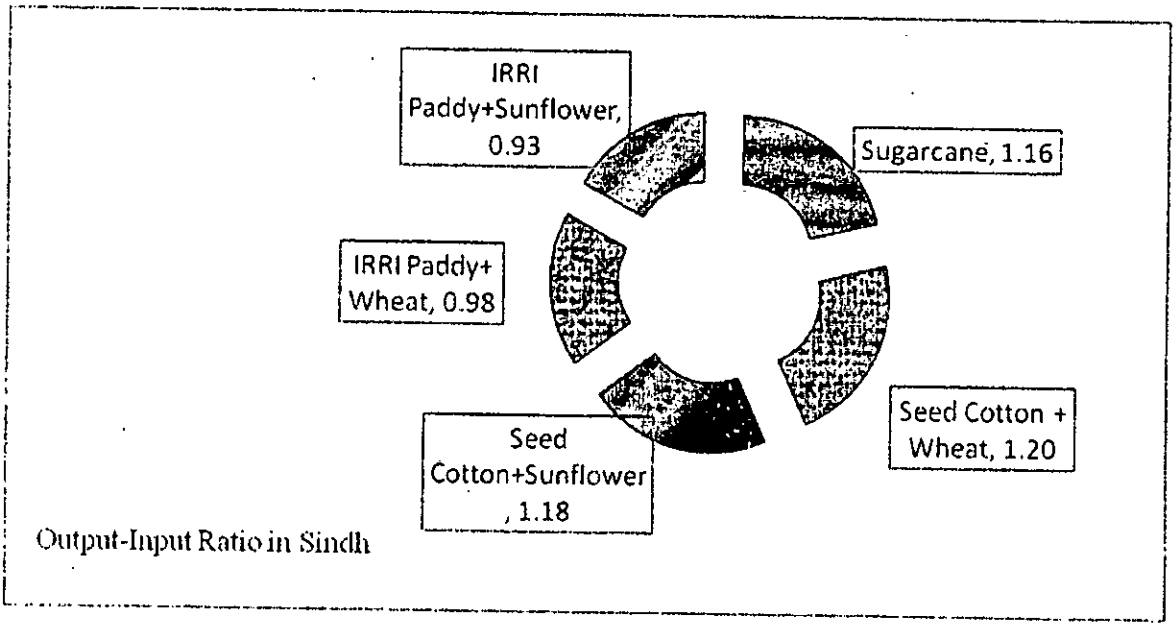
55. Sugarcane growers, in Sindh too, have been largely reported receiving the prices better than the indicative price announced for the year 2018-19. Presuming that the farmers received the indicative price, the analysis presents a favourable situation for Sugarcane performing better than the competing crops, especially in terms of output-input ratio and returns to purchased inputs. However, wheat and cotton remained better than sugarcane in giving returns to grower.

Table-13: Economics Of Sugarcane And Competing Crops At Prices Realized By The Growers in Sindh: 2018-19 Crops

Province / crops / crop combination	Output-input ratio	Revenue per		
		Rupee of purchased inputs	Crop day	Acre inch of water used
		.....Rupees.....		
Sindh				
1 Sugarcane	1.16	4.23	256	1761
2 Seed Cotton + Wheat	1.20	3.72	323	4525
3 Seed Cotton+Sunflower	1.18	3.38	294	3084
4 IRRI Paddy+ Wheat	0.98	2.94	259	1369
5 IRRI Paddy+Sunflower	0.93	2.73	224	1035

56. In terms of returns to crop duration, sugarcane performed low against all the combinations except IRRI combinations. Similarly, Sugarcane performed better than IRRI combinations in terms of returns to irrigation water and crop duration.. Sugarcane in Sindh, out competed entire crop combinations in terms of returns to purchased inputs considerably.

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



9.1 Economics of Sugarcane: Inter Provincial Comparison

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

58. The higher yield of Sindh by 19 percent over Punjab may be explained in terms of relatively greater use of inputs. The cost incurred on purchased inputs other than chemical fertilizers is relatively higher in Sindh i.e 34 percent as compared to the Punjab. Similarly, irrigation water is also applied on higher side in Sindh (48 percent). The crop duration is longer in Sindh by 24 percent as compared to Punjab.

59. Chemical fertilizers are used on higher side in Sindh by 86 per cent in nitrogenous and by 15 per cent in phosphatic ingredients

Table-14: Input Use Level and Yield of Sugarcane in Sindh Vs Punjab: 2018-19 Crop

Item	Unit	Sindh	Punjab	Change in Sindh 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	15490	11524	34.41
Fertilizer Use:				
• N	Nutrients kg/acre	104	56	85.71
• P	"	39	34	14.71
Crop yield	40 kg/ acre	750	628	19.43

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

60. Sugar is one of the important items in average household budget. Sugar is also included in the basket of goods used in estimating the Consumer Price Index (CPI). Any change in sugar price affects the household budget and CPI. The impact of change in the price of sugar has been worked out against the CPI and annual expenditure and summary of the results is given in Table-17:

10.1 Impact on CPI

61. The changes in CPI as the result of increase in sugar price over the base price is give in Table-15.

62. It is evident from the Table-15 that every increase or Re 1 per kg over the base price of Rs 62.69 per kg is expected to raise the CPI by 0.0140 per cent, provided other things remaining the same. Accordingly, the CPI is likely to increase by 0.0280 and 0.0700 per cent, if sugar price is increased by Rs 2 and Rs 5 per kgs..

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

Sugar price	Rise in CPI	Increase in annual expenses on the basis of average per capita sugar availability @ 24.01 kgs per year	
		Per person	Per household
Rs per kg	Per cent	------ Rupees -------	
62.69* Base price			
63.69	0.0140	24.01**	151.50
64.69	0.0280	48.02	303.00
65.69	0.0420	72.03	454.50
66.69	0.0560	96.04	606.01
67.69	0.0700	120.05	757.51
68.69	0.0840	144.06	909.01
69.69	0.0980	168.07	1060.51
70.69	0.1120	192.08	1212.0
71.69	0.1260	216.09	1363.5
72.69	0.1400	240.10	1515.0

Note: * Price for the month of August 2019 was Rs 63.69 per kg
Average size of household comprises 6.31 members

** 24.01 per person taken from Annex-XVI

Sources:

1. Pakistan Bureau of Statistics (PBS), Islamabad
2. Annex-XVI.

10.2 Impact on Household Expenditure

63. According to the Household Integrated Economic Survey (HIES) during 2015-16 by the PBS, average household in Pakistan consists of 6.31 members. The annual per capita availability of sugar based on the domestic Balance Sheet Method has averaged at 24.01 kgs per annum, 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 base level of 62.69 per kg would raise the CPI by 0.0140 per cent. In addition, the per head and average household expenditure would increase by Rs 24.01 and Rs 151.50 respectively per annum with rise in sugar price by Re 1 per kg, other things remaining the same. Accordingly, an increase of Rs 2 and Rs 5 over the base level would increase the per head expenditure by Rs 48.02 and 120.05 per annum and average house expenditure by Rs 303.00 and Rs 757.51 per annum.

11. ECONOMIC EFFICIENCY OF SUGARCANE PRODUCTION

64. 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.

65. There are three widely accepted measures of economic efficiency. These are; 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 perspective. Analysis in export context is based on export parity price of the concerned crop while import substitution ability of the crop is analyzed using import parity price of that crop.

66. Sugar is an important food item in Pakistan. Sugarcane provides raw material for manufacturing sugar. Accordingly, it is very necessary to study resource use efficiency of the crop.

67. In resource use efficiency we compare cumulative effect of cost of production of the crop and its import and export parity prices against the established economic efficiency yardsticks i.e Nominal Protection Coefficient (NPC), Effective Protection Coefficient (EPC) and Domestic Resource Cost (DRC) Coefficients.

68. Here efficiency is actually a comparison of crop revenues against its cost of production. Though profit is very important consideration from farmer point of view to sustain a crop but at the same time, viability of a crop to justify national resources (land, labour, capital, cntrepreneurship skills) employed in its production is also equally important from social point of view. It needs to be mentioned here that in the former case we use cost of production and domestic private market price of the crop and inputs used in its production while for the later we convert private (market) prices into social with the help of corresponding import and export parity prices of the crop.

69. 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)

70. 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.

71. 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.

72. For this analysis, NPC estimates are estimated under import and export scenarios both for 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.

73. Under import scenario we calculate this price 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
2013-14	1.3	1.8	1.2	1.7
2014-15	1.5	2.2	1.6	2.3
2015-16	1.4	1.9	1.4	2.0
2016-17	1.4	1.9	1.2	1.7
2017-18	1.3	1.7	1.2	1.7
2018-19	1.0	2.1	1.0	2.1

Source: For NPC, Annex-VII, IX, XI and XIII

74. It may be observed from data produced in Table-16 that NPCs for both Punjab and Sindh under import as well as export situations are greater than one throughout the period under analysis. It implies that sugarcane growers are receiving relatively higher price for their cane than the corresponding parity price. But it needs to be kept in mind that these coefficients are calculated assuming Rs 180/40 Kg price of sugarcane received by the growers whereas it is commonly observed during the cane disposal season that farmers sell their consignments to the middlemen where they get price less than Rs 180/40 Kg. It has been revealed during the field surveys that farmers sell their produce to middlemen relatively at lower price. Normally middle man price is 10% less than the indicative price. Its reason is that middleman offers them cash payment whereas sugar mills pay them somewhat late. Thus if we estimate NPC values on the

basis of middleman price, NPC values would be around one which may approximate domestic sugar price to international price.

75. However, the above coefficients show that sugarcane growers seem price protected through the indicative price of sugarcane. This may be questioned why sugarcane growers get this price protection? A valid explanation may be that sugar being an important food item, needs to be adequately available in the market. Indicative price helps continue sugarcane cultivation. 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)

76. 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.

77. 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 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 import scenario	Under export scenario	Under import scenario	Under export scenario
2013-14	1.34	2.44	1.25	2.03
2014-15	1.68	3.43	1.80	3.39
2015-16	1.45	2.60	1.47	2.51
2016-17	1.46	2.41	1.24	2.02
2017-18	1.41	2.23	1.23	1.78
2018-19	1.03	1.35	0.92	2.75

Source: Estimated from Annex-VIII.

78. Table-17 provides EPC values for Punjab and Sindh provinces under import and export scenarios. All values are found higher than one. Respective values of EPC higher than one mean 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 much higher than those derived under import scenario analysis.

