

API SERIES NO. 257



SUGARCANE POLICY ANALYSIS FOR 2016-17 CROP



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

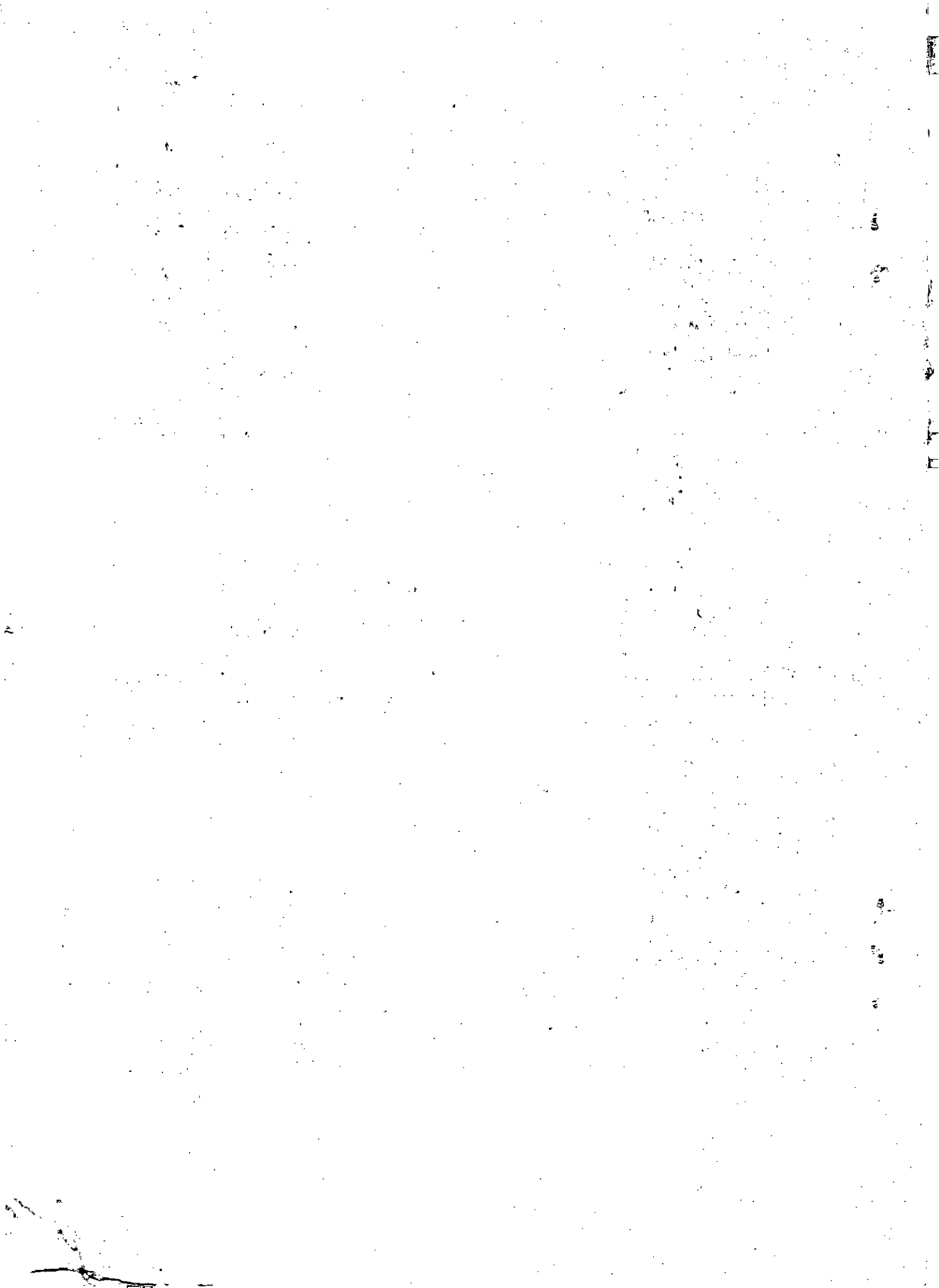
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SUMMARY FOR THE PROVINCES – SUGARCANE PRICE POLICY OPTIONS FOR 2016-17 CROP

The Agriculture Policy Institute (API) is responsible for recommending indicative price of sugarcane every year for Punjab, Sindh and Khyber Pukhtunkhawa provinces. These provinces hold meetings of their respective sugarcane Control Board annually to discuss and approve API recommended indicative price of sugarcane with provincial stakeholders. The Provincial Sugarcane Commissioners are responsible to implement the announced price of sugarcane in their respective provinces.

- Likely Price Policy Options

2. API conducted rigorous analysis for determining Indicative Price for Sugarcane 2016-17 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	160.16	152.33
2. Indicative price for 2016-17 crop assuming average wholesale prices of sugar:		
a) Rs 60,000 per ton	143.18	133.50
b) Rs 65,000 per ton	155.12	144.63
c) Rs 70,000 per ton	167.05	155.75
3. Price received by cane growers for 2015-16 crop	180	172
4. Import Parity based on average fob London price of white sugar at US \$ 469.35/ton (May 2016)	162.84	151.82
5. Export Parity based on: average fob London price of white sugar at US \$ 469.35/ton (May 2016).	124.71	116.28

- Price Recommendations

3. In 2015-16 growers of sugarcane got indicative price announced by the Provincial Governments. However, there was price dispute between farmers and sugar mills consequently area of sugarcane reduced especially in Sindh province but there was no impact of this area reduction on production. It is evident from the statistics that area and production targets fixed by the Federal Committee on Agriculture could not meet. Demand of sugarcane by the mills is increasing due to installation of new mills, this led the Government of Punjab to fix indicative

price at Rs 180 per 40 kgs for 2015-16 crop. Response from sugarcane growers was very positive and production of sugarcane increased in the province.

4. In Sindh situation was almost same as that of Punjab, production increased despite reduction in area, this was due to increasing demand of sugarcane from newly established sugar mills in the Upper Sindh. Government of Sindh initially announced sugarcane price at Rs 182/40 kgs but later it was not implemented at announced price of Rs 172/40 kgs which disappointed the growers.

5. Sugar mills were unable to export surplus stock of sugar due to continuously declining international price of sugar and faced very serious liquidity crunch to clear farmer's dues. The sugar mills demanded to reduce the indicative price to make Pakistani sugar competitive in the international market and enable sugar mills to make payments to growers in time.

6. Keeping in view the prevailing scenario and the analysis of different economic parameters such as cost of production, export parity prices of sugar, prices of sugarcane realized by the growers during 2015-16 and domestic and international market prices of sugar are not suggestive of increasing prices of sugarcane in Punjab and KPK, however, for Sindh it is strongly recommended that Indicative Price of Sugarcane for 2016-17 crop should be fixed at Rs 182 per 40 kgs.

- **Non-Price Recommendations**

7. The issues relating to sugarcane production, domestic marketing problems and low international sugar price viz-a-viz export have been discussed in detail in the API meeting where the participants unanimously suggested that Ministry of Industries must allow more export of sugar and Ministry of Commerce should do extraordinary efforts to promote sugar export. They must help the sugar exporters in exploring new markets for export of sugar.

1. INTRODUCTION

Sugarcane is an important cash crop of Pakistan. It is mainly grown for sugar production. It is an important source of income and employment for the farming community of the country. It also forms essential items for industries like sugar, chip board, paper, barrages, confectionery, uses in chemicals, plastics, paints, synthetics, fiber, insecticides and detergents. Sugarcane production in the country has increased tremendously over the past decades. Despite expansion in production over the years, increase in the productivity per unit of area has been very low in Pakistan. The average sugarcane yield in the country is around 55 tons per hectare which is quite low compared with other sugarcane producing countries. The average yield of sugarcane in the world is around 60 metric *tons/ha*. Egypt with highest cane yield in the world is getting about 142 per cent high yield than Pakistan. In order to increase the production of sugarcane several steps were taken by the Government and the sugar mill association to help farmers. Efforts have been made to improve its productivity by improving seed production, quality control and by distribution of quality seed.

2. Pakistan occupies an important position in cane producing countries of the world. It ranks at fifth position in cane acreage and production and almost 15th position in sugar production. Most of the farmers cultivate this crop as major source of income. Its demand has been increased due to installation of new sugar mills. However, its production is still short of requirement. Although production during 2015-16 has increased as compared with previous year's level, but area declined in Punjab and Sindh. Farmers particularly in lower Sindh were deprived because of dispute over price of sugarcane between mills and farmers. Initially Government of Sindh announced price of sugarcane at Rs142/40 kgs but later it was revised and fixed at Rs 172/40 kgs which was not accepted by the farmers. In the Upper Sindh, farmers sold their cane to sugar mills adjacent to Punjab where they received Rs180/40 kgs. Farmers from Sindh reported that price issue is still pending to be resolved in Sindh. Government of Punjab and KPK announced indicative price at Rs 180/40 kgs which was received by the majority of farmers.

3. Rising trend in sugarcane cost of production has so far been paced down due to measures taken by the federal and provincial governments like kissan package and subsidy on fertilizers.

Government of Punjab watched the situation and accepted the recommendations of the Agriculture Policy Institute and announced price of sugarcane at Rs. 180/40 kgs. In few areas of Sindh, farmers got more than Rs. 172/40 kgs.

4. The Agriculture Policy Institute conducted a mini field survey in the main sugarcane producing districts of Sindh. The team reported that farmers were not satisfied on the price announced by the Government of Sindh and demanded a reasonable increase in the indicative price of sugarcane. Government of Sindh has also desired that the Agriculture Policy Institute must help the sugarcane stakeholders to get out of the price dilemma.

5. Another issue which is cause of serious concern especially to sugar mills and provincial governments is long standing payment of quality premium to farmers which is pending since 1998. This issue is now taken up by the Supreme Court of Pakistan and the matter is sub-judice in the Apex Court. A stakeholders meeting was held under the Chairmanship of Secretary in the Ministry of National Food Security and Research in which all stakeholders participated and reviewed was done on the formula for the payment of Quality Premium to growers. It was unanimously decided that the issue is more related with the provincial governments. In this regard, it was informed by the representative of Sindh Government that a seminar will be held in Karachi to reach an agreement between all stakeholders.

6. Keeping in view the whole scenario and after analyzing different policy options, Agriculture Policy Institute prepared this price policy analysis report for 2016-17 sugarcane crop and presented its recommendations to the Provincial Governments. The analysis is given in the following sections of the report.

2. SUGARCANE PLANTING AND HARVESTING SEASONS

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

Table-1: Planting and Harvesting Months/Season of Sugarcane by Province

Province	Planting month/season	
	Spring Crop	Autumn Crop
Punjab	15th February to 3rd week of March	September
Sindh	1st February to 15th March	September to 15 th October
KPK	15th February to 3rd week of March	September
Harvesting Time		
Punjab, Sindh, KPK	15 th October to 1 st March	

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

3. PROVINCIAL SHARES

8. The provincial Shares in area and production of sugarcane during the periods 2010-11 to 2012-13 and 2013-14 to 2015-16 and in changes therein are presented in Table-2 below:

Table-2 : Comparison of Provincial Shares in Area and Production of Sugarcane: 2010-11 to 2012-13 and 2013-14 to 2015-16

Country/ Province	Area			Production		
	2010-11 to 2012-13	2013-14 to 2015-16	Change	2010-11 to 2012-13	2013-14 to 2015-16	Change
----- Per cent -----						
Pakistan	100.00	100.0	-	100.0	100.0	-
Punjab	68.11	63.04	-7.4	65.40	64.62	-1.2
Sindh	22.24	26.95	21.2	26.06	27.14	4.1
KPK	9.60	9.96	3.7	8.50	8.18	-3.7
Balochistan	0.05	0.06	29.3	0.04	0.05	17.2

Source: Worked out from Annex-I.

9. It is clear from Table-2 above that Punjab, Sindh and KPK shared respectively 68.1, 22.2 and 9.6 percent in area and 64.6, 27.1 and 8.2 percent in production. Over the years, the share of Punjab has gone down by 7.4 percent in area and 1.2 percent in production. In case of Sindh, area has gone up by 21.2 percent and production by 4.1 percent. In KPK, production has gone down by 3.7 percent although area went up by 3.7 percent. Provincial shares are also depicted in Figures 1 to 4.