11.3 Domestic Resource Cost Coefficient (DRC)

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

80. Domestic Resource Cost coefficients (DRCs) for present analysis are derived by using cost of production of sugarcane and import price of sugar. The estimates are produced in Table-3. In this respect detailed data on private and social profitability under import situation are produced in Annex-VII, Annex-VIII, Annex-XI and XII. and for export situation these data are produced in Annex-IX, Annexes-X, XIII and Annex-XIV.

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

Year	Under import situation		Under export situation	
[1]	Punjab [2]	Sindh [3]	Punjab [4]	Sindh [5]
2013-14	0.58	0.76	1.06	1.24
2014-15	0.68	0.70	1.39	1.33
2015-16	0.64	1.01	1.15	1.71
2016-17	0.57	0.75	0.95	1.07
2017-18	0.55	0.80	0.87	1.15
2018-19	0.45	0.63	0.58	1.88

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

81. It is observed from Table-18 that DRC values under import scenario analysis are less than one throughout the period of analysis except for Sindh, 2015-16. However, these have mixed trend under export scenario analysis. Findings in the above table support that Punjab has 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

82. The sugar production from 2018-19 (Oct-Sept) crop has been estimated at 5.27 million tonnes. After accounting the opening stocks of previous year 2.29 million tonnes (Estimated stocks and production, the opening stocks at the beginning of new season as on 1st October are not available) the leftover stocks from 2017-18, the total sugar supply for 2018-19[1] consumption year is estimated to 7.56 million tonnes. Based on average per capita availability of sugar estimated at 24.01 kgs during 2018-19 on the basis of balance sheet method, total domestic requirement for a population of 219.37 million has been worked at 5.27 million tonnes for 2018-19. Thus, there is an estimated 1.78 million tonnes surplus sugar is available at country for export during 2018-19. Surplus stocks may increase to 3.47 million tonnes if per capita consumption 16.32 kgs per annum as reported by the Household Integrated Survey 2015-16 (HIES) by PBS.

Table-19: Domestic Requirement Situation of Sugar during 2018-19

S. No	Items	Balance Sheet Method	HIES per capita consumption
		24.01 Kgs/per annum	16.32 kgd / per annum
		-------Millions----	
1	Opening stocks left over from 2017-18	2.29	2.29
2	Production 2018-19	5.27	5.27
3	Total Supply for 2018-19	7.56	7.56
4	Population during 2019-20	219.37	219.37
5	Requirement	5.27	3.58
6	Surplus/ deficit	1.78	3.47

Note: The quantity of production and stocks of those sugar mills which are under investigation by NAB is not included due to non-availability of data.

Sources: i). Annex-XV.
ii) For production and Stocks; Ministry of Industries.
ii). For population, Economic Survey of Pakistan and projected on the basis of growth rate

[1] The production and leftover stocks of those sugar mills which are being investigated by the NAB are not included.

12.2 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 2018 and 2019 (Jan - Aug) are presented Annex-XVI while for the last 12 years in Annex-XVII.

84. During 2018, average monthly wholesale prices ranged between Rs 4600 per 100 kgs in Karachi and Hyderabad markets during the month of March 2018 to Rs 6400 per 100 kgs in Peshawar during December, 2018. During 2019 (Jan-Aug), average monthly wholesale prices highest and lowest price observed between Rs 4750 to Rs 7242 in Lahore market January to March to Rs per 7242 per 100 kgs during August, 2019. The overall average of sugar price at country level ranged between Rs 47157 to Rs 7062 per 100 kgs during 2018-19.

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

13.1 Supply, demand, stocks and trade

85. The data on world balance sheet of sugar (raw equivalent) for the period of 2016-17 to 2018-19 are presented in Table-20:

Table - 20: World Balance Sheet of Sugar (Raw Equivalent): 2016-17 to 2018-19 (October - September)

Item	2016-17	2017-18 Estimated	2018-19 Projected
	----------Million tones----------		
1. Opening stocks	88.80	85.96	92.25
2. Production	169.59	182.70	180.49
.3 Total supply (item 1+2)	258.39	268.66	272.74
4. Disappearance (consumption)	172.44	175.42	178.32
5. Stock adjustment *	(-)0.01	-0.99	-1.06
6. End year stocks (3-4+5)	85.96	92.25	93.36
7. Trade (Export)	65.32	59.69	54.47

Note: * Including adjustment for unknown net trade.
Source: Quarterly Market Report - November 2018, International Sugar Organization.

86. The world sugar production is estimated at 182.70 million tonnes during 2017-18, 13.11 million tones (7.73 percent) higher than the last year level of 169.59 million tonnes. With the addition of opening stocks of 85.96 million tonnes, global supply of sugar in 2017-18 were reported at 268.66 million tonnes (3.97 per cent) higher than 2016-17. The world consumption in 2017-18 is estimated at 175.42 million tonnes, 1.73 per cent higher than the last year level of 172.44 million tones. End year stocks in 2017-18 are estimated at 92.25 million tonnes, 7.32 percent higher than last year.

87. According to ISO November, 2018 Issue, the World sugar production during 2018-19 is forecast at 180.49 million tones, 2.21 million tonnes lower than last year's production. Accounting for the opening stocks of 92.25 million tones, global supply of sugar in 2018-19 projected at 272.74 million tones 4.08 million tonnes higher than 2017-18. World consumption in 2018-19 is projected at 178.32 million tones, 2.90 million tonnes higher than the last year. End year stocks projected to increase slightly during 2018-19 are 93.36 million tones. If these forecasts come true, the price of sugar in international market may remain stable.

13.2 International Prices of Sugar

88. International prices of raw (fob Caribbean ports) and white (fob London) sugar from 2008-09 to 2018-19 are presented in Fig-7 and Annex-XVIII.

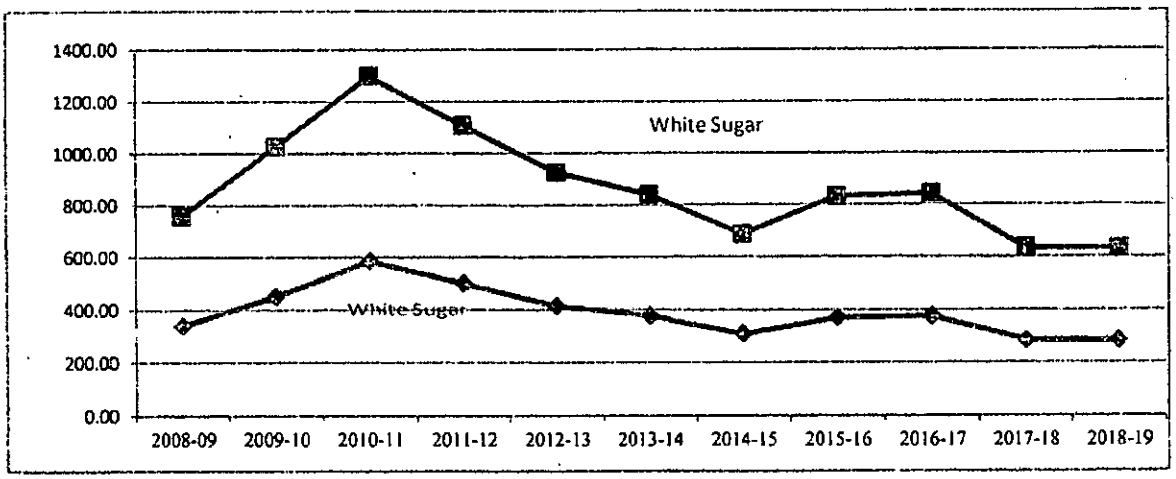


Fig-7- International prices

89. Prices of both raw and white sugar have fluctuated from 2008-09 to 2010-11.During 2008- 09, the prices of raw sugar (Caribbean port) averaged at US $ 340.02 per tonne. However, this price rose sharply in next two years and averaged at US $ 585.45 per tonne during 2010-11, and touched the highest level of price during the period under review. From 2011-12, prices started a continuous downward trend and averaged at $ 285.62 per tonne in 2017-18. In the current season 2018-19 (Oct-Aug), a downward trend is being observed and reached at $ 282.32 per tonne, the lowest level of price during the period under review.

90. The pattern followed by the prices of white sugar during period under reference has been similar to that of raw sugar described above. Difference between the average annual price of raw and white sugar ranges between $ 63.50 per tonne to $ 128.58 per tonne

14. IMPORT AND EXPORT PARITY PRICES OF SUGARCANE

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

92. 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-XX and XXI, while the results are summarized in Table-21.

Table-21: Import/Export Parity Prices of Sugarcane as Worked Back from Average fob (London) Prices of Sugar

Average fob London prices of white sugar per tonne	Sugarcane prices (Rs/40 kgs)	
	Punjab	Sindh
Import parity		
US $ 317.48 (August 2019)	174.51	183.14
US $ 339.52, 2018-19 (Oct-Aug)	184.22	193.34
US $ 384.27 (2016-17 to 2018-19)	203.95	214.04
Export parity		
US $ 317.48 (August 2019)	83.13	87.24
US $ 339.52, 2018-19(Oct-Aug)	92.38	96.95
US $ 384.27 (2016-17 to 2018-19)	111.17	116.67

Source Annexes –XIX and XX.

15. MILL-GATE PRICES OF SUGARCANE BASED ON DOMESTIC WHOLE SALE PRICES OF SUGAR DURING 2018-19 CONSUMPTION YEAR

93. Sugarcane prices have also been estimated from the wholesale prices of sugar during the 2018-19 consumption year and presented in Table-22. This analysis is based on actual sucrose recovery as reported by the PSMA; processing cost of sugar and Sales Tax @ 17 percent. A summary of sugarcane prices estimated under this scenario from various wholesale prices of sugar is presented in Table-22 while the details are given in Annex - XXI.

Table - 22: Sugarcane Prices Estimated from Expected Wholesale Prices of Sugar During 2018-19

Wholesale prices of sugar (Rs /Tonnes)	Sugarcane prices (Rs/40 Kgs)	
	Punjab	Sindh
Rs 6000	144.52	151.67
Rs 65000	156.57	164.31
Rs 70000	168.61	176.95
Rs 75000	180.65	18.59
Rs 80000	192.70	202.23

Source Annex-XXII

16. USE OF SUGARCANE CESS FUND

94. The former Agriculture Prices Commission (APCom) presently Agriculture Policy Institute (API) had suggested in the Sugarcane Policy Reports that the sugarcane cess fund which is utilized for the construction and improvement of roads in the sugarmills areas. It should also be utilized for research and development of sugarcane crop. Huge amounts of sugarcane cess fund are lying unutilized with the district/provincial governments, 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.

95. To strengthen sugarcane research in the Punjab, the Government of Punjab has allocated 10% of Sugarcane Cess fund amounting to Rs 78.153/- million to Sugarcane Research and Development Board (SRDB), Punjab from 26.10.2016 to 11.06.2018.

96. The SRDB will utilize the said amount of cess fund (10%) for both sugarcane research & development and also includes operational expenditures of SRDB (salaries, POL and traveling etc.). Utilization of its budget towards sugarcane research mainly covers funding for research projects, import of germplasm (fuzz/clones) from Canal Point USA & other countries for sugarcane variety development and capacity building of scientists/researchers etc. The impact on development of sugarcane requires some time to evaluate.

17. SUGARCANE CROP RESEARCH AND DEVELOPMENT IN PAKISTAN

- **Punjab**

97. The Sugarcane Research Institute, (SRI), Faisalabad is an apex public sector organization working on development and release of sugarcane varieties along with production technologies.

98. The Institute has overall 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 - 23: Varieties Developed by SRI, in Last Ten Years with their Characteristics

S.No	Variety	Year of Release	Main characteristics
1	CPF 246	2011	• It is medium maturing variety • Avg. yield potential: 1600 t ha^{-1} • Avg. yield: 1200 t ha^{-1} • Sugar recovery: 12.15% • Ratooning ability: Good • **2083 t ha^{-1}** cane yield was reported in sugarcane yield competition in the Punjab-2012
2	CPF 247	2011	• It is medium maturing variety • Avg. yield potential: 1500 t ha^{-1} • Avg. yield: 1200 t ha^{-1} • Sugar recovery: 12.25% • Ratooning ability: Good • Also good for light soils and non-lodging variety
3	CPF 248	2014	• It is medium maturing variety • Avg. yield potential: 1500 t ha^{-1} • Avg. yield: 1200 t ha^{-1} • Sugar recovery: 12.71% • Ratooning ability: Good
4	CPF 249	2016	• It is medium maturing variety • Avg. yield potential: 1650 t ha^{-1} • Avg. yield: 1200 t ha^{-1} • Sugar recovery: 12.46% • Ratooning ability: Good • Also good for saline soils and having highest yield potential

18. MARKETING OF SUGARCANE

99. Sugarcane is one of the main cash crops of Pakistan and is sown on vast areas throughout the country. As it cannot be stored after harvesting, so is to be processed either into gur/khandsari at the farms or crushed by sugar mills for sugar manufacture. So its marketing

plays an important role in this respect. For having an upto date information in this respect API conducted a mini survey in the main sugarcane producing areas of Punjab and Sindh. On the basis of survey results and discussion in the API Committee meeting at Islamabad on March 26,2019, the main issues/problems faced by the farming community are briefly discussed below:

18.1 Delayed payments

100. In the beginning of the season, the payments are generally made within two weeks but as the season progresses to the end, the payments are delayed by months and in some cases by seasons. The mills are of the view that this happens due to liquidity problem. Similarly vast majority of sugarcane growers sell their produce at the local procurement centers which are managed privately. Here though they sell relatively at lower price i.e @ Rs. 165/40 Kg but they get cash immediately whereas at the mill gate they may sell at higher price but they receive payment much later from the sugar mill.

18.2 Underweighment

101. It has been noticed and reported by farmers that there was underweighment of cane at the purchase centers and mills gates. The private purchase centers and the mills agents are very notorious in this respect. The weighbridges and scales installed at the purchase centers do not record the correct weighment. Mostly the farmers bringing cane remained unaware about the readings of these scales. The quantity underweighed varied from place to place and for each mill area. In order to check the underweighment at weighbridges, the supervisory committees should be quite effective. Moreover, the use of private/temporary bridges may be banned and district governments should install their own weighbridges at the purchasing points.

18.3 Undue deductions

102. The sugarmills are making deductions on the plea that poor quality cane with high trash contents is being supplied by the farmers. In some places these deductions go upto 10 per cent. For improving the situation, the growers should be educated for properly cleaning the trash before supply to mills, and the Provincial Cane Commissioners should check against such high undue deductions.

18.4 Presence of middlemen

103. The role of middle man is increasing day by day in sugarcane business. Sugarcane growers are in need of immediate payments for their sale proceeds, they in order to avoid the delayed payments are compelled to sell their produce or CPRS at discount rates varying from area to area, but mostly ranging between Rs 2 – 5 per 40 kgs of cane price to the middle man.

21. ACKNOWLEDGEMENT

111. The technical contribution and professional efforts of the following staff members are highly appreciated in completion of Sugarcane Policy Report for 2019-20 Crop:

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1.	Mr. Abdul Karim	Chief
2.	Mr. Muhammad Ejaz Ahmed	Chief
3.	Mr. Hussain Ali Turi	Deputy Chief
4.	Mr. Muhammad Amin	Deputy Chief **(Coordinator)**
5.	Syed Riaz Ali Shah	Assistant Chief
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9.	**Mr. Muhammad Akram**	**Lower Division Clerk**
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Dr. Javed Humayun
Senior Joint Secretary/
Director General
M/o NFS&R

ANNEX-I

PROVINCE-WISE AREA ,PRODUCTION AND YIELD OF SUGARCANE IN PAKISTAN : 2008-09 TO 2018-19

YEAR	PUNJAB	SINDH	KPK	BALOCHISTAN	PAKISTAN
AREA	---------- 000 hectares ----------				
2008-09	666.5	263.9	98.2	0.8	1029.4
2009-10	607.4	233.9	100.8	0.7	942.8
2010-11	672.2	226.4	88.4	0.6	987.6
2011-12	761.2	189.7	105.9	0.7	1057.5
2012-13	767.7	253.7	106.7	0.7	1128.8
2013-14	756.8	297.6	117.4	0.7	1172.5
2014-15	710.6	316.7	112.5	0.7	1140.5
2015-16	705.4	312.8	112.7	0.7	1131.6
2016-17	777.8	320.5	118.6	0.7	1217.6
2017-18	859.1	333.3	148.5	0.9	1341.8
2018-19	710.6	279.5	111.2	0.9	1102.2
YIELD	---------- Tonnes per hectare ----------				
2008-09	48.45	50.41	44.89	49.22	48.62
2009-10	51.57	57.74	44.72	50.86	52.37
2010-11	55.76	60.81	45.59	51.33	56.00
2011-12	56.35	56.87	44.23	44.86	55.22
2012-13	55.99	62.93	44.71	45.00	56.48
2013-14	57.75	61.70	45.67	46.00	57.54
2014-15	57.80	52.46	45.40	44.71	55.09
2015-16	59.50	57.49	48.79	45.29	57.87
2016-17	63.79	63.05	47.46	45.14	61.99
2017-18	64.10	61.84	51.25	48.22	62.11
2018-19	63.19	59.72	49.75	49.22	60.95
PRODUCTION	---------- 000 Tonnes ----------				
2008-09	32294.7	13304.3	4408.5	37.9	50045.4
2009-10	31324.0	13505.4	4507.9	35.6	49372.9
2010-11	37481.0	13766.4	4030.3	30.8	55308.5
2011-12	42893.0	10788.3	4684.3	31.4	58397.0
2012-13	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	44.3	67173.9

Sources:

1- For 2008-09 to 2016-17 : Agricultural Statistics of Pakistan 2009-10,M/o NFS&R, Islamabad.
2- For 2017-18: Final estimates provided by concerned Provincial Agriculture Departments.
3- For 2018-19: Agriculture Statistic of Pakistan Economic Wing M/o NFS&R.

ANNEX-II

PROVINCE-WISE AREA ,PRODUCTION AND YIELD OF SUGARCANE IN PAKISTAN : 2008-09 TO 2018-19

YEAR	PUNJAB	SINDH	KPK	BALOCHISTAN	PAKISTAN
AREA	---------- 000 acres ----------				
2008-09	1647.0	652.1	242.7	1.9	2543.7
2009-10	1500.9	578.0	249.1	1.7	2329.8
2010-11	1661.1	559.5	218.4	1.5	2440.5
2011-12	1881.0	468.8	261.7	1.7	2613.2
2012-13	1897.1	626.9	263.7	1.7	2789.4
2013-14	1870.1	735.4	290.1	1.7	2897.4
2014-15	1756.0	782.6	278.0	1.7	2818.3
2015-16	1743.1	773.0	278.5	1.7	2796.3
2016-17	1922.0	792.0	293.1	1.7	3008.8
2017-18	2122.9	823.6	367.0	2.2	3315.7
2018-19	1756.0	690.7	274.8	2.2	2723.6
YIELD	---------- Tonnes per acre ----------				
2008-09	19.61	20.40	18.17	19.92	19.67
2009-10	20.87	23.37	18.10	20.58	21.19
2010-11	22.56	24.61	18.45	20.77	22.66
2011-12	22.80	23.01	17.90	18.15	22.35
2012-13	22.66	25.47	18.09	18.21	22.85
2013-14	23.37	24.97	18.48	18.62	23.28
2014-15	23.39	21.23	18.37	18.09	22.29
2015-16	24.08	23.27	19.74	18.33	23.42
2016-17	25.81	25.52	19.21	18.27	25.09
2017-18	25.94	25.03	20.74	19.51	25.13
2018-19	25.57	24.17	20.13	19.92	24.66
PRODUCTION	---------- 000 Tonnes ----------				
2008-09	32294.7	13304.3	4408.5	37.9	50045.4
2009-10	31324.0	13505.4	4507.9	35.6	49372.9
2010-11	37481.0	13766.4	4030.3	30.8	55308.5
2011-12	42893.0	10788.3	4684.3	31.4	58397.0
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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

Sources: 1- For 2008-09 to 2016-17 : Agricultural Statistics of Pakistan 2009-10,M/o NFS&R, Islamabad.
2- For 2017-18: Final estimates provided by concerned Provincial Agriculture Departments.
3- For 2018-19: Agriculture Statistic of Pakistan Economic Wing M/o NFS&R.