FIG-1: SHARES IN AREA

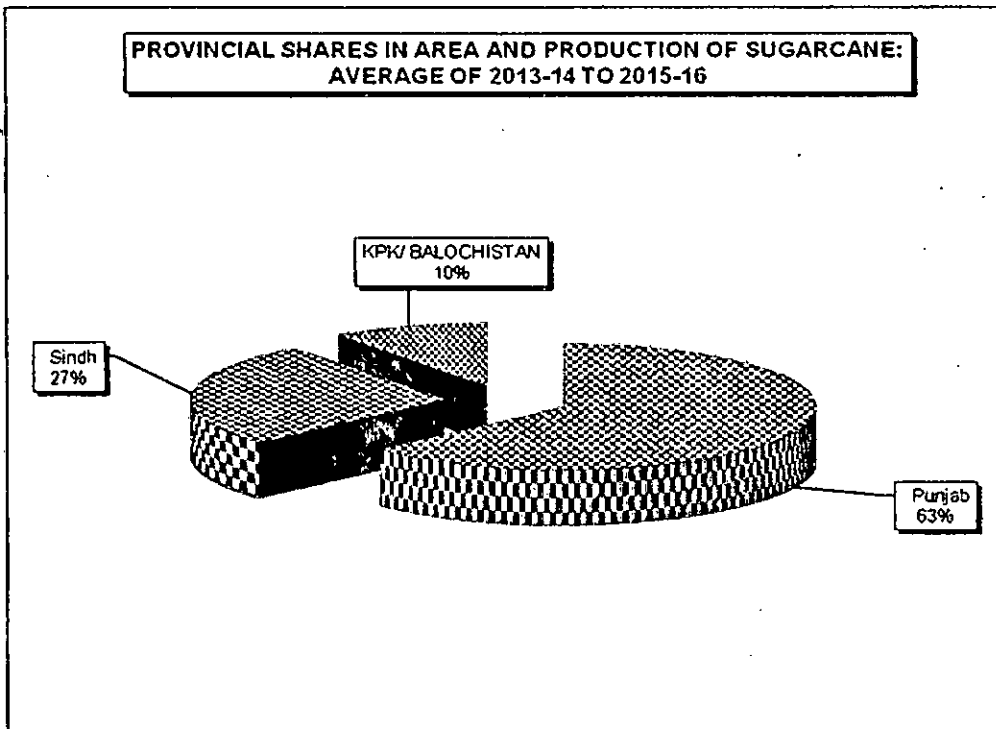
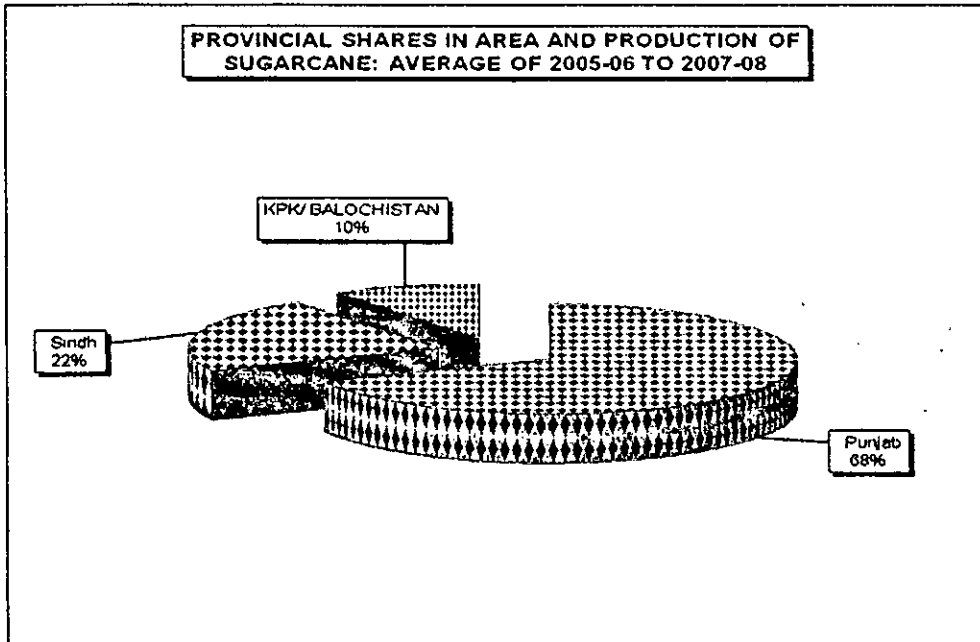
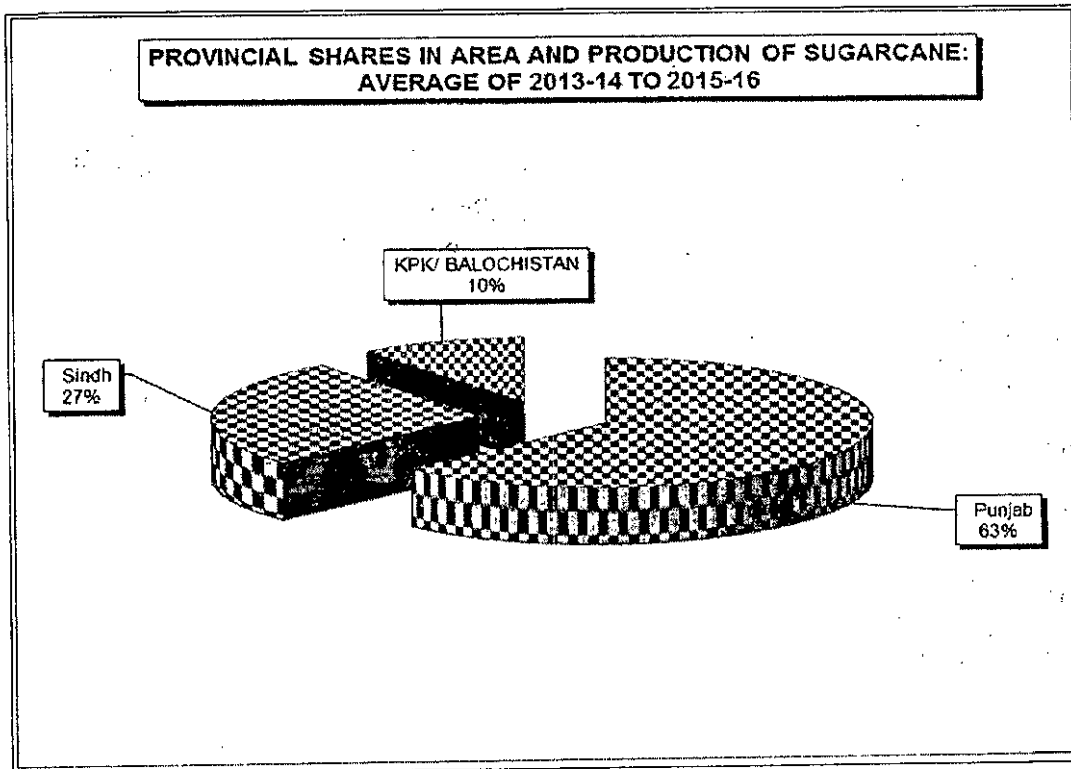
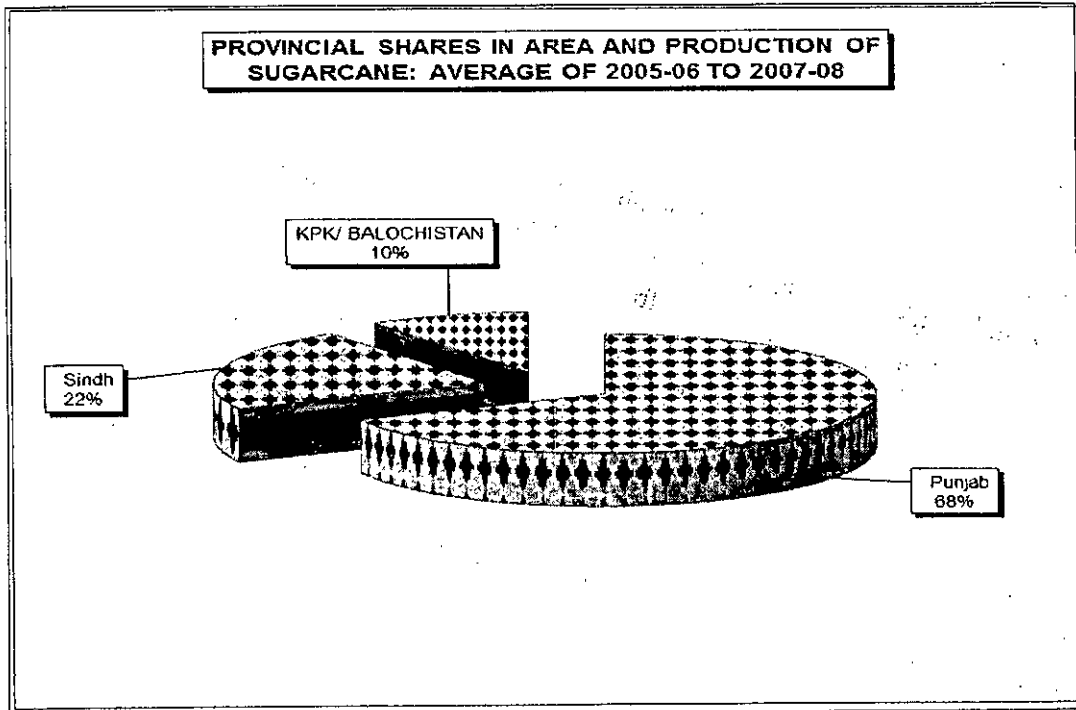


FIG-2: SHARES IN PRODUCTION



4. IMPORTANT SUGARCANE PRODUCING DISTRICTS

10. Sugarcane is a high delta crop. It is mainly grown in irrigated conditions. Districts which grow 100 thousand tonnes or more of sugarcane in Pakistan are R.Y.Khan, Faisalabad, Sargodha, Jhang, Muzaffargarh, T.T.Singh, Chiniot, Rajanpur, Kasur, Bahawalpur, Bhakkar, M.B.Din, Vehari, Bahawalnagar, Nankana Sahib, Layyah, Okara, Khanewal, D.G.Khan, Khushab, Sahiwal, Hafizabad, Multan, Pakattan, Mianwali, Sheikhpura, and Lodhran, in the Punjab; Badin, Ghotki, Thatta, Nawabshah, Tando Muhammad Khan, Mirpur Khas, N.Feroze, Tando Allah Yar, Khairpur, Sanghar, Matiari, Hyderabad, Sukkur, Dadu, and Umer Kot in Sindh; Charsadda, Mardan, D.I.Khan, Peshawar, Nowshera, Malakandand Swabi in KPK. These 49 districts; 27 from the Punjab, 15 from Sindh and 7 from KPK collectively account for 99 per cent of the sugarcane area and production (Annex-III).

11. However, 25 districts, namely R.Y.Khan, Faisalabad, Sargodha, Jhang, Muzaffargarh, T.T.Singh, Chiniot, Rajanpur, Kasur, Bahawalpur, Bhakkar, M.B.Din, Vehari, Badin, Ghotki, Thatta, Nawabshah, Tando Muhammad Khan, Mirpur Khas, N.Feroze, Tando Allah Yar, Khairpur, Charsadda, Mardan, and D.I.Khan, collectively produce 81 per cent of the total sugarcane produced in the country.

5. CHANGES IN AREA, YIELD AND PRODUCTION

12. During the decade ending 2015-16, area under sugarcane at country level ranged between 907.5 and 1241.3 thousand hectares. While production remained between 44.666 and 67.460 million tonnes and yield oscillated between 48.62 and 57.54 tons per hectare (Annex-I). Long-term and short-term changes in area, yield and production of sugarcane are discussed below.

5.1 Long-term Changes 2005-06 to 2015-16

13. During the period under discussion, sugarcane production at the country level increased @ 3.0 per cent per annum mainly due to improvement in yield @ 1.5 per cent and area @ 1.5 per

cent per annum (Table-3).

14. Sugarcane production in the Punjab during the reference period increased @ 3.0 percent per annum, as a result of 2.3 per cent improvement in yield and 0.7 per cent expansion in area. While Sugarcane production in Sindh increased @ 3.3 per cent mainly due to 3.5 per cent expansion in area because yield has slightly decreased in this province.

Table-3: Average Annual Growth Rates of Area, Yield and Production of Sugarcane: 2005-06 to 2015-16

Country/Province	Area	Yield	Production
	----- Per cent per annum -----		
Pakistan	1.5	1.5	3.0
Punjab	0.7	2.3	3.0
Sindh	3.5	-0.3	3.3
KPK	1.5	0.3	1.8
Balochistan	3.6	0.7	4.3

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

15. In KPK, sugarcane production increased @ 1.8 per cent per annum while both area and yield increased during the reference period by 1.5% and 0.3 percent, respectively.

5.2 Short-term Changes: 2014-15 and 2015-16 Crops

16. According to the estimates of Provincial Crop Reporting Departments, sugarcane production at the country level of 2015-16 crop is reported at 64.828 million tons which is an increase of 3.2 percent over the last year production of 62.826 million tons. Increase in production is mainly due to increase of 4.4 per cent in yield while area contracted by 1.1 percent (Table-4).

Table-4: Area, Yield and Production of Sugarcane: 2004-15 and 2015-16 Crops

Country/ Province	Area		Change	Yield		Change	Production		Change
	2014-15	2015-16		2014-15	2015-16		2014-15	2015-16	
	000 hectares		Per cent	Tonnes per hectare		Per cent	Million tonnes		Per cent
Pakistan	1140.5	1127.5	(-) 1.1	55.1	57.5	4.4	62826.1	64828.1	3.2
Punjab	710.6	701.3	(-) 1.3	57.8	58.9	1.9	41074.0	41314.0	0.6
Sindh	316.7	312.8	(-) 1.2	52.5	57.5	9.6	16613.8	17984.3	8.2
NWFP	112.5	112.7	(-) 0.2	45.4	48.8	7.5	5107.0	5498.2	7.7
Balochistan	0.66	0.70	(+) 6.1	47.4	45.1	-4.8	31.3	31.6	1.0

Source: Annex-I.