DISTRICT- WISE AREA, YIELD AND PRODUCTION OF SUGARCANE
AVERAGE OF 2016-17 TO 2018-19

ANNEX-III

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
PUNJAB						**KHYBER PAKHTUNKHWA**					
1	R.Y.Khan	171.30	13327.13	17.52	77.80	1	D.I.Khan	46.09	2809.53	3.69	60.96
2	Faisalabad	105.78	6023.48	7.92	56.94	2	Charsadda	29.66	1262.45	1.66	42.56
3	Muzaffergarh	55.42	3752.28	4.93	67.71	3	Mardan	27.90	1189.55	1.56	42.63
4	Sargodha	60.44	3375.85	4.44	55.86	4	Peshawar	9.83	506.54	0.67	51.55
5	Jhang	50.59	3020.96	3.97	59.71	5	Nowshera	3.43	174.27	0.23	50.76
6	Rajanpur	29.98	2565.30	3.37	85.57	6	Malakand	4.44	167.89	0.22	37.79
7	Chiniot	41.30	2287.09	3.01	55.38	7	Swabi	2.04	78.27	0.10	38.38
8	T.T.Singh	36.69	2280.84	3.00	62.16	8	Bannu	0.44	17.43	0.02	39.47
9	Bahawalpur	27.24	1818.98	2.39	66.77	9	Tank	0.88	17.04	0.02	19.78
10	Bhakkar	26.86	1749.58	2.30	65.13	10	Khyber AG.	0.64	14.75	0.02	22.92
11	Kasur	29.12	1496.59	1.97	51.40	11	Mohmand AG.	0.18	5.83	0.01	32.39
12	M.B.Din	22.98	1172.47	1.54	51.02	12	Kohat	0.12	4.13	0.01	34.54
13	Vehari	17.61	1027.02	1.35	58.32	13	Haripur	0.09	2.80	0.00	31.25
14	Layyah	15.63	1007.77	1.33	63.64	14	Lakki Marwat	0.06	2.04	0.00	36.89
15	Bahawalnagar	13.36	772.73	1.02	57.86	15	Bunir	0.07	1.70	0.00	26.13
16	Nankana Sahib	13.22	740.81	0.97	56.02	16	Dir Lower	0.04	1.23	0.00	30.98
17	Okara	12.78	646.11	0.85	50.57	17	F.R.Peshawar	0.02	0.54	0.00	31.24
18	D.G.Khan	9.22	624.58	0.82	67.76	18	F.R.D.I.Khan	0.08	0.31	0.00	3.88
19	Khushab	8.19	444.81	0.58	54.26	19	Hangu	0.01	0.18	0.00	36.60
20	Khanewal	6.54	420.45	0.55	64.26	20	Mansehra	0.01	0.15	0.00	24.04
21	Lodhran	4.73	320.34	0.42	67.69	21	F.R.Bannu	0.04	0.15	0.00	3.88
22	Multan	6.02	319.89	0.42	53.14						
23	Hafizabad	6.15	294.65	0.39	47.89						
24	Sahiwal	4.76	254.02	0.33	53.42						
25	Mianwali	2.94	148.56	0.20	50.45						
26	Sheikhupura	2.06	115.04	0.15	55.91						
27	Gujrat	2.17	105.83	0.14	48.67						
28	Pakpattan	1.79	96.32	0.13	53.88						
29	Gujranwala	1.79	70.18	0.09	39.26						
30	Narowal	1.40	45.19	0.06	32.19						
31	Sialkot	1.15	39.15	0.05	34.02						
32	Lahore	0.38	19.34	0.03	50.83						
33	Jhelum	0.13	4.73	0.01	35.45						
	Sub Total	**789.94**	**50387.86**	**66.25**	**63.79**		**Sub Total**	**126.04**	**6256.89**	**8.23**	**49.64**
SINDH						**BALOCHISTAN**					
1	Ghotki	52.60	3885.46	5.11	73.87	1	Sibi	0.74	36.90	0.05	49.82
2	Nawabshah	33.01	2217.54	2.92	67.19	2	Lasbela	0.05	2.90	0.00	53.24
3	Badin	39.47	2057.77	2.71	52.14						
4	Thatta	34.03	1989.19	2.62	58.45						
5	Khairpur	21.45	1350.64	1.78	62.96						
6	N.Feroze	21.04	1309.14	1.72	62.21						
7	Tando Muhammad	19.28	1235.05	1.62	64.05						
8	Sanghar	16.27	1051.68	1.38	64.64						
9	Mirpurkhas	17.83	1011.65	1.33	56.73						
10	Tando Allahyar	19.41	1004.50	1.32	51.76						
11	Matiari	14.33	939.58	1.24	65.58						
12	Sukkur	7.20	476.46	0.63	66.22						
13	Hyderabad	6.02	345.13	0.45	57.33						
14	Dadu	4.52	241.29	0.32	53.37						
15	Umerkot	2.49	124.42	0.16	49.92						
16	Larkana	0.67	57.20	0.08	85.05						
17	Jamshoro	0.53	24.38	0.03	46.26						
18	Shikarpur	0.39	17.94	0.02	46.23						
19	Tharparkar	0.27	15.97	0.02	59.95						
20	Shadadkot	0.12	6.40	0.01	54.38						
21	Jacobabad	0.16	5.66	0.01	34.87						
	Sub Total	**311.08**	**19367.05**	**25.47**	**62.26**		**Sub Total**	**0.80**	**39.81**	**0.05**	**50.05**
							Pak Total	**1227.85**	**76051.61**	**100.00**	**61.94**

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

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

ANNEX-IV

AVERAGE FARMER COST OF PRODUCTION OF SUGARCANE IN PUNJAB FOR 2018-19 AND 2019-20 CROPS

S.No	Operations / Inputs	Unit	Average No. of units/used acre	For 2018-19 crop		For 2019-20 crop		Change in 2019-20 over 2018-19
				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
			Field data 2018	.....	.....Rupees.....			
1	Land preparation:							
	1.1 Deep ploughing	No. of ploughings	0.58	1400	812	1500	870	200
	1.2 Rotavator/disc plough used	No. of ploughings	1.00	1500	1500	1600	1600	239
	1.3 Ploughing	"	4.00	800.00	3200	859	3436	240
	1.4 Planking	No. of plankings	1.00	400.00	400	430	429.5	30
	1.5 Tractor levelling	Hour	0.54	800.00	432	859	463.86	232
	1.6 Laser levelling	Hour	1.00	1200.00	1200	1264	1264	25.6
2	Seed bed preparation							
	2.1 Ploughing	No	1.00	800.00	800	859	859	60
	2.2 Ridge making with tractor	Hour	0.50	800.00	400	859	429.5	42
	2.3 Clearing soil at ends of ridges (labor charges)	M. day	1.00	400.0	400	500	500	100
3	Seed and sowing operations:							
	3.1 Seed used	Marlas/ acre	10.00	1000.00	10000	1000	10000	0
	3.2 Contract sowing - including harvesting, stripping, making of sets for seed, transport and sowing	Rs./ acre			3500		4000	500
4	Irrigation							
	4.1 Canal	No. of irrigations/acre	9.00		250		250	0
	4.2 Private tubewell (RS./irrigation)	No. of irrigations/acre	7.00	750.00	5250	875	6125	900
	4.3 Mixed	No. of irrigations/acre	2.16	375.00	810	438	945	108
	4.4 Labour for irrigation and water course cleaning	M. days/ acre	2.00	400.00	800	500	1000	200
5	Interculture/ hoeing							
	5.1 Manual hoeing on contract	No. of hoeings	1.40	1000.00	1400	1200	1680	400
	5.2 With tractor	Hour/acre	0.50	800.00	400	859	430	0
6	Plant protection including application cost							
	6.1 weedicide	No. of applications	1.00	950.00	950	1000	1000	50
	6.2 Sprays	"	1.00	700.00	700	872	872	600
	6.3 Application cost	Rs./application/acre	3.00	200.00	600	200	600	150
7	Farm Yard Manure including transport and application cost	No. of trolleys	0.80	2800.00	1213	3000	1300	0
8	Fertilizers: (bags)							
	8.1 DAP	No. of bags	2.00	3614.00	7228	3614	7228	0
	8.2 Urea	"	3.60	1830.00	6588	1830	6588	0
	8.3 NP	"	0.52	2950.00	1534	2939	1528	0
	8.4 CAN	"	0.33	1625.00	536.25			
	8.5 SOP	"	0.70	3800.00	2660	4000	2800	140
	8.6 Fertilizer transport and application cost	"	7.2	100.00	715	100	715	0
9	*Traded inputs' cost (item 1 to 8 minus item 4.1)*	*Rs./acre*			*54279*		*56913*	*4216.6*
10	Mark up on item 9 @ 14% per annum for 13 months	"			8194		8594	1264
11	Land rent for 13 months	"		25000	27083	30000	32500	5000
12	Average weighted land tax @ Rs 132/acre/annum for 13 month	"			132.00		132	0
13	Management charges for 13 months	"			2909.00		2909	0
14	Crop harvesting, stripping, binding, loading etc	Rs./ 40 Kg		20.00	13190	22	15150	1400
15	*Total cost*	*Rs./ acre*			*105787*		*116197*	*11881*
16	Yield per acre	40 Kg/ acre			659.50		688.63	0
17	17.1 Cost of production at farm level with land rent	Rs./ 40 Kg			160.41		168.74	17
	17.2 Cost of production at farm level without land rent	Rs./40 Kg			119.34		121.54	
18	Marketing cost	Rs./40 Kg			16.50		17.00	0
19	Road Cess	Rs./40 Kg			1.00		1.00	
20	20.1 Cost of production at mill gate with land rent	Rs./ 40 Kg			177.91		186.74	16.97
	20.2 Cost of production at mill gate without land rent	Rs./ 40 Kg			136.84		139.54	16.97

Source:

1 For rates/ prices of inputs, API field survey , 2019

2 Average yield in Punjab, as used by Crop Reporting Service in their cost of production for 2019-20.

3 For average yield in Sindh, Crop Reporting Service, Sindh

ANNEX-V

AVERAGE FARMER COST OF PRODUCTION OF SUGARCANE IN SINDH:
2018-19 AND 2019-20 CROP

S.No	Operations / Inputs	Unit	Average No. of units/used acre	For 2018-19 crop		For 2019-20 crop		Change in 2019-20 over 2018-19
				Cost per unit	Cost per acre	Cost per unit	Cost per acre	
1	2	3	4	5	6 =4*5	7	8 =7*4	9=8-6
			Field data 2018					
1	Land preparation:							
	1.1 Deep ploughing	No	0.680	1550	1054	1600	1088	34
	1.2 Ploughing	No	4.000	1200	4800	1200	4800	
	1.3 Planking	No	1.000	600	600	600	600	
	1.4 Tractor levelling	Hour	0.30	1000	300	1200	360	
	1.5 Laser levelling	"	1.000	1200	1200	1250	1250	50
2	Seed bed preparation							
	2.1 Ploughing	No	1.0	1200	1200	1200	1200	0
	2.2 Ridge making with tractor	Hrs.	0.500	1200	600	1200	600	0
	2.3 Clearing soil at ends of ridges	M. day	1.000	400	400	500	500	100
3	Seed and sowing operations:							
	3.1 Seed used	40 Kgs	89.0	182	16198	182	16198	0
	3.2 Contract sowing including harvesting, stripping, making of sets, transport and sowing	Rs./ acre			3500		3500	0
4	Irrigation							
	4.1 Canal	Irrigations/acre	18		250		250	0
	4.2 Private tubewell (RS./irrigation)	Irrigations/acre	1.0	725	725	750	750	25
	4.3 Mixed	"	2.16	725	1566	750	1620	54
	4.4 Labour for irrigation and water course cleaning	M. day	2.0	400	800	500	1000	200
5	Interculture/ hoeing							
	5.1 Manual		2.0	1900	3800	2000	4000	200
	5.2 Hoeing with tractor	No	1.8	1200	2160	1200	2160	
6	Plant protection including application cost							
	6.1 weedicide	No. of sprays	1.000	780	780	900	900	120
	6.2 Granules							
	6.3 Sprays	"	1.20	780	936	800	960	24
	6.4 Application cost	Rs./appli-/acre	2.20	150	330	150	330	
7	Farm Yard Manure including transport & application cost (50%)	No. of trolleys	0.32	1600	512	1600	512	
8	Fertilizers: (bags)							
	8.1 DAP	No. of bags	1.6	3614	5782.4	3614	5782.4	0
	8.2 Urea	"	4.0	1830	7320	1830	7320	0
	8.3 NP	"	0.6	2950	1652	2950	1652	0
	8.4 CAN	"						
	8.5 SOP	"	0.2	3800	760	3800	760	0
	8.6 Fertilizer transport and application cost	"	6.4	100	636	100	636	0
9	Traded inputs cost (Item 1 to 8-Item 4.1)	Rs./acre			57861		58728	867
10	Mark up on item 9 @ 14% per annum for 13 month	"			8776		8907	131
11	Land rent	"		26000	28167	26000	28167	0
12	Average weighted land tax @ Rs 200/acre/annum for 13 month	"			132		132	0
13	Management charges for 13 months	"			2909		2909	0
14	Crop harvesting, stripping, binding, loading etc	Rs./ 40 Kg		17	11900	17	10633	-1267
15	Total cost	Rs./ acre			109495		109227	-268
16	Yield per acre	40 Kg/ acre			700		625.49	-75
17	Cost of production at farm level							
	17.1 Including land rent	Rs./ 40 Kg			156.42		174.63	18
	17.2 Excluding land rent	Rs./ 40 Kg			116.18		129.59	13
18	Marketing cost							
	18.1 Transport	Rs./40 Kg			16.50		17.00	1
	18.2 Road Cess	Rs./40 Kg			1.00		1.00	0
19	Cost of production at mill gate							
	19.1 Including land rent	Rs./ 40 Kg			173.92		192.63	19
	19.2 Excluding land rent	Rs./ 40 Kg			133.68		147.59	14

Sources:

1 For input usage, API filed survey , 2018

2 For input rates, field surveys of API for respective years.

3 For yield, Crop reporting Service, Sindh

Annex- VI

ECONOMICS OF SUGARCANE AND COMPETING CROPS AT
PRICES REALIZED BY THE GROWERS: 2018-19 CROPS

S #	Province/crops/crop combination	Crop duration	Water used	Gross cost	Cost of purchased inputs	Gross revenue	Gross margin	Net income	Output-input ratio	Revenue per Rupee of purchased inputs	Revenue per Crop day	Revenue per Acre inch of water used
		Days	Acre inches	.....Rupees per acre.....					Ratio	.....Rupees.....		
	1	2	3	4	5	6	7=6-5	8=6-4	9=6/4	10=6/5	11=6/2	12=6/3
	Punjab											
1	Sugarcane	394	48	88386	20886	102364	81478	13978	1.16	4.90	260	2133
2	Seed Cotton	240	22	63865	21009	83192	62183	19327	1.30	3.96	347	3781
3	Basmati Paddy	180	58	62597	30560	64779	34220	2183	1.03	2.12	360	1117
4	IRRI Paddy	180	62	63151	28412	53075	24663	-10076	0.84	1.87	295	856
5	Wheat	180	12	44902	12583	46500	33917	1598	1.04	3.70	258	3875
6	Sunflower (spring)	180	22	50118	19323	47240	27918	-2878	0.94	2.44	262	2147
7	Seed Cotton + Wheat	420	34	108768	33591	129692	96101	20924	1.19	3.86	309	3814
8	Seed Cotton+Sunflower	420	44	113983	40331	130432	90101	16449	1.14	3.23	311	2964
9	Basmati Paddy+Wheat	360	70	107499	43142	111279	68137	3780	1.04	2.58	309	1590
10	Basmati Paddy+Sunflowe	360	80	112715	49682	112019	62137	-696	0.99	2.25	311	1400
11	IRRI Paddy + Wheat	360	74	108054	40995	99575	58580	-8479	0.92	2.43	277	1346
12	IRRI Paddy+Sunflower	360	84	113270	47735	100315	52580	-12955	0.89	2.10	279	1194
	Sindh											
1	Sugarcane	488	71	107408	29567	125010	95443	17602	1.16	4.23	256	1761
2	Seed Cotton	240	18	69840	23596	90925	67329	21085	1.30	3.85	379	5051
3	IRRI Paddy	180	56	52012	18745	48295	29550	-3717	0.93	2.58	268	862
4	Wheat	180	12	42631	12935	44813	31877	2182	1.05	3.46	249	3734
5	Sunflower (spring)	180	22	47768	18348	29475	11128	-18293	0.62	1.61	164	1340
6	Seed Cotton + Wheat	420	30	112471	36531	135738	99206	23267	1.21	3.72	323	4525
7	Seed Cotton+Sunflower	420	40	117608	36531	120400	83869	2792	1.02	3.30	287	3010
8	IRRI Paddy+ Wheat	360	68	94643	31680	93108	61428	-1535	0.98	2.94	259	1369
9	IRRI Paddy+Sunflower	360	78	99780	37092	77770	40678	-22010	0.78	2.10	216	997

Notes for Annex-VI :

1. The economic analysis presented in the above exercise is based on the input-output prices applicable for 2018-19 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, 2018-19 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 2018-19 crops. To incorporate the escalations in input prices, which occurred during the growing period of 2018-19 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 Rs 1300 per 40 kgs, as maintained by the government for 2018-19 crop, has 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 1775 and Rs 1050 per 40 kgs, respectively. While, the average price of IRRI paddy in Sindh is reported at Rs 1041 per 40 kgs.

   4.3 The wholesale market prices of seed cotton during the post-harvest months of 2018-19 in the main producer area markets have averaged at Rs 3776 per 40 kgs in the Punjab and Rs 3637 Sindh.

   4.4 The price of Sunflower crops has been reported hovering around Rs 2400/40 kgs and Rs 2500/40 kgs for Canola during 2018-19.

   4.5 The indicative prices of sugarcane as announced by the provincial governments are taken for the analysis i.e Rs 180 per 40 kgs in the Punjab and Rs 182 per 40 kgs in Sindh. However, the prices received by the growers remained much lower (ranging Rs 160 and 140, respectively for Punjab and 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 17 per 40 kgs in Punjab and Rs 15.32 in Sindh for sugarcane, Rs 40 for seed cotton in Punjab and Sindh, Rs 50 for rice paddy in Punjab and Sindh, and for wheat and oilseeds, Rs 38 in Punjab and Rs 42 in Sindh.

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-VII

ECONOMIC EFFICIENCY OF RESOURCE USE IN SUGARCANE IN PUNJAB (AVERAGE FARMER)

Under sugar importing scenario

Item	2013-14		2014-15		2015-16		2016-17		2017-18		2018-19	
	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices
A. GROSS INCOME												
1. Yield(40 kgs/acre)	565	565	585	585	565	565	600	600	600	600	660	660
2. Price(Rs/40 kgs)	170	133	180	122	180	133	180	132	180	139	180	173
NPC		1.28		1.48		1.35		1.36		1.29		1.04
3. Income from cane	96076	75346	105300	71130	101727	75120	108000	79206	108000	83586	118710	114417
4. Value of tops												
5. Gross Income	**96076**	**75346**	**105300**	**71130**	**101727**	**75120**	**108000**	**79206**	**108000**	**83586**	**118710**	**114417**
B. GROSS COSTS												
I. Traded Inputs												
i. Seed	5679	5679	5679	5679	5679	5679	6384	6384	5320	5320	10000	10000
ii. Fertilizer	9190	7628	9027	7493	9331	7745	6836	5674	6877	8627	18546	20296
iii. Plant protection	275	231	298	283	329	313	306	291	316	300	1650	1568
iv. Machinery:												
Tractor operations	7859	6602	8458	7020	8458	7020	8388	6962	7816	6487	8719	7237
Tubewell	5620	3777	5778	3883	5778	3883	3467	2330	3065	2060	6060	4072
v. Escalation in traded inputs' cost	4761	4761	3578	3578	2640	2640	2609	2609	2975	2975	0	0
Sub-total	**33384**	**28677**	**32818**	**27936**	**32215**	**27280**	**27990**	**24249**	**26369**	**25769**	**44975**	**43173**
II. Domestic Factors												
1. Hired Labour												
1.1 Pre-Harvest	7363	7363	8248	8248	8402	8402	12374	12374	10523	10523	8447	8447
1.2 Harvesting, stripping,binding, loading	7272	7272	7272	7272	7273	7273	8316	8316	8316	8316	13190	13190
2. Working Capital (Mark-up)	4818	0	6279	0	6383	0	6436	0	4645	0	8194	0
3. Farm yard manure	1075	1075	1150	1150	1300	1300	1850	1850	1813	1813	607	607
5. Canal water	250	1000	250	1000	250	1000	250	1000	252	1008	250	1000
6. Management charges	2103	2103	2235	2235	2362	2362	2540	2540	2909	2909	2909	2909
7. Land Rent (For 13 months)	22750	22750	24917	24917	26000	26000	26000	26000	26000	26000	27083	27083
8. Land Tax	143	143	143	143	143	143	144	144	143	143	132	132
9. Land revenue												
Total Domestic Cost (II.1..II.8)	**45773**	**27071**	**50493**	**29445**	**52113**	**30805**	**57909**	**31534**	**54348**	**31873**	**60812**	**31731**
Gross cost	**79158**		**83311**		**84328**		**85899**		**80717**		**105787**	
Import parity (mill gate) price of sugarcane	**148.32**		**136.59**		**147.92**		**147.01**		**154.31**		**188.49**	
Transport charges from farm to mill gate (Rs./ 40Kg)	14		14.00		14		14.00		14.00		14.00	
Development charges (Rs./ 40 Kg)	1		1.00		1		1.00		1.00		1.00	
Price of sugarcane at farm level	**133**		**121.59**		**133**		**132.01**		**139.31**		**173.49**	