17. Sugarcane production for 2015-16 in Punjab is reported at 41.314 million tons which shows a slight increase of 0.6 percent over the last year. The increase is mainly due to 1.9 percent increase in yield, because area shows a decrease of 1.3 per cent over 2014-15.

18. In Sindh, sugarcane production during 2015-16 increased by 8.2 per cent over the last year, from 16.613 to 17.984 million tons. The increase is attributed to 9.6 per cent improvement in yield.

19. In the KPK and Baluchistan production has also increased by 7.7 and 1.0 per cent respectively. In KPK this increase is due to 7.5% improvement in yield and in Baluchistan this happened due to 6.1 % increase in area.

20. Reasons for shifting of sugarcane crop area to other competitive crops as reported by the API teams are sugarcane disposal problems and payment difficulties restricted the acreage of sugarcane late start of Sugar Mills and dispute over the price of sugarcane.

21. Provincial Agricultural Departments have provided following reasons for changes in area, yield and production.

Punjab

- Area

- i) Sugarcane disposal problems and payment difficulties restricted the average of sugarcane.

ii) Shifting of sugarcane crop area to other competitive crops.

- Production

The production thus shows an increase of 0.6% over the previous year which is due to favorable weather conditions

Sindh

- Area

Due to late start of Sugar Mills and dispute over the price of sugarcane area has decreased.

- Production

Production increased due to more irrigation water at the sowing time due to more rains.

6. TARGETS VS ACHIEVEMENTS: 2015-16 CROP

22. The Federal Committee for Agriculture (FCA) had fixed sugarcane production targets for 2015-16 crop at 70.035 million tonnes. As per final estimates of the Provincial Agriculture Departments sugarcane production is reported at 64.828 million tonnes (7.4 percent less than the target) due to less achievement of area and yield by 1.2% and 6.4% respectively (Table-5).

23. In the provinces of the Punjab, Sindh, KPK and Baluchistan sugarcane production lagged behind the targets by 8.2, 5.3, 8.4 and 9.7 per cent respectively.

Table-5: Targets and Estimated Achievements of Area, Yield and Production of Sugarcane: 2015-16 Crop

Country/ Province	Area		Deviation from target	Yield		Deviation from target	Production		Deviation from target
	Target	Achievement		Target	Achievement		Target	Achievement	
	000 hectares		Per cent	Tonnes per hectare		Per cent	Million tonnes		Per cent
Pakistan	1140.7	1127.5	-1.2	61.4	57.5	-6.4	70035.0	64828.1	-7.4
Punjab	690.0	701.3	1.6	65.2	58.9	-9.7	45000.0	41314.0	-8.2
Sindh	320.0	312.8	-2.3	59.4	57.5	-3.2	19000.0	17984.3	-5.3
NWFP	130.0	112.7	-13.3	46.2	48.8	5.7	6000.0	5498.2	-8.4
Balochistan	0.7	0.7	0.0	50.0	45.1	-9.7	35.0	31.6	-9.7

Source:

1. For targets: Targets were fixed by the FCA, Islamabad on the basis of estimates of respective Provincial Agriculture Departments.
2. For achievements: Annex-I.

7. SUGARCANE YEILD AMONG COMPETING COUNTITRES

24. Globally sugarcane crop occupied an area of around 27,182 thousand hectares with a total production of 1,899,992 thousand tons during 2014. Top 10 sugarcane producing countries contributed 81.1 percent of total area and 82.5 per cent of total production as given in Table-6 and 7.

25. In terms of sugarcane area, Brazil is on top with 10,438 thousand hectares followed by India with 5,012 thousand hectares and China with 1,738 thousand hectares, Pakistan stands at 5th position in this regard with 1,173 thousand hectares. Pakistan shares 4.32 percent of world area under sugarcane.

Table-6: MAJOR SUGARCANE PRODUCING COUNTRIES' SHARE IN THE WORLD AREA: 2014 CROP

S.No.	Country	Area (000 hect.)	Percent share in world area
1.	Brazil	10438	38.40
2.	India	5012	18.44
3.	China mainland	1738	6.42
4.	Thailand	1353	4.98
5.	Pakistan	1173	4.32
6.	Mexico	762	2.80
7.	Indonesia	473	1.74
8.	Philippine	432	1.59
9.	Cuba	405	1.49
10.	Argentina	387	1.42
	Total 10 countries	22173	81.15
	World Total	27182	100.00

Source: <http://faostat3.fao.org/download/Q/QC/E>

26. In terms of sugarcane production, Brazil is again on the top with 737,156 thousand tons followed by India with 352,142 thousand tons and China with 125,611 thousand tons. In production, Pakistan again retains 5th position in sugarcane production of the world (Table-7).

Table-7: MAJOR SUGARCANE PRODUCING COUNTRIES' PRODUCTION AS % OF THE WORLD PRODUCTION 2014 CROP

S.No.	Country	Area (000 hect.)	Percent share in world area
1.	Brazil	737156	38.80
2.	India	352142	18.53
3.	China	125611	6.61
4.	Thailand	103697	5.46
5.	Pakistan	67460	3.55
6.	Mexico	56673	2.98
7.	Colombia	38157	2.01
8.	Indonesia	28600	1.51
9.	Philippine	32464	1.71
10.	Australia	30518	1.61
	Total 10 countries	1542478	81.18
	World Total	1899992	100.0

Source: <http://faostat3.fao.org/download/Q/QC/E>

27. In terms of yield per hectare, Peru lies at the top with 126.1 tons per hectare followed by Ethiopia with 119.3 and Senegal with 114.7 tons per hectare while India falls at 37th positions with 70.3 tons per hectare, However, the world average yield of sugarcane is approximately 58 tons per hectare (Table-8)

Table-8: MAJOR SUGARCANE PRODUCING COUNTRIES' YIELD OF THE WORLD: 2014 CROP

S.No.	Country	Yield (tones/ha.)
1.	Peru	126.05
2.	Ethiopia	119.26
3.	Senegal	114.73
4.	Egypt	113.56
5.	Malawi	107.96
6.	Guatemala	103.68
7.	Zambia	103.46
8.	Burkina Faso	103.04
9.	Nicaragua	98.76
10.	Chad	98.52
	World Average	69.90

8. SUGARCANE CRUSHED AND SUGAR MADE IN PAKISTAN

28. As evident from Table 9, the overall sugarcane produced and crushed, sugar production and recovery have increased remarkably during last 5 years. However, last year due to price and marketing problems, production of sugarcane declined by 6.7%. This has affected crushing of sugarcane at national level during 2014-15. Sugarcane crushing was 50.79 million tons, less by 10.40 per cent compared with 56.46 million tons of previous year. Sugar production also declined by 8.22% from 5.59 million tons during 2014-15. Recovery increased to 10.12 per cent in the same year from 9.90% in 2013-14. Despite better sugar recovery, sugar production has reduced as compared to previous year due to short and irregular supply of cane and differences between millers and farmers.

Table-9: Sugarcane and Sugar Produced and Cane Utilization in Pakistan

Year	Cane Produced	Cane crushed	Cane Utilized by Mills	Sugar Made	Percent Recovery	No. of Mills
	---- Million tons ----		%	Million tones	%	
2010-11	55.44	44.53	80.47	4.17	9.37	84
2011-12	58.04	48.25	83.13	4.67	9.64	86
2012-13	63.72	50.09	79.00	5.03	10.64	86
2013-14	67.43	56.46	84.00	5.59	9.90	88
2014-15	63.20	50.79	80.40	5.13	10.12	89

Source: Pakistan Sugar Mills Associations.

9. COST OF PRODUCTON

29. In outlining price proposals for farm produces, the cost of production (COP) is one of the significant considerations. However its empirical estimation involves various problems and practical hindrance on account of wide variation in agro-climatic conditions and farming systems under which the crop is grown. In case of sugarcane, the dilemma is further intricate as fresh and ratoon crops i.e. spring and autumn are raised with different duration and farming practices following varying use of inputs and yield level.

9.1 Cost of Production of Sugarcane by Province

30. The cost of production of sugarcane for the 2016-17 crop in Punjab and Sindh have been analyzed by adopting the input-output parameters as used in calculating COP estimates for the 2015-16 crop and the latest prices of various farm inputs and custom hiring rates of cultural operations. These rates were collected through annual field survey conducted by API in the major sugarcane producing areas of Punjab and Sindh during April 2016. The detailed cost estimates are presented in Annexes-IV to V while summary of the results is given in Table-10.

Table-10: Average Farmer Cost of Production of Sugarcane: 2015-16 and 2016-17 Crops

Items	Unit	Cost estimates		Increase in 2016-17 over 2015-16
		2015-16 Crop	2016-17 Crop	
Punjab				
1. Cost of cultivation	Rs/acre	84328	85899	1571.46
2. Yield	40 kgs/acre	565.15	600	34.85
3. Cost of production at farm level	Rs/40 kgs	149.21	143.16	-5.38
4. Marketing cost	"	15	17	2.00
5. Cost of production at mill-gate	"	164.21	160.16	-3.38
Sindh				
1. Cost of cultivation	Rs/acre	101311	95906	-5405.00
2. Yield	Kgs/acre	676	700	24.00
3. Cost of production at farm level	Rs/40 kgs	149.87	137.01	-12.86
4. Marketing cost	"	14.32	15.32	1.00
5. Cost of production at mill-gate	"	164.19	152.33	-11.86

Source: Annexes-IV to V.

Punjab

31. The cost of raising one acre of sugarcane in the Punjab during 2016-17 crop season is likely to be Rs 85899, including land rent table 10. Based on the average yield of 600 maunds (40 kgs) per acre, the cost of production at farm level comes to Rs 143.16 per 40 kgs. Weighing

up marketing expenses @ Rs 17.00 per 40 kgs, the cost of sugarcane at mill-gate would be Rs 160.16 per 40 kgs, lower by Rs 4.05 (2.53%) than the parallel cost estimates of 2015-16 crop.

Sindh

32. During 2016-17 crop season, the cost of cultivation of sugarcane in Sindh works out to Rs 95906 per acre, including land rent. The farm-level cost of production of sugarcane is estimated at Rs 137.01 per 40 kgs, based on an average yield of 700 maunds per acre. According for marketing expenses including cane development cess @ Rs 15.32 per kgs, the mill-gate cost of production would be Rs 152.33 per 40 kgs, lower by Rs 11.86 (7.79 percent) than the correspondence cost of Rs 164.19/40 kgs of previous year.

9.2 Cost of Major Operations/Inputs

33. The shares of major operations and farm inputs in the total cost of cultivation of sugarcane for 2015-16 and 2016-17 crops in the Punjab and Sindh are shown in the Table-11.

Punjab

34. Land rent is the major component of the cost of sugarcane in Punjab for 2016-17 crop, contributing 30 percent. Other major ingredients are: seed & sowing costs 13%, fertilizers including FYM (12.6%), land preparation (10.7%) and harvesting and stripping 9.6%.

Sindh

35. In Sindh major components of the cost of cultivation of sugarcane during 2016-17 crop would be land rent (27.8%), fertilizer including FYM (14.6%), seed sowing operation (14.45), harvesting and stripping (10.2%) and land preparation 8.8%.

Input/operation	2015-16 crop	2016-17 crop	Changes in 2016-17 over 2015-16
	Rs/acre		Per cent
Punjab			
1. Land Preparation	8835 (10.7)	9225 (10.7)	391
2. Seed and sowing operations	7455 (8.8)	11184(13.0)	3729
3. Inter-culture and ear thing up	2258(2.7)	2158 (2.5)	-100
4. Plant protection	366 (0.4)	340 (0.4)	-26
5. Irrigation	8371 (9.9)	6046 (7)	-2325
6. Fertilizer including FYM	12242 (14.5)	10902(12.6)	-1340
7. Land rent	26000 (30.8)	26000(30.1)	0
8. Harvesting and stripping	7273(8.6)	8316 (9.6)	1043
9. Other costs	11497(13.6)	12098 (14.0)	601
Total cost	84297 (100)	86269 (100)	1971
Sindh			
1. Land Preparation	11174 (11.0)	8432 (8.8)	-2742
2. Seed and sowing operations	13379 (13.2)	13769 (14.4)	391
3. Inter-culture and ear thing up	4541 (4.50)	3764 (4.4)	-776
4. Plant protection	489 (0.5)	503 (3.9)	14
5. Irrigation	4070 (4.0)	4240 (4.40)	170
6. Fertilizer including FYM	17481 (17.30)	13964 (14.60)	-3517
7. Land rent	25333 (25.0)	26667(27.80)	1333
8. Harvesting and stripping	8788 (8.7)	9800 (10.2)	1012
9. Other costs	16056 (15.8)	14766(15.40)	-1290
Total cost	101311 (100)	95906(100)	-5404

- Notes: 1. Others include mark-up, management, land tax, drainage cess and expected escalation in the cost of selected items.
2. Figures in parenthesis are per cent shares in total cost.

10. NOMINAL AND REAL INDICATIVE / MARKET PRICE OF SUGARCANE

36. The Real price of a commodity is the price achieved by 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 sugarcane has been carried out. This analysis is based on the prices of sugarcane during 2010-11 to 2015-16.

10.1 Nominal and Real indicative and Market Prices of Sugarcane in Punjab

37. The analysis of indicative and market prices of sugarcane for the Punjab during 2010-11 to 2015-16 is given in the Table-12.

Table-12: Nominal and Real Indicative & Market Prices of Sugarcane Realized By the Growers in the Punjab 2010-11 to 2015-16

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(2/4)x100	6=2(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

Sources:

1. Price Policy Report for Sugarcane by API (Various Issues).
2. Pakistan Economic Survey 2015-16.

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.

38. The nominal indicative price of sugarcane in the Punjab increased by 30 per cent from Rs 125 to 180 per 40 kgs between 2010-11 and 2015-16. During this period, the Consumer Price Index (CPI), the most commonly used measure of inflation in the economy, escalated by 38.43 per cent. A consistent growth is observed in real indicative prices of sugarcane upto 2012-13. However, the real prices subsequently declined on an irregular basis. For the last year 2015-16, real indicative price of sugarcane works out to be Rs 88.89 per 40 kgs, 2nd lowest after base price. The real indicative price was lower than the nominal price since 2010-11 mainly for high CPI.

39. As far the nominal market price of sugarcane is concerned, it declined gradually from Rs 175 per 40 kgs in 2010-11 to Rs 148 per kgs in 2011-12, but increased to Rs.170 in 2012-13 and to Rs.180 in 2014-15, which remained constant for 2015-16, Rs 180. However, the nominal market price convey also a depressing situation which remained below the nominal market price in 2011-12 but at per with immediate price all the way through the period under review.

10.2 Nominal and Real indicative Prices of Sugarcane in Sindh

40. The nominal and real indicative and market prices of sugarcane in Sindh for the period 2010-11 to 2015-16 are displayed in Tabel-13.

Table-13: Nominal and Real Indicative & Market Prices of Sugarcane Realized By the Growers in Sindh 2010-11 to 2015-16

Crop year	Nominal prices		Consumer price Index(CPI) 2007-08= 100	Real Prices	
	Indicative*	Market**		Indicative	Market
	---- Rs per 40 kgs ----			---- Rs per 40 kgs ----	
1	2	3	4	5=2(2/4)x100	6=2(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

Sources:

1. Price Policy Report for Sugarcane by API (Various Issues).
2. Pakistan Economic Survey 2015-16.

Notes:

- * Indicative Price of sugarcane at mill-gate fixed by the Provincial government.
- ** Prices of sugarcane actually realized by the growers collected through the API's field survey.

41. Nominal indicative price in Sindh increased from 125 per 40 kgs in 2010-11 to Rs 172 per 40 kgs in 2015-16. This counts 37.6 per cent increase. Market price usually remained higher than the indicative price except in two year (2013-14 and 2014-15 when it marginally fell against the indicative price. It proves that indicative price of sugarcane is not a distortion in the market conditions. The real indicative price of sugarcane during the period under study experienced relatively smooth increasing trend from the lowest level of Rs 85.35 per 40 kgs in the base year and the highest level of Rs 98.55 per 40 kgs in 2012-13 crop. However, it declined to Rs 84.94

42. As far as the 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 in 2015-16 to Rs 191. However, the real market price shows also a depressing situation which remained below the nominal market price throughout the period under review.

43. It may be observed from the above data that CPI consistently increased during the reference period. It increased from Rs 146.45 in 2010-11 to 202.73 in 2015-16. One striking feature of real market price is that it recovered from a drop of over 10% in 2013-14 to an increase of 0.16% in 2014-15 and further 3.19% in 2015-16. Such volatility in the market may push the growers in to a higher factor of instability in their returns from the crop.

10.3 Gains from sugarcane Cultivation in Sindh in Real Terms

44. The real indicative price has been lower than the nominal price since 2010-11 onwards both in the Punjab and Sindh. The major factor for this mismatch between the nominal and the real price is attributed to the higher CPI which has been increasing constantly, thus pushing the real value/returns to a lower level. This indicates that sugarcane farmers have been getting less in real terms from the crop. As indicated above, the rising trend in CPI also impacted the real market price of sugarcane in Sindh which recorded at Rs 94.21 per 40 kgs in 2015-16 showing decrease in 5.4 per cent against the last year.

45. It may be concluded from this analysis that indicative and market price of sugarcane almost follow the same pattern, which visibly implies successful implementation of indicative price of sugarcane. However, field evidenced does not support these findings as a number of factors has been reported to undermine price actually received by the sugarcane growers. In nutshell indicative price is found to play its envisaged role.

11. ECONOMICS OF SUGARCANE AND COMPETING CROPS-2016-17

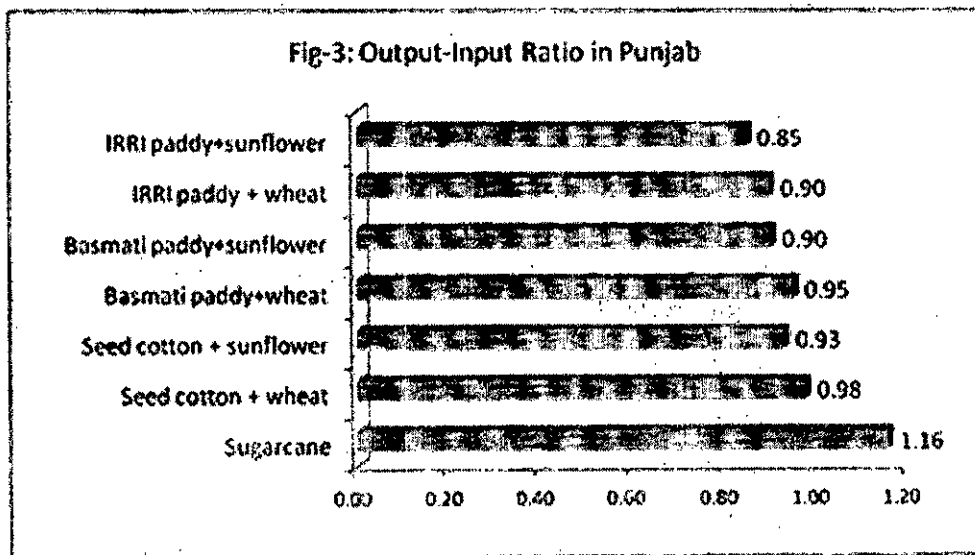
46. Resources allocation among the competing enterprises is primarily governed by the economic considerations reflected in their gross cost, gross income, gross margin, net income, output-input ratio, etc.

47. 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 2015-16 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-14 and Table-15 and results of the analysis are in brief discussed in the following paragraphs.

Punjab

48. The API field survey held in 2016 revealed that sugarcane growers, on the whole, received the indicative price. In respect of returns to overall investment, the sugarcane performed better than

entire crop combinations. None of the combinations could complete with sugarcane in terms of returns to



purchased inputs and gross revenue per day of crop duration. Similarly, Sugarcane also out-competed both Basmati and IRRi combinations in terms of irrigation water.

However, cotton + wheat, and cotton + sunflower rotations performed better than sugarcane in terms of returns to irrigation water while the sugarcane out-competed rest of the combinations.

Table- 14: Economics of Sugarcane and Competing Crops at Prices Realized by the Growers for 2015-16 crop in Punjab province

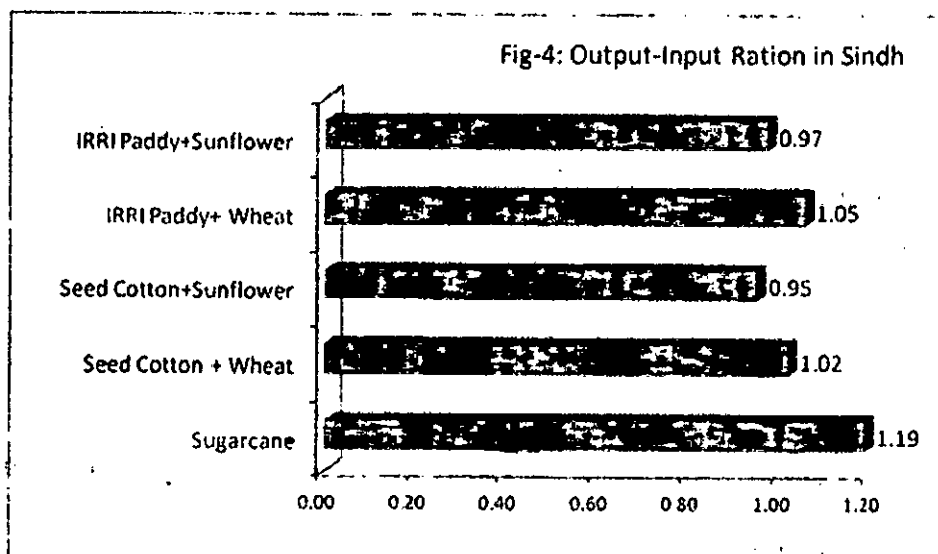
Competing crops/ crop combinations	Output/ input ratio	Gross revenue per		
		Rupee of purchased inputs cost	Day of crop duration	Acre-inch of irrigation water used
----- Rupees -----				
1. Sugarcane	1.16	3.86	237	1943
2. Cotton+wheat	0.98	2.77	218	2695
3. Cotton+sunflower	0.93	2.45	215	2055
4. Basmati+wheat	0.95	2.19	228	1172
5. Basmati+sunflower	0.90	1.96	225	1011
6. IRRI+wheat	0.90	2.12	207	1007
7. IRRI+sunflower	0.85	1.89	204	873

Source: Annex-VI.

Sindh

49. Sugarcane growers, in Sindh, have also been largely reported reviving the indicative price during 2015-16.

However, in certain parts of the province, the price received by the farmers was less than the indicative price. Based on the indicative price, the analysis



However, in

certain parts of

the province,

the price

received by

the farmers

was

shows that Sugarcane returned better than the competing crops, in terms of output-input ratio.

50. In terms of returns to crop purchased inputs and duration, sugarcane performed better against all the crops combinations. However, returns to irrigation water for Cotton combinations remained higher than the sugarcane.

Table-15: Economics of Sugarcane and Competing Crops at Prices Realized by the Growers for 2015-16 Crop in Sindh

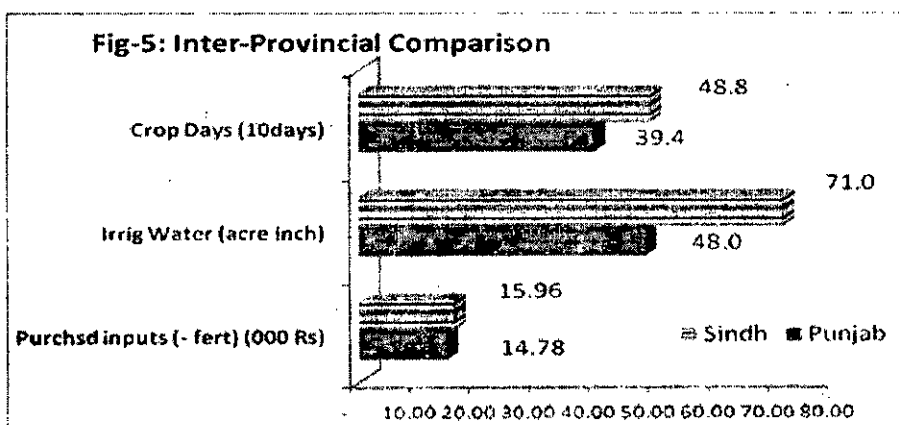
Crop/crop combination	Output-input ratio	Gross revenue per		
		rupee of purchased inputs cost	day of crop duration	acre-inch of irrigation water used
----- Rupees -----				
1. Sugarcane	1.19	3.77	232	1597
2. Cotton+wheat	1.02	3.08	213	2980
3. Cotton+sunflower	0.95	3.08	213	2238
4. IRRI+wheat	1.05	2.91	217	1149
5. IRRI+sunflower	0.97	2.47	217	1003

Source: Annex-VI.

11.2 Economic of Sugarcane: Inter Provincial Comparison

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

52. The higher yield of Sindh by 20 percent over Punjab may be



in the Sindh province requires more water and other inputs as compared to Punjab.

52. The higher yield of Sindh by 20 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 as compared to the Punjab, Similarly, irrigation water is also applied on higher side in Sindh.