Source: Annex-IV

ANNEX-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 SUGARCANE)

Description	Revenue	Traded Inputs Cost	Domestic Factor Cost	Profit
	---------- Rupees per acre ----------			
2013-14				
Private Prices	96076	33384	45773	16918
Social Prices	75346	28677	27071	19598
Transfers	20730	4707	18702	-2680
2014-15				
Private Prices	105300	32818	50493	21989
Social Prices	71130	27936	29445	13750
Transfers	34170	4883	21048	8239
2015-16				
Private Prices	101727	32215	52113	17399
Social Prices	75120	27280	30805	17035
Transfers	26607	4936	21308	364
2016-17				
Private Prices	108000	27990	57909	22101
Social Prices	79206	24249	31534	23423
Transfers	28794	3741	26375	-1322
2017-18				
Private Prices	108000	26369	54348	27283
Social Prices	83586	25769	31873	25945
Transfers	24414	600	22476	1338
2018-19				
Private Prices	118710	44975	60812	12923
Social Prices	114417	43173	31731	39513
Transfers	4293	1802	29081	-26590

Source: Annex-VII

ANNEX- IX

ECONOMIC EFFICIENCY OF RESOURCE USE IN SUGARCANE IN PUNJAB (AVERAGE FARMERS)

Under sugar exporting scenario

Item	2013-14		2014-15		2015-16		2016-17		2017-18		2018-19	
	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices
A. GROSS INCOME												
1. Yield(40 kgs/acre)	565	565	585	585	565	565	600	600	600	600	660	660
2. Price(Rs/40 kgs)	170	96	180	84	180	96	180	96	180	104	180	148
NPC		1.77		2.15		1.88		1.88		1.73		1.21
3. Income from cane	96076	54322	105300	49052	101727	53977	108000	57492	108000	62388	118710	97771
4. Value of tops												
5. Gross Income	**96076**	**54322**	**105300**	**49052**	**101727**	**53977**	**108000**	**57492**	**108000**	**62388**	**118710**	**97771**
B. GROSS COSTS												
I. Traded Inputs												
i. Seed	5679	5679	5679	5679	5679	5679	6384	6384	5320	5320	10000	10000
ii. Fertilizer	9190	7628	9027	7493	9331	7745	6836	5674	6877	8627	18546	20296
iii. Plant protection	275	231	298	283	329	313	306	291	316	300	1650	1568
iv. Machinery:												
Tractor operations	7859	6602	8458	7020	8458	7020	8388	6962	7816	6487	8719	7237
Tubewell	5620	3777	5778	3883	5778	3883	3467	2330	3065	2060	6060	4072
v. Escalation in traded inputs' cost	4761	4761	3578	3578	2640	2640	2609	2609	2975	2975	0	0
Sub-total	**33384**	**28677**	**32818**	**27936**	**32215**	**27280**	**27990**	**24249**	**26369**	**25769**	**44975**	**43173**
II. Domestic Factors												
1. Hired Labour												
1.1 Pre -Harvest	7363	7363	8248	8248	8402	8402	12374	12374	10523	10523	8447	8447
1.2 Harvesting, stripping, binding, loading	7272	7272	7272	7272	7273	7273	8316	8316	8316	8316	13190	13190
2. Working Capital (Mark-up)	4818	0	6279	0	6383	0	6436	0	4645	0	8194	0
3. Farm yard manure	1075	1075	1150	1150	1300	1300	1850	1850	1813	1813	607	607
4. Transportation												
5. Canal water	250	1000	250	1000	250	1000	250	1000	252	1008	250	1000
6. Management charges	2103	2103	2235	2235	2362	2362	2540	2540	2909	2909	2909	2909
7. Land Rent (For 13 months)	22750	22750	24917	24917	26000	26000	26000	26000	26000	26000	27083	27083
8. Land Tax	143	143	143	143	143	143	144	144	143	143	132	132
9. Land revenue												
Total Domestic Cost (II.1..II.8)	**45773**	**27071**	**50493**	**29445**	**52113**	**30805**	**57909**	**31534**	**54348**	**31873**	**60812**	**31731**
Gross cost	**79158**		**83311**		**84328**		**85899**		**80717**		**105787**	
Export parity (mill gate price) of sugarcane	**111.12**		**98.85**		**110.51**		**110.82**		**118.98**		**163.25**	
Transport charges from farm to mill gate (Rs./ 40Kg)	14		14.00		14		14.00		14.00		14.00	
Development charges (Rs./ 40 Kg)	1		1.00		1		1.00		1.00		1.00	
Price of sugarcane at farm level	**96**		**83.85**		**96**		**95.82**		**103.98**		**148.25**	

Source: Annex- IV

ANNEX- X

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)

Description	Revenue	Traded Inputs Cost	Domestic Factor Cost	Profit
	---------- Rupees per acre ----------			
2013-14				
Private Prices	96076	33384	45773	16918
Social Prices	54322	28677	27071	-1426
Transfers	41753	4707	18702	18344
2014-15				
Private Prices	105300	32818	50493	21989
Social Prices	49052	27936	29445	-8328
Transfers	56248	4883	21048	30317
2015-16				
Private Prices	101727	32215	52113	17399
Social Prices	53977	27280	30805	-4107
Transfers	47750	4936	21308	21506
2016-17				
Private Prices	108000	27990	57909	22101
Social Prices	57492	24249	31534	1709
Transfers	50508	3741	26375	20392
2017-18				
Private Prices	108000	26369	54348	27283
Social Prices	62388	25769	31873	4747
Transfers	45612	600	22476	22536
2018-19				
Private Prices	118710	44975	60812	12923
Social Prices	97771	43173	31731	22867
Transfers	20939	1802	29081	-9944

Source: Annex-IX

ANNEX-XI

ECONOMIC EFFICIENCY OF RESOURCE USE IN SUGARCANE IN SINDH (AVERAGE FARMERS)

Based on Import parity prices

Item	2013-14		2014-15		2015-16		2016-17		2017-18		2018-19	
	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices
A. GROSS INCOME												
1. Yield(40 kgs/acre)	676	676	676	675	676	676	676	676	676	676	700	700
2. Price(Rs/40 kgs)	172	139	182	113	172	123	182	146	181	145	182	183
NPC		1.2		1.5		1.4		1.2		1.2		1.0
3. Income from sugarcane	116272	93788	123032	76462	116272	83094	123032	98851	122356	98338	127400	127967
4. Value of tops	8788	8788	8788	8788	8788	8788	9800	9800	12000	12000	11900	11900
5. Gross Income	125060	102577	131820	85251	125060	91882	132832	108651	134356	110338	139300	139867
B. GROSS COSTS												
I. Traded Inputs												
i. Seed	10769	9046	10769	8938	10769	9046	10769	8938	11256	9342	16198	13444
ii. Fertilizer	13262	11140	13419	11138	14015	11773	10469	8689	10346	8587	15514	12877
iii. Plant protection	353	297	403	383	440	369	452	430	510	485	1716	1630
iv. Machinery:												
Tractor	10032	8427	11013	9141	11013	9251	8009	6647	10284	8536	10127	8405
Tubewell	1678	1410	1838	1525	1838	1544	1715	1423	858	712	2291	1902
v. Escalation in traded inputs' cost	5074	5074	3552	3552	2668	2668	2668	2668	2668	2668	0	0
Sub-total	41169	35394	40995	34678	40743	34651	34082	28796	35922	30330	45846	38258
II. Domestic Factors												
1. Hired Labour												
1.1 Pre -Harvest	9882	9882	11273	11273	11377	11377	11577	11577	12429	12429	11509	11509
1.2 Harvesting & threshing	8788	8788	8788	8788	8788	8788	9800	9800	12000	12000	11900	11900
2. Working Capital (Mark-up)	7568	6369	10023	6654	10190	6779	8898	6176	7412	6772	8776	8017
3. Farm yard manure	1325	1325	1400	1400	1500	1500	1500	1500	1500	1500	256	256
4. Transportation												
5. Canal water	182	727	182	727	182	727	182	727	182	727	250	1000
6. Management charges	2589	2589	2589	2589	2907	2907	2907	2907	2909	2909	2909	2909
7. Land Rent (For 16 month)	21333	21333	24000	24000	25333	25333	26667	26667	27083	27083	28167	28167
8. Land Tax	267	267	267	267	267	267	267	267	267	267	132	132
9. Drainage Cess	24		24		24		24					
Total Domestic Cost (II.1..II.8)	51959	51281	58546	35638	60568	57679	61822	59621	63783	63688	63899	63890
Gross cost	93128		99541		101311		95904		99522		109495	
Import parity price of sugarcane	152.99		127.36		137.92		161.23		160.47		197.81	186.12
transport charges from farm to mill gate	14		14		14		14.00		14.00		14.00	
road cess	0		0.25		1		1.00		1.00		1.00	
farm level price	139		113		123		146		145		183	

Source: Estimated from Annex-IV

ANNEX-XII

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)

Description	Revenues	Traded Cost	Domestic Factors' Cost	Profits
2013-14	----------	Rs per acre	----------	
Private Prices	125060	41169	51959	31932
Social Prices	102577	35394	51281	15902
Transfers	22484	5775	678	16031
2014-15				
Private Prices	131820	40995	58546	32280
Social Prices	85251	34678	35638	14935
Transfers	46570	6317	22908	17344
2015-16				
Private Prices	125060	40743	60568	23749
Social Prices	91882	34651	57679	-448
Transfers	33178	6092	2890	24197
2016-17				
Private Prices	132832	34082	61822	36928
Social Prices	108651	28796	59621	20234
Transfers	24181	5286	2201	16693
2017-18				
Private Prices	134356	35922	63783	34652
Social Prices	110338	30330	63688	16320
Transfers	24018	5592	95	18332
2018-19				
Private Prices	139300	45846	63899	29555
Social Prices	139867	38258	63890	37719
Transfers	-567	7588	9	-8164