53. Chemical fertilizers are used on higher side in Sindh by 86 per cent in nitrogenous and by 15 per cent in phosphatic ingredients. Similarly, cost of purchased inputs is also higher in Sindh by about 24 per cent. The details are illustrated in Table-16 below:

Table-16: Inputs Use Level and Yield of Sugarcane in Sindh versus Punjab: 2015-16 Crop

Item	Unit	Sindh	Punjab	Edge in Sindh over Punjab (Per cent)
Crop duration	Crop days	488	394	24 (+)
Irrigation water	Acre-inches	71	48	48 (+)
Inputs use (purchased)	Rs/acre	15960	14777	7.41 (+)
Fertilizer Use:				
N	Nutrient kgs/acre	104	56	86 (+)
P	Nutrient kgs/acre	39	34	15 (+)
Crop yield	40 kg units	676	565	20 (+)

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

54. Expenditure on sugar is one of the important items in average household budget. Sugar is also included in the basket of goods used in estimating the Consumer Price Index (CPI). Any change in sugar price affects the household budget and CPI. Summary of the results is given in Table-17 below:

12.1 Impact on CPI

55. The Pakistan Bureau of statistics (PBS) has estimated the changes in CPI as a result of increase in sugar price over the base price. The impact of increase in sugar price on CPI is given in Tale-17.

Table-17: 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 @ 23.98 kgs per year	
		Per person	Per household
Rs per kg	Per cent	----- Rupees -----	
63* Base price			
64	0.0079	23.98	149.4
65	0.0446	47.96	298.9
66	0.0629	71.94	448.2
67	0.0812	95.92	597.6
68	0.0995	119.90	747.0
69	0.1179	143.88	896.4
70	0.1545	167.86	1045.8
71	0.1729	191.84	1195.2
72	0.1912	215.82	1344.6

Note: * Price for the month of April 2016 was Rs 63.57 per kg
Average size of household comprises 6.23 members

Source: Pakistan Bureau of Statistics (PBS), Islamabad

56. It is evident from the Table-17 that every increase of Rupee 1 per kg over the base price of Rs 63 per kg is expected to raise the CPI by 0.0079 per cent, other things remaining the same.

Accordingly, the CPI is likely to increase by 0.0446 and 0.0995 per cent, if sugarcane price is increased by Rs 2 and Rs 5 per kgs.

12.2 Impact on Household Expenditure

57. According to the Household Integrated Economic Survey (HIES) during 2013-14 by the PBS, average household in Pakistan consists of 6.23 members. The annual per capita availability of sugar based on the Balance Sheet Method has averaged at 23.98 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 Rupee 1 in sugar price over the base level of 63 per kg would raise the CPI by 0.0079 per cent. In addition, the per head and average household expenditure would increase by Rs 23.98 and Rs 149.40 respectively per annum with rise in sugar price by Rupee 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 47.96 and 119.90 per annum and average house expenditure by Rs 298.90 and Rs 747.0 per annum.

13. ECONOMIC EFFICIENCY OF SUGARCANE PRODUCTION IN PAKISTAN¹

13.1 Under Import Situation

13.1.1 Nominal Protection Coefficient (NPC)

58. NPC is the ratio of the market price to the social price of a commodity while social price is the import / export price. It examines the impact of domestic market price of a crop without any consideration to the distortions in the input prices. As a rule of thumb if NPC is greater than one it means that local producers have price protection and if it is less than one it means that domestic producers are implicitly taxed. Implicit taxation to the growers of a particular crop means flow of resources from that particular crop. It is evident from Table-18 that NPC values for the Punjab province drastically changed during the period 2010-11 to 2013-14. These ranged

¹ Update of this portion is not available, that is why last's year analysis is included in the policy paper of 2016-17 crop.

Table-18: Nominal and Effective Protection Coefficients for Sugarcane in Pakistan

Year	Nominal Protection Coefficient (NPC)	Effective Protection Coefficient (EPC)	Nominal Protection Coefficient (NPC)	Effective Protection Coefficient (EPC)
	Punjab		Sindh	
2010-11	0.78	0.72	0.78	0.74
2011-12	0.90	0.83	0.93	0.89
2012-13	1.21	1.28	1.20	1.26
2013-14	1.28	1.39	1.21	1.28

Source: Annex-VII & VIII.

13.1.2 Effective Protection Coefficient (EPC)

59. EPC is the ratio of the difference between the revenue and the cost of tradable inputs at the private prices and the difference between the revenue and the tradable inputs cost at social prices. Thus EPC is the indicator of the net incentive and disincentive effects of all policies affecting prices of tradable output and inputs. EPC greater than one means that private profit is higher than it could be without government intervention in the input/output market. In contrast EPC less than one indicates that net effect of policies that net effect of input/output pricing policies is reduction in private profits. In the former case, there is domestic protection to the producers of the commodity while in the latter case they are implicitly taxed which discourages domestic production. The above referred Table-18 presents EPC estimates. EPC values for 2010-11 to 2013-14 show significant variations. In 2012-13 EPC value suddenly jumped to the level 1.28 from 0.83 in 2011-12 which further increased to 1.39 in 2013-14. The underlying reason is increase in domestic price of sugarcane in 2012-13 and onward.

13.1.3 Domestic Resource Cost Coefficient

60. DRC is the ratio of the social cost on domestic factors to value added at social prices. If DRC is less than one it implies comparative advantage as the domestic production can save foreign exchange at costs less than the corresponding cost of imports. When DRC is greater than one, it indicates comparative disadvantage in domestic production as in such situations import of

a commodity is cheaper. However, it should be noted that DRC varies with changes in opportunity cost of non-tradable inputs as well as the social value of output. Based on cost of production of average farmer and import prices of sugar, DRCs for Punjab and Sindh are estimated and produced in Table-19. Data on private and social profitability for analysis period are produced in Annex-IX and X.

Table-19: Domestic Resource Cost Coefficient (DRC) for Sugarcane in Punjab and Sindh Provinces

Year	DRC Coefficient (Punjab)	DRC Coefficient (Sindh)
2010-11	0.29	0.27
2011-12	0.63	0.57
2012-13	0.87	0.77
2013-14	0.19	0.82

Source: Annex-IX and X.

61. It is visible from data in the above table that for most of the time Domestic Resource Cost coefficients are substantially below one which indicate Pakistan's comparative advantage in sugarcane production under import situation. In other words domestic resource cost would be less than the corresponding import expenditure. Therefore, it would be an economic proposition to invest in wheat production and marketing at home rather to import.

13.2 Under Export Situation

62. Economic efficiency indicators for sugarcane production in Pakistan under export scenario are presented in Table-20. It may be seen from the NPC and EPC estimates that almost all of them are above one which imply that resource use efficiency in sugarcane production for export purposes is low the underlying explanation is that export parity price of sugarcane is less than the domestic price of sugarcane.

Table-20: Nominal and Effective Protection Coefficients for Sugarcane in Pakistan

Year	Nominal Protection coefficient (NPC)	Effective Protection coefficient (EPC)	Nominal Protection coefficient (NPC)	Effective Protection Coefficient (EPC)
2010-11	0.96	0.93	0.94	0.92
2011-12	1.10	1.10	1.13	1.15
2012-13	1.56	1.98	1.51	1.78
2013-14	1.77	2.00	1.67	1.85

63. So far as DRCs are concerned, if value of DRC is less than one it indicates that a particular crop has comparative advantage in the respective crop and the vice versa. DRC values under export scenario may also be observed in Table-21. It is clear that here DRC values are higher than one during 2011-12 and 2012-13 which means that for Pakistan export purpose production of sugarcane is not a viable option.

Table-21: Domestic Resource Cost Coefficient (DRC) for Sugarcane in Punjab and Sindh Provinces under Import Scenario

Year	DRC Coefficient (Punjab)	DRC Coefficient (Sindh)
2010-11	0.37	0.34
2011-12	0.83	0.74
2012-13	1.30	1.08
2013-14	1.84	1.35

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

14.1 Domestic Demand, Supply and Stocks

64. The sugar production from 2015-16 (Oct-Sept) crop has been estimated at 5.139 million tons. Adding 1.197 million tons of leftover stocks from 2014-15, the total sugar supply for 2015-16 consumption year is estimated to 6.359 million tons. Based on average per capita availability of sugar estimated at 24 kgs during 2013-15, total domestic requirement for a population of 202.89 million has been worked at 4.869 million tons for 2015-16. Thus, there is

0.419 million tons exports is recorded hence 1.071 million tons surplus sugar is available at country for export during 2015-16. For detail see Table-22, Annex-XI.

Table-22: Domestic Situation of Sugar During 2015-16

S.No.	Items	Data (million)
1.	Opening stocks left over from 2014-15	1.197
2.	Production 2015-16	5.139
3.	Total supply for 2015-16	6.359
4.	Exports	0.419
5.	Population	202.89
6.	Requirement	4.869
7.	Likely surplus in 2015-16	1.071

14.2 Behaviour of Sugar Prices in Domestic Market

65. The monthly average wholesale prices of sugar in Karachi, Hyderabad, Lahore, Faisalabad and Peshawar markets during 2015 and 2016 (Jan-June) are presented Annex-XII, while for the last 13 years in Annex-XII.

66. During 2014, average monthly wholesale prices ranged between Rs 4800 per 100 kgs in Hyderabad to Rs 6600 per 100 kgs in Peshawar. During 2015 (Jan-June), average monthly wholesale prices ranged between Rs 5300 per 100 kgs in Hyderabad market during January 2016 and Rs 8500 per 100 kgs in Peshawar market during April 2016. The overall average of sugar price at country level ranged between Rs 5093 to Rs 6312 per 100 kgs during 2015-16. Average Sugar Retail Price for the week ending 18-08-2016 was Rs 71.25 per kg (Source: PBS). Akbar Mandi, Lahore wholesale price was Rs 69.00 per kg as on 21st August 2016 (Source: Business Recorder).

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

15.1 Supply, Demand, Stocks and Trade

67. The data on world balance sheet of sugar (raw equivalent) for the period of 2013-14 to 2015-16 are presented in Table-23.

Table-23: World Balance Sheet of Sugar (Raw Equivalent): 2013-14 to 2015-16 (October-September)

S.No.	Item	2013-14	2014-15	2015-16	Changes 2015-16 over 2014-15
		----- Million tones -----			
1.	Opening stocks	77.23	83.97	87.32	(+)3.99
2.	Production	171.39	171.23	163.91	(-)4.29
3.	Total supply (1+2)	248.62	255.20	251.23	(-)1.56
4.	Disappearance (consumption)	164.59	167.49	170.91	(+)2.04
5.	Stock adjustment*	(-)0.06	(-)0.39	(+)0.29	
6.	Ending stocks	83.97	87.32	80.61	(-)7.68
7.	Trade (export)	58.02	55.64	56.60	(+)1.73

Note: * Including adjustment for unknown net trade.

Source: Quarterly Market Outlook, International sugar Organization, May 2016.

68. The world sugar production was estimated at 171.23 million tons during 2014-15, 0.16 million tons (0.09 per cent) lower than the last year level of 171.39 million tones. Accounting for the opening stocks of 83.97 million tones, global supply of sugar in 2014-15 was reported at 255.20 million tons (2.65 per cent) higher than 2013-14. The world consumption in 2014-15 was estimated at 167.49 million tons, 1.76 per cent higher than the last year level of 164.59 million tons. End year stocks in 2014-15 were estimated at 87.32 million tons, 3.35 per cent higher than last year.

69. World sugar production during 2015-16 is forecast at 163.91 million tons, 4.29 per cent lower than last year's production. Accounting for the opening stocks of 87.32 million tons, global supply of sugar in 2015-16 is projected at 251.23 million tons 1.56 per cent lower than 2014-15. The world consumption in 2015-16 is projected at 170.91 million tons, 2.04 per cent higher than last year. End year stocks will be decreased significantly due to lower production and high consumption during 2015-16, projected at 80.61 million tons. If these forecasts become

true, the price of sugar in international market may increase as it has already showed upward trend in current season 2015-16 (Oct-May) in Annex-XIV and describe below.

15.2 International Prices of Sugar

70. The international prices of raw (fob Caribbean ports) and white (fob London) sugar from 2005-06 to 2015-16 are presented in Annex-XIV.

71. the prices of both raw and white sugar have fluctuations widely during the period under review. During 2005-06, the prices of raw sugar averaging at US \$ 327.15 per ton but again declined to \$ 229.90 per ton in next year. From 2007-08 prices started upward trend and averaged at \$ 585.45 per ton in 2010-11 and touched the highest level during the period under review. From 2011-12 prices started decreasing and reached at \$ 307.69 per ton during 2014-15. In the current season 2015-16 (Oct-May) prices are showing upward trend and ranges between \$ 292.77 per ton during February 2015 to \$ 373.02 per ton during May 2016. international Sugar Price of Refined White Sugar was US \$ 550.30 per ton (Rs 57.68 per kg) respectively as on 23rd August 2016 (Source: www.sugaronline.com).

16. IMPORT AND EXPORT PARITY PRICES OF SUGARCANE

72. 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 exporters in the others, both the import and export parity prices of sugarcane have been worked out for analyzing price policy options for the next crop season. 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-XV and XVI, while the results are summarized in Table-24.

Table-24: Import/Export Parity Prices of Sugarcane s Worked back from Average fob (London) Prices of Sugar

Average fob London prices of white sugar per ton	Sugarcane prices (Rs/40 kgs)	
	Punjab	Sindh
Import Parity		
US \$ 469.35 (May 2016)	162.84	151.82
US \$ 418.35 (Oct 2015 to May 2016)	147.92	137.92
US \$ 456.37 (2012-13 to 2014-15)	159.04	148.29
Export Parity		
US \$ 469.35 (May 2016)	124.71	116.28
US \$ 418.35 (Oct 2015 to May 2016)	110.51	103.03
US \$ 456.37 (2012-13 to 2014-15)	121.10	112.91

Source: Annexes-XV and XVI.

17. MILL-GATE PRICES OF SUGARCANE BASED ON DOMESTIC WHOLE SALE PRICES OF SUGAR DURING 2014-15 CONSUMPTION YEAR

73. Sugarcane prices have also been estimated from the wholesale prices of sugar during the 2014-15 consumption year and presented in Table-24. This analysis is based on actual sucrose recovery as reported by the PSMA; processing cost of sugar and Federal Excise duty @ 8 per cent. A summary of sugarcane prices estimated under this scenario from various wholesale prices of sugar is presented in Table-25 while the details are given in annex-XVII.

Table-25: Sugarcane Prices Estimated from Expected Wholesale Prices of Sugar During 2015-16

Wholesale prices of sugar (Rs per tonnes)	Sugarcane prices (Rs/40 kgs)	
	Punjab	Sindh
Rs 60,000	143.18	133.50
Rs 65,000	155.12	144.63
Rs 70,000	167.05	155.75

18. Sugar Production Marketing & Stock Summary (Season 2015-16) as on 23 August 2016

74. In 2015-16 record production of sugarcane crop was reported by the crop reporting departments of the provinces. It was a gratifying feature for the season placing the crop area of sugarcane at 1.140 million hectares with cane production of 62.826 million tons. Less area was cultivated in 2015-16 due to non-payment of dues from sugar mills in 2014-15.

75. The sugar production from above crop by the close of the crushing season in Market 2016 was reported to be 5.11 million tons less than estimates of 5.139 million tons. However, production of sugar was above than domestic needs of 4.869 million tons for a population of 202.89 million at per capita of 24 per kg sugar position for the year 2015-16 is as follows:

Sugarcane plantation	=	1.140 million hectares
Sugarcane produced	=	62.826
Sugarcane crushed	=	50.795 (Utilization 81%)
Sugar produced from cane	=	5.114
Carry over stock from 2013-14	=	0.329
Sugar availability for 2015-16	=	5.443
Domestic requirement 2014-15	=	4.869
Sugar Consumed till 23-08-2016	=	2.844
Sugar stocks as on 23-08-2016	=	2.60
Sufficient till 16-03-2017		

20. SUGAR TRADE

76. The major impediment in the export of sugar was the high cost of sugarcane and export of allocated quota in the given time which created further hindrance in the smooth flow of export. To provide a congenial environment for export and to maintain a smooth flow of sugar export the issue of cut off date was taken up with the Government of Pakistan and accordingly the date for export of 650,000 MT of sugar was extended from May 15, 2015 to July 15th, 2015. The sugar industry exported 2,492,000 Tons (2.49 Million Tons) of sugar from 2011-12 to

2014-15. The ECC of the Cabinet allowed further 500,000 Tons (0.5 Million Tons) sugar export vide decision dated: 07-12-125 out of which 293,541 Tons have been exported till 16-08-2016.

21. **MARKETING OF SUGARCANE 2015-16 CROP**

77. As a perishable commodity sugarcane cannot be stored after harvesting and is to be processed either into gur at farm level or crushed by sugar mills for sugar manufacture. Its marketing plays an important role in this respect. To update information, API conducted an extensive field survey during February, 2016 in the provinces of Punjab and Sindh on the issue relating to the production and marketing of sugarcane 2015-16 crop. The survey teams interviewed cane growers, sugar mills management and crop experts. The meeting of API Committee on Sugarcane, held on February 24, 2015 also discussed matters relating to cane marketing. In the following paragraphs, salient observation of the field survey and the meeting of API's Committee on sugarcane are summarized.

- **Price/Supply of Sugarcane**

78. The supply of sugarcane to the sugar mills in the Punjab and Sindh was observed satisfactory during 2015-16. No shortage of cane supply to any sugarmill in the survey area was reported. As price of sugarcane is concerned, the growers received Rs 180 per 40 kgs in the Punjab and Rs 182 per 40 kgs in Sindh at the mill gate. However, farmers were not satisfied with the intervention price fixed by the Provincial government of the Punjab and Sindh. They demanded that since prices of all inputs are increasing due to 17 per cent GST imposed by the Federal Government, price for the next sugarcane crop should be high. In Sindh, it was reported that certain mills paid Rs 155 per 40 kgs and farmers had delayed supply of cane. Certain segments of farmer community had approached provincial authorities for reviewing the price at Rs 182 per 40 kgs.

- **Payments of Quality Premium**

79. In Pakistan, the growers have repeatedly demanded adoption of ratio proportion systems for the judicious payment of their cane price. The system would encourage the growers and the millers to improve their efficiency. In early 1980s, a system was evolved for payment of premium on the basis of average recovery attained by a mill during the crushing season. This system suffers from the drawback that farmers supplying cane of poor quality were also receiving quality premium, at the expense of the farmers' who were supplying superior quality cane. Thus there was no incentive for individual farmers to grow a better quality cane with higher sucrose contents.

80. 1988, the Sugar Board asked APCoM to study the possibility of relating sugarcane price to the price of sugar. The matter was discussed by APCoM in its Standing Committee meeting of sugarcane with the growers, millers and experts. In 1991 APCoM was directed by the Cabinet to conduct a research study for the payment of quality premium on the basis of ratio proportion system to growers. It was also suggested that if necessary, international agency like FAO may be requested to provide technical assistance or a consultant may be hired from a country to conduct the study for ratio proportion system for payment of quality premium. In addition to the proposed study a committee comprising the following was constituted to prepare a comprehensive proposal.

1. Additional Secretary ... MINFA.
2. Joint Secretary, Ministry of Industries.
3. Sugarcane Commissioner, MINFA.
4. Provincial Sugarcane Commissioners
5. Representative of PSMA.
6. Representative of PSST.
7. A grower nominated by MINFA.
8. Representative of APCoM.

81. In the APCom study it was suggested that to determine sucrose contents in sugarcane a core sampler in which, sampling is completely mechanized, eliminating personal bias and minimizing labour requirements should be adopted. The installation of core samplers was discussed in the APCom meeting held on 9th January, 1993. The millers did not feel enthusiastic about the introduction of this device. In their view, the consignments of sugarcane with lower sucrose recovery than the bench mark should be also allowed to be paid correspondingly lower support price. According to growers, this would open gates for disputes among growers and mills. The Committee further suggested that APCom should look into the practicability of the installation of core sampler under our conditions, In addition, various formula of determining sucrose contents from juice analysis should be considered and recommend a suitable option.

82. In 1993-94 matter was again discussed in the APCom Standing Committee meeting and it was argued that since support price for cotton is based on varieties, it should be possible to fix support price of sugarcane on the basis of varieties. However, there could be problem in the identification of varieties at the procurement centre and at the mill gate. One view was that since separate support prices are fixed for provinces and that the sugar contents in some varieties are low in the beginning but improve later, this would necessitate the fixing of a number of support prices for various provinces. Moreover, the acceptable level of sugar contents of each variety would have to be determined because results of the Sugarcane Research Institutes and Sugar-mills may differ from one another due to differences in the formulae used to convert juice analysis into sucrose contents.

83. Finally the best method of evaluation of cane price on bases of its sucrose content was decided This was not adopted by the mills. As a result not only the farmers but also the industry and the country had suffered losses through increased in-efficiency in sugarcane and sugar production. The system of flat rate payment has encouraged the cultivation of low sugar varieties. Ultimately in 1996-97 efforts were made on the suggestion of APCom to introduce core sampler at one mill of each province. For this, part of the cost was to be borne by the Government of Pakistan. The core sampler did start functioning at Thatta Sugar Mill in Sindh and at Kamalia Sugar Mill in Punjab.

84. While considering the 1996-97 Support Price Policy for Sugarcane, the Cabinet decided to retain the rate of quality premium @ 35 paisas per 40 kgs of cane delivered to the sugar-mills for each 0.1 per cent point excess recovery above the provincial benchmarks (Sindh 8.7 per cent, Punjab and NWFP 8.5 per cent). The Cabinet decision regarding payment of quality premium has not been implemented in the Punjab. In Sindh and KPK growers were compensated to some extent for the high sucrose contents.

Under-weighment

85. The under-weighment and undue deductions on the part of mills and their agents at purchase centers have been reported. The private purchase centers and the mills agents reportedly have no good repute 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 of under weighed varies from place to place and for each mill area. In order to check the under-weighment at weighbridges, the supervisory committees should be more effective. Moreover the use of private, temporary weighbridges may be banned and district governments should install their own weighbridges in the producing areas at reasonable distances.

Undue deductions

86. The sugar mills normally follow a practice of 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 Cane Commissioners should check against such high undue deductions.

Delayed payments

87. 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. Thus, there is a need to impose penalties on late payments as laid down in the Sugar Factories Control Act and

also to enhance the liquidity of the sugar mills by lifting sugar at a certain pre-determined price by the public sector.

Presence of middlemen

88. The importance of middlemen in sugarcane marketing cannot be denied as it facilitates the marketing transactions between buyers and sellers. But in case the middlemen delay the supply of cane to mills, it harms the sugar manufacturing process by making reductions in the sugar recovery. Therefore in such cases the role of middlemen needs to be eliminated by putting restrictions on their involvement through the use of administration/legal laws

The purchase of CPRs

89. Since growers are in need of immediate payments for their sale proceeds, in order to avoid the delayed payments they are compelled to sell their CPRs at discount rates varying from area to area. This practice has caused loss to the farming sector. It is therefore stressed that this practice of selling CPRs at discount rates may be discontinued or stopped altogether. In order to improve the situation the mills may be compelled to make the payments for sale proceeds at the earliest, so that need for selling CPRs may be minimized

Use of sugarcane cess fund

90. The sugarcane cess fund is to be utilized for the construction and improvement of roads in the sugar mills areas. It can also be utilized for research and development of sugarcane crop. Reportedly, huge amounts of sugarcane cess fund are lying unutilized with the Provincial Governments, due to lack of proper planning and decision .it is therefore recommended that the unutilized amounts may be used for the improvement of roads and for research purpose

Amendments in Sugar Factories Control Act

91. Presently many changes have occurred in the cane marketing system and the functioning of Sugar Factories Control Act, 1950 has become less effective. Keeping in view the current needs, it is essential that the Act may be amended accordingly

22. MEASURES FOR IMPROVING PRODUCTIVITY

92. In view of high water requirement of sugarcane and increasing water shortages, horizontal expansion of this crop is not feasible. Hence the enhanced productivity is the only way forward to maintain the regular supply of sugarcane as raw material to 2nd largest agro-based sugar industry of Pakistan. API has recommended the following productivity enhancement measures

22.1 Varietal Development

93. The government should pursue the PSMA and provincial research institutes to emphasize on cane varietal development. Provincial governments should take strict measures to implement the ECC decision regarding the release and utilization of "Cess Fund".

22.2 Improved Cultural practices

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

- a) Agricultural machinery and tools for diverse ecologies and varied farm sizes be improved to enhance the productivity.
- b) Cost effective and zone specific crop production technologies might be developed and disseminated through coordinated efforts.
- c) Chemicals and bio-control agents for the management of pests and diseases be introduced.
- d) Modernizing technology for improving productivity and competitiveness in the sugar industry.
- e) Need for improvement in efficiency and productivity of irrigation water and fertilizer.
- f) Promote use of deep tillage for seedbed preparation for sugarcane cultivation.
- g) Practice recommended 'row to row' distance in sugarcane fields for effective weed control.

- h) Use healthy seed of improved varieties of fresh crop of sugarcane and discourage cultivation of un-approved varieties.
- i) Motivate farmers for 'Hot Water Treatment' of sugarcane sets for disease control.
- j) Apprise the farmers for achieving the desirable plant population per acre
- k) Awareness to the farmers for using press mud to improve soil fertility
- l) Educate sugarcane growers for using different fertilizers in recommended dosage
- m) Apprise the growers about use of weedicides for controlling weeds.
- n) Awareness campaign to educate sugarcane growers about the benefits of IPM techniques.