Source: Annex- XI

ANNEX-XIII

ECONOMIC EFFICIENCY OF RESOURCE USE IN SUGARCANE IN SINDH (AVERAGE FARMERS)

Based on Export parity prices

Item	2013-14		2014-15		2015-16		2016-17		2017-18		2018-19	
	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices	Private Prices	Social Prices
A. GROSS INCOME												
1. Yield(40 kgs/acre)	676	676	676	676	676	676	676	676	676	676	700	700
2. Price(Rs/40 kgs)	172	101	182	78	172	88	182	110	181	109	182	86
NPC		1.7		2.3		2.0		1.7		1.7		2.1
3. Income from sugarcane	116272	67979	123032	52667	116272	59508	123032	74502	122356	73501	127400	60347
4. Value of tops	8788	8788	8788	8788	8788	8788	9800	9800	12000	12000	11900	11900
5. Gross Income	125060	76767	131820	61455	125060	68296	132832	84302	134356	85501	139300	72247
B. GROSS COSTS												
I. Traded Inputs												
i. Seed	10769	9046	10769	8938	10769	9046	10769	8938	11256	9342	16198	13444
ii. Fertilizer	13262	11140	13419	11138	14015	11773	10469	8689	10346	8587	15514	12877
iii. Plant protection	353	297	403	383	440	369	452	430	510	485	1716	1630
iv. Machinery:												
Tractor	10032	8427	11013	9141	11013	9251	8009	6647	10284	8536	10127	8405
Tubewell	1678	1410	1838	1525	1838	1544	1715	1423	858	712	2291	1902
v. Escalation in traded inputs' cost	5074	5074	3552	3552	2668	2668	2668	2668	2668	2668	0	0
Sub-total	41169	35394	40995	34678	40743	34651	34082	28795	35922	30330	45846	38258
II. Domestic Factors												
1. Hired Labour												
1.1 Pre -Harvest	9882	9882	11273	11273	11377	11377	11577	11577	12429	12429	11509	11509
1.2 Harvesting & threshing	8788	8788	8788	8788	8788	8788	9800	9800	12000	12000	11900	11900
2. Working Capital (Mark-up)	7568	6369	10023	6654	10190	6779	8898	6176	7412	6772	8776	8017
3. Farm yard manure	1325	1325	1400	1400	1500	1500	1500	1500	1500	1500	256	256
4. Transportation												
5. Canal water	182	727	182	727	182	727	182	727	182	727	250	1000
6. Management charges	2589	2589	2589	2589	2907	2907	2907	2907	2909	2909	2909	2909
7. Land Rent (For 16 month)	21333	21333	24000	24000	25333	25333	26667	26667	27083	27083	28167	28167
8. Land Tax	267	267	267	267	267	267	267	267	267	267	132	132
9. Drainage Cess	24		24		24		24					
Total Domestic Cost (II.1..II.8)	51959	51281	58546	35638	60568	57679	61822	59621	63783	63688	63899	63890
Gross cost	93128		99541		101311		95904		99522		109495	
Export parity price of sugarcane	114.81		92.16		103.03		125.21		123.73		101.21	186.12
transport charges from farm to mill gate	14		14		14		14.00		14.00		14.00	
road cess	0		0.25		1		1.00		1.00		1.00	
farm level price	101		78		88		110		109		86	

Source: Annex-V

ANNEX-XIV

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)

Description	Revenues	Traded Cost	Domestic Factors' Cost	Profits
	----------Rs per acre----------			
2013-14				
Private Prices	125060	41169	51959	31932
Social Prices	76767	35394	51281	-9908
Transfers	48293	5775	678	41840
2014-15				
Private Prices	131820	40995	58546	32280
Social Prices	61455	34678	35638	-8860
Transfers	70365	6317	22908	41140
2015-16				
Private Prices	125060	40743	60568	23749
Social Prices	68296	34651	57679	-24033
Transfers	56764	6092	2890	47782
2016-17				
Private Prices	132832	34082	61822	36928
Social Prices	84302	28796	59621	-4115
Transfers	48530	5286	2201	41043
2017-18				
Private Prices	134356	35922	63783	34652
Social Prices	85501	30330	63688	-8516
Transfers	48855	5592	95	43168
2018-19				
Private Prices	139300	45846	63899	29555
Social Prices	72247	38258	63890	-29901
Transfers	67053	7588	9	59456

Source- XIII

Notes for Economic Efficiency Analysis Tables for 2018-19 Sugarcane Pricing Policy

	Conceptual description		
	Private price is price of an input or output (crop) prevailing in the domestic open market		**Social price** is domestic price of an input or output (crop) estimated on the basis of import or export parity price
	Conceptual description at private price		**Conceptual description at social price**
1	**Gross income**	Price weighted production of sugarcane crop from an acre of land	Dometic price of an input or a crop estimated on the basis of its import or export parity price (as the case may be)
2	***Fertilizer expenditure***	Cost of fertilizer applied to one acre of the crop	Cost of fertilizer applied to one acre of the crop estimated at social price ***less GST paid on this purchase @17%***
3	***Plant protection expediture***	Cost of weedicides, granules and insecticides applied to the crop	Cost of weedicides, granules and insecticides applied to the crop ***less GST paid on these purchases @17%***
4	***Cost of tractor operations***	85% of the expenditure incurred in using tractor (for deep ploughing, planking, rotavator use, tractor/ laser levelling, ridge making, bund making and hoeing) 15% of tractor expenditure assumed salary of driver and included in pre-harvest labour	85% of the expendtiture incurred in using tractor (for deep ploughing, planking, rotavator use, tractor/ laser levelling, ridge making, bund making and hoeing) **less 17% GST levied on diesel**
5	***Cost of tube well water***	90% of the cost of tube water applied to the crop purchased at the market price. Remaining ***10% assumed salary of tube well operator which is included in the Pre-harvest labour charges***	Respective cost at private prices less 17% GST levied on diesel
6	***Traded inputs expenditure***	Cost of seed, fertilizers, pesticides, tube well water, tractor operations and escalation in this expenditure	Sum total of corresponding expenditures at social prices (as mentioned above)

	Conceptual definition		
	Conceptual description at private prices		**Conceptual description at social prices**
7	**Domestic factors' cost**	Domestic factors' cost comprises cost of labour involved in **pre and post harvest operations**. It needs to be mentioned here that Post harvest labour costs also include cost of harvesting. Then sub total of proxy mark-up on capital, cost of Farm Yard Manure, transportation cost, canal water charges (abiana), management charges, land rent and land tax is added to pre and post harvest labour charges. This all makes 'Domestic Factors' Cost'.	Total cost of 'domestic factors' estimated at social prices
8	***Labour involved in pre-harvest operations***		
9	*Cost of labour involved in tractor run operations*	15% of cost of tractor run operations i.e deep ploughing, rotavator use, ploughing & planking, tractor/ laser levelling, ridge making and interculture	Same as described in 'Privtae Prices' column
10	*Bund making (manual)*	Cost of labour used for making bunds on daily wage basis	Same as described in 'Privtae Prices' column
11	*Bund making with tractor*	15% of the cost of making bunds with tractor (salary of driver)	Same as described under Private Prices column
12	*Harvesting, stripping and making of sets for seed of sugarcane*	Cost paid to labour for harvesting, peeling (stripping) and making sets of cane to sow as seed	Same as decribed under private prices column
13	Cost of labour for shifting seed (sets) of sugarcane	Cost paid to labour for transporting/ shifting sugarcane sets to the field prepared for	Same as described under private prices column

		sowing sugarcane	
14	*Sowing of sugarcane sets*	Cost of labour employed on daily basis for sowing sugarcane.	Same as decribed under private prices column

	Conceptual definition		
	Conceptual description at private prices		**Conceptual description at social prices**
15	*Cost of contractual labour emploed for sowing sugarcane*	Cost of labour employed on contract for sowing sugarcane	Same as described under private prices colimn
16	*Salary of tube well operator*	10% of the cost of tube well water purchased and applied to sugarcane	Same as described under private prices column
17	*Cost of labour used for irrigation and water course cleaning*	Cost of labour employed to irrigate sugarcane and clean water channels within the field	Same as described under private prices column
18	*Manual hoeing*	Wages paid to labour for hoeing	Same as under private prices column
19	*Labor cost of post harvest operations (harvesting, striping, binding and loading)*	Respective cost of labour paid at the prevailing wage rate	Same as described under private prices column
20	*Working capital*	Amount of interest @ 14.5% for 13 months (crop duration)	Same as described under private prices column
21	*Cost of Farm Yard Manure*	50% of the cost of farm yard manure **Assumption:** Existing crop consumes 50% of the cost of farm yard manure applied to the crop	Same as described under private prices column
22	*Canal water charges*	Rs 252/acre/annum (Abiana fixed by the Government)	Ra 1000 (4 times of Abiana) becasue canal water is subsidised in Pakistan
22	*Management charges*	Equivalent to the pay of Field Assistant	Same as decribed under the Private Prices column
23	*Land rent*	Land rent for 13 months @ Rs. 24000/acre/annum **Assumption:** sugarcane occupies land for 13 months	Same as described in Private prices column
24	*Land tax*	Land tax @ Rs 143/annum/acre of sugarcane	Same as described in Private prices column

ANNEX - XV

PER CAPITA AVAILABILITY (CONSUMPTION OF SUGAR: 2015-16 TO 2017-18
(October - September)

S. No	Items	2015-16	2016-17	2017-18
		---------Thousands tonnes----------		
1	Opoening stocks as on Ist October	319	1866	1580
2	Production	5115	7005	6621
3	Imports	11	9	8
4	Export	398	306	1572
5	Closing stocks as on 30th September	1886	1886	1495
6	Net availability (item 1+2+3-4-5)	3161	6688	5142
		----------Million----------		
7	Population (a)	202.10	205.90	215.08
		----------Kgs per annum----------		
8	Per capita availability (consumption)	15.64	32.48	23.91
9	Average per capita availability Average (2015-16 to 2017-18)		24.01	

Note: a). It includes the population of Pakistan, AJ&K, NAs 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 popolation of Pakistan: Economic Survey, 2018-19.