22.3 Biological Control

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

22.4 Role of Sugar Industry in Cane Development

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

- * Take concrete measures to multiply and disseminate high sucrose varieties along-with necessary extension work for development of sugarcane crop.
- * Take immediate steps to increase supply of improved varieties of cane seed among the farmers in addition to government efforts in this regard.
- * Investigate the agronomic problems of sugarcane production and soil conditions.
- * Study soils in sugarcane producing areas and to relate these to crop management.
- * Supply press mud free of cost to sugarcane growers to ensure adequate amounts of organic matter in the soil to sustain necessary fertility level to improve yield of the sugarcane crop
- * Discourage the role of middlemen in cane marketing

22.5 Low Sugar Recovery

97. Provincial and PARC Research Institutes should determine the reasons for low sugar recovery. The comparison with the world sugar recovery rate, which is on average higher than 10 percent indicates that efforts are required to enhance this percentage, in order to increase sugar production. Even in farming conditions, potential sugar recovery is not achieved.

23. COMMERCIAL VARIETIES AND THEIR YIELD POTENTIAL IN THE PUNJAB, SINDH AND KPK

98. Cane varieties play a pivotal role in improving yield and recovery of sugar cane. The yield of cane is important for economic uplift of growers and the sugar recovery of variety is the single most dominant factor that affects the economic viability of sugar industry. Improved and high yielding of sugar varieties are one of the major sources through which cane and sugar yield per unit area can be increased. Varieties should be cultivated according to the areas.

99. The yield potential of sugarcane varieties in the Punjab range between 80 and 130 tonnes per hectare. The highest yield potential of HSF-240, HSF-242 and CPF-243, varieties is estimated at 130, 108 and 102 tonnes per hectare and highest sugar recovery percentages are 12.7, 12.5 and 12.4 of the varieties CP-77-400, CPF-243, CPF-237, HSF-240, CPF-247. If these varieties are adopted for vast cultivation in their specified field areas with their recommended production technology and timely supply of inputs and application, the yield per hectare would definitely improve at the country level. List of the varieties have been presented in the (Annex-XVIII).

100. Yield of High yielding cane varieties evolved by Research Institutes in Sindh range between 170 and 200 tonnes per hectare and highest recovery varieties is Thatta-10 and LRK-2001 on the top with 11 per cent sugar recovery. The highest yield potential of Ghulabi-95 is estimated at 200 tonnes per hectare and in KPK high yielding variety is CP-77-400 estimated at 100 tonnes per hectare with 12.7 per cent sugar recovery

24. ACKNOWLEDGEMENT

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5. Mr. Muhammad Amin, Assistant Chief
6. Syed Riaz Ali Shah, Assistant Chief
7. Mrs. Shagufta Tasleem, Research Officer
8. Mr. Shakeel Ahmed, Naib Qasid
9. Mr. Muhammad Naeem, DMO

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**PROVINCE-WISE AREA , PRODUCTION AND YIELD OF SUGARCANE
IN PAKISTAN : 2005-06 TO 2015-16**

YEAR	PUNJAB	SINDH	KPK	BALUCHISTAN	PAKISTAN
AREA ----- 000 hectares -----					
2005-06	625.2	183.2	98.5	0.45	907.5
2006-07	711.8	214.7	101.8	0.50	1028.8
2007-08	827.2	308.8	104.8	0.50	1241.3
2008-09	666.5	263.9	98.2	0.77	1029.4
2009-10	607.4	233.9	100.8	0.70	942.8
2010-11	672.2	226.5	88.4	0.60	987.7
2011-12	761.2	189.7	105.9	0.70	1057.5
2012-13	767.7	253.7	106.7	0.65	1128.8
2013-14	756.8	297.6	117.4	0.67	1172.5
2014-15	701.3	312.8	112.7	0.70	1127.5
YIELD ----- Tonnes per hectare -----					
2005-06	46.33	61.38	45.02	32.22	49.22
2006-07	52.74	58.36	45.63	50.60	53.21
2007-08	48.73	60.86	45.73	56.20	51.49
2008-09	48.45	50.41	44.89	49.22	48.62
2009-10	51.57	57.74	44.72	50.86	52.37
2010-11	55.76	60.78	45.59	51.33	56.00
2011-12	56.35	56.87	44.23	44.86	55.22
2012-13	55.99	62.93	44.71	48.46	56.48
2013-14	57.75	61.70	45.67	48.06	57.54
2014-15	57.80	52.46	45.40	47.42	55.09
2015-16	59.50	57.49	48.79	45.29	57.87
2016-17	61.66	63.05	47.46	45.14	60.63
PRODUCTION ----- 000 Tonnes -----					
2005-06	28968.6	11243.4	4439.0	14.5	44665.5
2006-07	37541.9	12529.2	4645.0	25.3	54741.4
2007-08	40306.0	18793.9	4792.0	28.1	63920.0
2008-09	32294.7	13304.3	4408.5	37.9	50045.4
2009-10	31324.0	13505.4	4507.9	35.6	49372.9
2010-11	37481.0	13766.4	4030.3	30.8	55308.5
2011-12	42893.0	10788.3	4684.3	31.4	58397.0
2012-13	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

Sources:

- 1- For 2005-06 to 2013-14 : Agricultural Statistics of Pakistan 2013-14, MINFA, Islamabad.
- 2- For 2014-15: Final estimates provided by concerned Provincial Agriculture Departments.
- 3- For 2015-16: Final estimates for Sindh, KPK and Balochistan and second estimate second estimate for Punjab by concerned Provincial Agriculture Departments.

**PROVINCE-WISE AREA ,PRODUCTION AND YIELD OF SUGARCANE
IN PAKISTAN : 2005-06 TO 2015-16**

YEAR	PUNJAB	SINDH	KPK	BALUCHISTAN	PAKISTAN
AREA ----- 000 acres -----					
2005-06	1545	452.7	243.7	1.1	2242.5
2006-07	1758.9	530.5	251.6	1.2	2542.3
2007-08	2044.1	763.1	259.0	1.2	3067.4
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	559.7	218.4	1.5	2440.7
2011-12	1881.0	468.8	261.7	1.7	2613.2
2012-13	1897.1	626.9	263.7	1.6	2789.3
2013-14	1870.1	735.4	290.1	1.7	2897.3
2014-15	1756.0	782.6	278.0	1.6	2818.2
2015-16	1743.1	773.0	278.5	1.7	2796.3
YIELD ----- Tonnes per acre -----					
2005-06	18.75	24.84	18.22	13.04	19.92
2006-07	21.34	23.62	18.46	20.48	21.53
2007-08	19.72	24.63	18.50	22.74	20.84
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	24.60	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	19.61	22.86
2013-14	23.37	24.97	18.48	19.45	23.28
2014-15	23.39	21.23	18.37	19.19	22.29
2015-16	24.08	23.27	19.74	18.33	23.42
PRODUCTION ----- 000 Tonnes -----					
2005-06	28968.6	11243.4	4439.0	14.5	44665.5
2006-07	37541.9	12529.2	4645.0	25.3	54741.4
2007-08	40306.0	18793.9	4792.0	28.1	63920.0
2008-09	32294.7	13304.3	4408.5	37.9	50045.4
2009-10	31324.0	13505.4	4507.9	35.6	49372.9
2010-11	37481.0	13766.4	4030.3	30.8	55308.5
2011-12	42893.0	10788.3	4684.3	31.4	58397.0
2012-13	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

Sources:

- 1- For 2005-06 to 2013-14 : Agricultural Statistics of Pakistan 2013-14, MINFA, Islamabad.
- 2- For 2014-15: Final estimates provided by concerned Provincial Agriculture Departments.
- 3- For 2015-16: Final estimates for Sindh, KPK and Balochistan and second estimate second estimate for Punjab by concerned Provincial Agriculture Departments.

DISTRICT- WISE AREA, YIELD AND PRODUCTION OF SUGARCANE
AVERAGE OF 2013-14 TO 2015-16

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	131.52	9856.42	15.15	74.94	1	Charsadda	31.25	1420.77	2.18	45.46
2	Faisalabad	102.38	5540.86	8.52	54.12	2	Mardan	30.72	1404.77	2.16	45.73
3	Sargodha	60.97	3021.92	4.65	49.56	3	D.I.Khan	26.79	1349.12	2.07	50.36
4	Jhang	49.50	2836.83	4.36	57.31	4	Peshawar	10.22	522.89	0.80	51.16
5	Muzaffargarh	45.19	2681.27	4.12	59.33	5	Nowshera	4.92	251.70	0.39	51.16
6	T.T.Singh	38.31	2185.72	3.36	57.05	6	Malakand	4.77	184.06	0.28	38.59
7	Chiniot	40.20	2169.55	3.34	53.97	7	Swabi	2.74	106.83	0.16	38.99
8	Rajanpur	27.38	1918.67	2.95	70.08	8	Banru	0.78	30.79	0.05	39.47
9	Kasur	33.19	1676.59	2.58	50.51	9	Khyber AG.	0.67	15.46	0.02	23.07
10	Bahawalpur	21.18	1337.22	2.06	63.14	10	Mohmand AG.	0.29	8.13	0.01	28.03
11	Bhakkar	21.98	1097.40	1.69	49.93	11	Lakki Marwat	0.18	7.15	0.01	39.72
12	M.B.Din	22.93	1059.43	1.63	46.20	12	Tank	0.23	4.82	0.01	20.96
13	Vehari	17.00	994.37	1.53	58.49	13	Kohat	0.12	4.11	0.01	34.25
14	Bahawalnagar	14.30	819.76	1.26	57.33	14	Haripur	0.11	3.34	0.01	30.36
15	Nankana Sahib	16.19	799.48	1.23	49.38	15	Bunir	0.09	2.31	0.00	25.67
16	Layyah	13.89	749.66	1.15	53.97	16	F.R.D.I.Khan	0.09	2.16	0.00	24.00
17	Okara	13.76	660.62	1.02	48.01	17	Dir Lower	0.07	1.70	0.00	24.29
18	Khanewal	7.15	414.68	0.64	58.00	18	N.Waziristan	0.02	0.63	0.00	31.50
19	D.G.Khan	6.61	381.47	0.59	57.71	19	F.R.Peshawar	0.02	0.56	0.00	28.00
20	Khushab	7.15	328.78	0.51	45.98	20	Hangu	0.02	0.46	0.00	23.00
21	Sahiwal	6.34	307.24	0.47	48.46	21	F.R.Banru	0.08	0.30	0.00	3.75
22	Hafizabad	5.12	228.92	0.35	44.71	22	Mansehra	0.01	0.16	0.00	16.00
23	Multan	3.51	172.54	0.27	49.16	23	Karak	0.00	0.01	0.00	21.01
24	Pakpattan	2.83	143.05	0.22	50.55						
25	Mianwali	2.70	139.54	0.21	51.68						
26	Sheikhpura	2.56	120.34	0.19	47.01						
27	Lodhran	1.89	109.21	0.17	57.78						
28	Gujrat	2.02	87.39	0.13	43.26						
29	Gujranwala	1.62	66.29	0.10	40.92						
30	Narowal	1.35	47.87	0.07	35.46						
31	Sialkot	1.35	42.49	0.07	31.47						
32	Lahore	0.40	19.71	0.03	49.28						
33	Jhelum	0.40	15.38	0.02	38.45						
Sub Total		722.87	42030.67	64.62	58.14	Sub Total		114.19	5322.23	8.18	46.61
SINDH						BALUCHISTAN					
1	Badin	44.34	2263.08	3.48	51.04	1	Sibi	0.61	29.26	0.04	47.91
2	Ghotki	37.45	2126.87	3.27	56.79	2	Lasbela	0.05	2.56	0.00	56.89
3	Thatta	36.68	2094.07	3.22	57.09						
4	Nawabshah	32.55	1907.66	2.93	58.61						
5	Tando Muhammad	24.95	1491.88	2.29	59.79						
6	Mirpurkhas	19.51	1226.02	1.89	62.84						
7	N.Feroze	21.38	1215.21	1.87	56.84						
8	Tando Allahyar	20.38	1193.13	1.83	58.54						
9	Khairpur	21.01	1180.36	1.81	56.18						
10	Sanghar	14.54	873.62	1.34	60.08						
11	Matiari	13.88	867.88	1.33	62.53						
12	Hyderabad	6.48	368.16	0.57	56.81						
13	Sukkur	6.35	359.08	0.55	56.55						
14	Dadu	4.86	250.20	0.38	51.48						
15	Umerkot	1.95	102.54	0.16	52.58						
16	Tharparkar	0.87	44.46	0.07	51.10						
17	Jamshoro	0.72	35.67	0.05	49.54						
18	Larkana	0.55	28.09	0.04	51.07						
19	Shikarpur	0.31	14.87	0.02	47.97						
20	Shadadkot	0.15	7.20	0.01	48.00						
21	Jacobabad	0.13	5.00	0.01	38.46						
22	Kashmore	0.01	0.49	0.00	49.00						
Sub Total		309.05	17655.54	27.11	57.13	Sub Total		0.66	31.82	0.05	48.53
						Pak Total		1146.77	65040.26	100.00	56.72