ANNEX- XVI

DOMESTIC AVERAGE WHOLESALE PRICES OF SUGAR IN MAJOR DOMESTIC MARKETS: 2018 AND 2019

Month	Lahore	Fasilabad	Karachi	Hyderabad	Peshawar	Average
2018	---------- Rupees per 100 kgs----------					
January	5000	5027	4950	4900	3700	**4715**
February	5000	4813	4750	4700	4850	**4823**
March	4804	4631	4600	4600	5000	**4727**
April	4750	4919	4850	4800	5200	**4904**
May	4750	4993	5100	5000	5200	**5009**
June	4750	5006	5000	4950	5000	**4941**
July	4750	5145	5200	5100	4160	**4871**
August	4750	5312	5300	5150	4400	**4982**
September	4750	5270	5100	5050	5100	**5054**
October	4750	5154	5100	5050	5200	**5051**
November	4750	5250	5125	5140	5320	**5117**
December	4750	5336	5150	5160	5560	**5191**
Average						
2019						
January	4750	5429	5600	5500	5700	**5396**
February	4750	5459	5500	5400	5640	**5350**
March	4750	5558	5600	5460	6120	**5498**
April	5750	5985	6300	6140	6500	**6135**
May	5934	6410	6400	6300	6600	**6329**
June	6975	6538	6600	6480	6700	**6659**
July	7200	6489	6800	6650	7100	**6848**
August	7242	7107	7100	6900	6960	**7062**
Average	**5919**	**6122**	**6238**	**6104**	**6415**	**6159**

Sources:
1. Agruculture Marketing Information Services, Punjab, Lahore.
2. Bureau of Supply and Prices, Sindh, Karachi.
3. Agriculture Marketing Services, Peshawar, KPK.

ANNEX - XVII

AVERAGE WHOLESALE PRICES OF SUGAR IN MAJOR DOMESTIC MARKETS: 2007-08 TO 2018-19 (October- September)

Year	Lahore	Fasilabad	Karachi	Hyderabad	Peshawar	Average	Increase(+) decrease(-) in average price over
	Rupees per 100 kgs						Percent
2007-08	2444	2410	2390	2346	2473	2413	-
2008-09	4049	3997	3998	3938	4090	4014	66.39
2009-10	6203	6161	6138	6084	6276	6173	53.76
2010-11	6848	6706	6687	6895	6993	6826	10.58
2011-12	5326	5256	5055	5374	5350	5272	-22.75
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	5619	10.75
2015-16	6198	6098	5975	5933	6750	6135	9.19
2016-17	6032	5889	6044	6006	6419	6118	-0.28
2017-18	4977	5008	5008	4931	4874	4960	-18.94
2018-19 (Oct-Aug)	5600	5883	5934	5835	6127	5876	18.47

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

ANNEX-XVIII

AVERAGE INTERNATIONAL PRICES OF SUGAR: 2008-09 to 2019-20 (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		
Oct - Sep	US Cents/ lb	US$/ tonne	US Cents/ lb	US$/ tonne	US Cents/ lb	US$/ tonne	Per cent of White Sugar
2008-09	15.42	340.02	18.94	417.56	3.52	77.54	18.57
2009-10	20.41	450.03	26.07	574.68	4.86	107.23	17.66
2010-11	26.56	585.45	32.29	711.93	5.74	126.49	17.77
2011-12	22.68	499.96	27.54	607.20	4.86	107.23	17.66
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	15.64	349.12	2.88	63.50	18.19
2018-19	**12.81**	**282.32**	**15.40**	**339.52**	**2.60**	**57.20**	**16.85**
Oct	13.28	292.77	16.41	361.85	3.13	69.08	19.07
Nov	12.90	284.39	15.67	345.43	2.96	65.19	18.97
Dec	12.63	278.44	15.59	343.63	2.96	65.19	18.97
Jan	12.82	282.63	15.82	348.70	3.00	66.07	18.95
Feb	12.98	286.16	15.87	349.93	2.89	63.77	18.22
Mar	12.71	280.20	15.48	341.27	2.77	61.07	17.89
Apr	12.82	282.63	15.26	336.46	2.44	53.83	16.00
Jun	12.52	276.01	14.89	328.26	2.37	52.25	15.92
Jul	12.91	284.61	14.62	322.22	1.71	37.61	11.67
Aug	12.49	275.35	14.40	317.48	1.91	42.13	13.27

Source: International Sugar Organization (ISO), London.

ANNEX-XIX

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

PRICE OF WHITE SUGAR

S.No	Item	August 2019		2018- 19 (Oct-Aug)		During 2016-17 to 2018-19	
		US $ per tonne					
1.	Average fob (London) price	317.48		339.52		384.27	
2.	Freight charges upto Karachi	60		60		60	
3.	C & f cost at Karachi port	377		400		444	
4.	Exchange rate (Rs/$)	156.20		156.20		156.20	
		Rs per tonne					
5.	C & f cost at Karachi port (Pak rupees)	58962		62405		69395	
6.	Marine insurance @ 0.23 % of c & f cost	136		144		160	
7.	**Cif cost at Karachi port**	**59098**		**62549**		**69555**	
8	Landing charges @1% of Cif Value	591		625		696	
9	L.C opening charges @0.04% of C&f Value	24		25		28	
10	Bank services charges @0.1% of C&F value	59		62		69	
11	Provision of shortage & unforeseen losses @0.25% of C&F	147		156		173	
12	Stevedoring charges	725		725		725	
13	Clearing & forwarded charges	8		8		8	
14	Misc: Exp 0.05% of of C&F value	29		31		35	
15	Wharfage & Weightment	54		54		54	
16	Importer's profit 2% of C&F value	1179		1248		1388	
17	Transport charges for up country	2200		2200		2200	
18	**Incidetal charges incured on imported sugar**	**5017**		**5135**		**5376**	
19	Ex-mill/ market cost of imported sugar	64115		67684		74930	
		Punjab	**Sindh**	**Punjab**	**Sindh**	**Punjab**	**Sindh**
20	Processing cost of sugar (a)	21799	21799	23012	23012	25476	25476
21	Value of cane to produce one tonne of sugar (item 19-Item 20)	42316	42316	44671	44671	49454	49454
22	Provincial base sugar recovery **(Percent)**	10.31	10.82	10.31	10.82	10.31	10.82
23	Qunatity of cane in tonnes required to produce on tonne of sugar ((100/ item 22)	9.70	9.24	9.70	9.24	9.70	9.24
24	Price of one tonne of sugarcane (item 21/item 23)	4362.75	4578.56	4605.61	4833.43	5098.71	5350.93
25	**Price of 40 kgs of cane**	**174.51**	**183.14**	**184.22**	**193.34**	**203.95**	**214.04**

Note:

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

Sources:

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

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

ANNEX-XX

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

S.No	Item	During					
		August 2019		2018-19 (Oct-Aug)		2016-17 to 2018-19	
		US $ per tonne					
1.	Average fob (London) price	317.48		339.52		384.27	
2.	Exchange rate (Rs/$)	156.20		156.20		156.20	
		Rs. per tonne					
3.	Average fob Karachi price (assuming equivalent to fob London price)	49590		53033		60023	
4.	Transport charges from interior Sindh to port, special packing, inspection transit insurance, loading and unloading, clearing and forwarding and port terminal charges	18000		18000		18000	
5	Bank commission @ 1.25 % of fob price	620		663		750	
6.	Inspection charges	429		429		429	
7.	Ex-mill price of sugar (item 3 minus items 4 through 6)	30541		33941		40844	
		Punjab	Sindh	Punjab	Sindh	Punjab	Sindh
8	Processing cost of sugar (a)	10384	10384	11540	11540	13887	13887
9	Value of cane to produce one tonne of sugar (item 7-item 8)	20157	20157	22401	22401	26957	26957
10	Provincial base sugar recovery (Percent)	10.31	10.82	10.31	10.82	10.31	10.82
11	Quntity of cane in tonnes required to produce one tonne of sugar ((100/ item 10)	9.70	9.24	9.70	9.24	9.70	9.24
12	Price of one tonne of sugarcane (item 9/ item 11)	2078	2181	2310	2424	2779	2917
13	Price of 40 kgs of cane	83.13	87.24	92.38	96.95	111.17	116.67

Note:

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

Notes:

i) For average fob (London) price: International sugar Organisation.
ii) For incidentals and duties: Trading Corporation of Pakistan, Karachi.
ii) For transport charges: Arian Cargo Transport Agensy, Karachi.

ANNEX-XXI

MILL-GATE PRICES OF SUGARCANE WORKED BACK FROM THE EXPECTED WHOLESALE MARKET PRICES OF SUGAR DURING 2018-19

S.No	Item	WORKED BACK PRICES OF SUGARCANE									
		Rupees per tonne									
1.	Average wholesale market prices of sugar (a)	60000		65000		70000		75000		80000	
2.	Wholesale dealer margin @5% on net price	2655		2876		3097		3319		3540	
3.	Sales Tax @ 17%	9027		9779		10531		11283		12035	
4.	Net price of sugar (Items 1-2-3)	53097		57522		61947		66372		70796	
		Punjab	Sindh	Punjab	Sindh	Punjab	Sindh	Punjab	Sindh	Punjab	Sindh
5	Processing cost of sugar	18053	18053	19558	19558	21062	21062	22566	22566	24071	24071
6	Value of cane to produce one tonne of sugar (item 4-item 5)	35044	35044	37965	37965	40885	40885	43805	43805	46726	46726
7	Provincial base sugar recovery (%)	10.31	10.82	10.31	10.82	10.31	10.82	10.31	10.82	10.31	10.82
8	Qunatity of cane in tonnes required to produce one tonne of sugar ((100/ Item 7)	9.70	9.24	9.70	9.24	9.70	9.24	9.70	9.24	9.70	9.24
9	Price of one tonne of sugarcane (item 6/Item 8)	3613	3792	3914	4108	4215	4424	4516	4740	4817	5056
10	Price of 40 kgs of cane	144.52	151.67	156.57	164.31	168.61	176.95	180.65	189.59	192.70	202.23

Note

(a) Ratio of cost of cane to processing cost has been estimated at 66:34 from publication " Cost of Production of Sugar " jointly prepared in 1996 by APCom and Business & Consultancy Services, Islamabad

Source:

For FED: FBR, Islamabad.