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

Sources: 1- M/o NFS&R, Islamabad
2- Respected Agriculture Provincial Departments

AVERAGE FARMER COST OF PRODUCTION OF SUGARCANE IN PUNJAB DURING 2015-16 AND 2016-17

Sr. No.	Operations / inputs	Average no. of operations /acre based on 1999-2000 survey	2015-16 crop		2016-17 crop		Change in 2016-17 over 2015-16
			Rate per unit	Cost per acre	Rate per unit	Cost per acre	
1	Land preparation:						
	1.1 Deep ploughing	0.476	1500	714	1400	666	-47.60
	1.2 Rotavator	0.152	1600	243	1500	228	-15.20
	1.3 Ploughing	7.847	700	5493	650	5101	-392.35
	1.4 Planking	3.309	350	1158	325	1075	-82.73
	1.5 Laser levelling ³	0.561	750	421	1800	1010	589.05
2	Seed bed preparation:						
	2.1 Ploughing/ furrow making	0.467	700	163	650	152	-11.68
	2.2 Planking	0.193	350	34	325	31	-2.41
	2.3 Trench/Ridge making						
	2.3.1 Manual	0.106	350	18.55	400	21	
	2.3.2 Tractor	0.700	700	245	650	228	
	2.4 Bund making						
	2.4.1 Manual (M.day)	1.655	350	290	400	662	372.38
	2.4.2 Tractor	0.158	700	55	650	51	-3.95
3	Seed and Sowing operations:						
	3.1 40 kg units	6.578	190	625			
	3.2 Marlas	10.640	950	5054	1200	6384	1330.00
	3.3 Harvesting, stripping (m.days) and making of sets	4.796	350	839			-839.30
	3.4 Transport (Contract)	80.0		400			-400.00
	3.5 Sowing of sets (m.days)	0.781	350	137			-136.68
	3.6 Contract sowing including harvesting, stripping and transport			400		4800	4400.00
4	Irrigation						
	4.1 Canal/Scarp tubewell	8.900		250.00		250.00	0.00
	4.2 Private Tubewell	4.440	1300	5772	780	3463	-2308.80
	4.3 Mixed	2.160	300	648	180	389	-259.20
5	Labour for irrigation and water course cleaning (m. days)	4.860	350	1701	400	1944	243.00
6	Interculture and Earthing up						
	6.1 Manual/binding of plants	0.609	1400	853	1400	853	0.00
	6.2 With tractor	2.008	700	1406	650	1305	-100.40
7	Plant Protection including application charges						
	7.1 Weedicides	0.124	650	81	600	74	-6.20
	7.2 Granules	0.120	600	72	560	67	-4.80
	7.3 Sprays	0.305	700	214	650	198	-15.25
8	Farm yard manure including transport and application (50%)						
	8.1 Material cost	2		1500	1500	1500	0.00
	8.2 Transport & application cost			1100	1100	2200	1100.00
9	Fertilizers: (bags)						
	9.1 DAP	1.280	3700	4736	2500	3200	-1536.00
	9.2 Urea	1.730	1875	3244	1400	2422	-821.75
	9.3 Nitrophos	0.350	2555	894	2100	735	-159.25
	9.4 SSP	0.010	967	10	1086	11	1.19
	9.5 CAN	0.010	1609	16	1600	16	-0.09
	9.6 SOP	0.070	4900	343	5200	364	21.00
	9.7 Gypsum	0.440	200	88	200	88	0.00
10	Fert. transport and application	3.890	80	311	94	366	54.46
11	Gross cost (Rs/acre)						
12	Farm Investment (Item 1 to 10 minus 4.1)			39277		39605	327.69
13	Mark up @ 12.0 % per annum for 13 months on item 1 to 10 minus item 6.1			6382		6436	53.25
14	Land rent for 13 months		24000	26000	24000	26000	0.00
15	Average weighted land tax @ Rs 131/acre/ annum for 13 months			143.00		144.00	1.00
16	Management charges for 13 months			2362.0		2540.0	178.00
17	Harvesting & stripping (40 kg units)		13.0	7273	14.0	8316	1042.52
18	Expected escalation in cost of selected items			2640.0		2609.0	-31.00
19	Total cost (items 1 to 15)			84328		85899	1571.46
20	Yield (40 kg units)			565.15		600.00	34.85
21	Cost per 40 kgs at farm level:						
	21.1 including land rent			149.21		143.17	-6.05
	21.2 excluding land rent			103.21		99.83	-3.38
22	Marketing expenses: (Rs/40 kgs)						
	22.1 Transport, etc.			14.00		16.00	2.00
	22.2 Development cess			1.00		1.00	0.00
23	Cost per 40 kgs at millgate:						
	23.1 including land rent			164.21		160.17	-4.05
	23.2 excluding land rent			118.21		116.83	-1.38

AVERAGE FARMER COST OF PRODUCTION OF SUGARCANE IN SINDH DURING 2015-16 & 2016-17

Sr. No.	Operations / inputs	Average no. of operations /acre based on 1999-2000 survey	2015-16 crop		2016-17 crop		Change in 2016-17 over 2015-16
			Rate per unit	Cost per acre	Rate per unit	Cost per acre	
	Land preparation						
1	1.1 Deep ploughing	0.523	1600	836.80	1500	784.5	-52.30
	1.2 Ploughing	5.606	1100	6166.60	650	3643.9	-2522.70
	1.3 Planking	1.577	550	867.35	325	512.5	-354.83
	1.4 Levelling	0.972	1100	1069.20	2000	1944.0	874.80
2	Seed bed preparation:						
	2.1 Ploughing	1.136	1100	862.22	650	509.5	-352.73
	2.2 Planking	1.340	550	508.53	325	300.5	-208.04
	2.3 Trench/Ridge making:						
	2.3.1 Manual (m. days)	0.074	350	17.87	400	20.4	2.55
	2.3.2 Tractor (hrs)	0.174	1100	132.07	650	78.0	-54.03
	2.4 Bund making:						
	2.4.1 Manual (M. days)	0.403	350	97.32	400	111.2	13.90
	2.4.2 tractor (hrs)	0.812	1100	616.31	650	527.8	-88.51
3	Seed and Sowing operations:						
	3.1 40 kg units	64.118	190	8405.87	190	8405.9	0.00
	3.2 Ghuntas	0.685	5000	2363.25	5000	2363.3	0.00
	3.3 Harvesting, striping and making of sets	4.420	350	1067.43			-1067.43
	3.4 Transportation			700.00			-700.00
	3.5 Sowing of sets	0.588	350	142.00			-142.00
	3.6 Contract sowing			700.00		3000.0	2300.00
4	Interculture and Earthing up:						
	4.1 Manual	1.762	1500	2643.00	1500	2,643	0.00
	4.2 Bullocks/ tractor	1.725	1100	1897.50	650	1,121.3	-776.25
5	Plant protection with appl						
	5.1 Weedicides	0.300	650	195.00	600	180.0	-15.00
	5.2 Granules	0.245	550	134.75	560	137.20	2.45
	5.3 Sprays	0.265	600	159.00	700	185.50	26.50
6	Irrigation						
	6.1 Canal	20.880		181.87		181.87	0.00
	6.2 Private tubewell	2.450	750	1837.50	700	1715.00	-122.50
	6.3 Labour for irrigation and water course cleaning (m. days)	5.859	350	2050.65	400	2343.60	292.95
7	Farm yard manure						
	7.1 Material cost			2000.00	1800	1800.0	-200.00
	7.2 Transport and application cost			1000.00	1200	1200.0	200.00
8	Fertilizers: (bags)						
	8.1 DAP	1.512	3650	5518.80	2500	3780.00	-1738.80
	8.2 Urea	3.625	1858	6735.25	1400	5075.00	-1660.25
	8.3 Nitrophos	0.376	2563	963.69	2100	789.60	-174.09
	8.4 CAN	0.239	1593	380.73	1600	382.40	1.67
	8.5 SOP	0.085	4900	416.50	5200	442.00	25.50
	8.6 Fert. transport and application	5.829	80	466.32	85	495.47	29.15
9	Farm Investment (Item 1 to 8 minus 6.1)			50952		44491.54	-6459.97
10	Mark up @ 12.0 % per annum for 16 months on item 1 to 10 minus item 6.1 months	-		10190		8898.31	-1291.99
11	Land rent for 16 months		19000	25333	20000	26667	1333.33
12	Land tax @ Rs 200/acre/annum for 16 months			266.67		266.67	0.00
13	Drainage Cess	-		24.00		24.00	0.00
14	Management charges for 16 months			2907.00		2909.40	2.40
15	Harvesting and stripping (40 Kg units)	676	13	8788	14	9800.00	1011.74
16	Expected escalation in the cost of selected items	-		2668		2668.00	0.00
17	Total cost (items 1 to 15)	-		101311		95906	-5404.49
18	Yield (40 kg units)	-		676		700.00	24.00
19	Cost per 40 kgs at farm level:						
	19.1 including land rent	-		149.87		137.01	-12.86
	19.2 excluding land rent	-		112.39		98.91	-13.48
20	Marketing expenses: (Rs/40 kgs)						
	20.1 Transport, etc.	-		14.00		15.00	1.00
	20.2 Development cess	-		0.32		0.32	0.00
21	Cost per 40 kgs at mill-gate:						
	21.1 including land rent	-		164.19		152.33	-11.86
	21.2 excluding land rent	-		126.71		114.23	-12.48

Notes for Annex IV to V

1. The input-output parameters for estimating cost of production for sugarcane 2016-17 have been adopted from the Price Policy Analysis for sugarcane 2015-16 crop- API Series No. 253.
2. The hiring rates of farm operations, input prices, wage rate, Land rentals and labour charges for harvesting and stripping have been revised/ adjusted in the light of the Standing Committee Meeting on Sugarcane held in API, in 2016 and data obtained through the annual field survey conducted by API in major sugarcane producing districts of Punjab and Sindh.
3. Seed and related costs- items 2 and 3 have been estimated @ 50% of their original values for Punjab and 69% for Sindh respectively in view of the incidence of rationing as reported @ 50 in Punjab and 48% in Sindh.
4. Leveling cost is for laser leveling instead of tractor leveling.
5. It was found through the field survey 2016 that most of sugarcane sowing is now done by the contractual labor. Thus for 2016 costs of harvesting/stripping, cutting of sets, moving sets within the field and sowing of sets- are not taken separately as done in previous reports, rather contract cost is taken which includes all of the above mentioned operations.
6. Unit cost of tube well irrigation for 2016-17 is calculated by reducing the 2015-16 unit cost by 40% as electricity tariff for agriculture tube wells was Rs.8.85/Kw/M in July 2015 which is announced to be reduced from 1 July, 2016 onward to Rs.5.36/Kw/M.
7. Price of urea is used @ Rs.1400/bag and DAP @ Rs 2500/ bag in view of the subsidy given on fertilizers as announced in the Federal Budget 2016-17.
8. Pesticides prices collected from the field through the API survey 2016 are reduced by 10% because at the time of survey GST on pesticides was levied @ 10% which has been completely eliminated in the Federal Budget for 2016-17.
9. Cost of Farm Yard Manure (FYM) is derived from the above referred field survey.
10. The likely escalation costs of operations like inter culture, plant protection, supplementary irrigation, urea, DAP, harvesting/stripping and marketing for 2016-17 are not changed in view of recent subsidies granted by the government in the federal budget 2016 and her efforts to contain inflation.
11. The management charges per month for a Field Assistant in BPS-6 at 15th stages of his scale giving on fourth of his time to 25 acre farm are estimated on the basis of Basic Scale of 2016. The estimate is then added to the amount of adhoc allowance of 2014 which is 50% of that particular basic scale. This amount is derived on the basis of 2014 Basic Salary and annual increment @ Rs.375/ annum.
12. Land rent is based on the API field data.

**ECONOMICS OF SUGARCANE AND COMPETING CROPS AT
PRICES REALIZED BY THE GROWERS: 2015-16 CROPS**

S #	Province/crops/crop combination	Crop duration	Water used	Gross cost	Cost of purchased inputs	Gross revenue	Gross margin	Net income	Output-input ratio	Revenue per		
										Rupee of purchased inputs	Crop day	Acre inch of water used
		Days	Acre inchesRupees per acre.....					RatioRupees.....		
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	80503	24139	93250	69111	12747	1.16	3.86	237	1943
2	Seed Cotton	240	22	55454	18998	50134	31136	-5320	0.90	2.64	209	2279
3	Basmati Paddy	180	58	47869	23330	40564	17234	-7304	0.85	1.74	225	699
4	IRRI Paddy	180	62	44457	20988	33039	12051	-11418	0.74	1.57	184	533
5	Wheat	180	12	38343	14094	41510	27416	3167	1.08	2.95	231	3459
6	Sunflower (spring)	180	22	41690	17858	40300	22443	-1390	0.97	2.26	224	1832
7	Seed Cotton + Wheat	420	34	93797	33092	91644	58552	-2153	0.98	2.77	218	2695
8	Seed Cotton+Sunflower	420	44	97144	36856	90434	53578	-6710	0.93	2.45	215	2055
9	Basmati Paddy+Wheat	360	70	86212	37424	82074	44650	-4138	0.95	2.19	228	1172
10	Basmati Paddy+Sunflower	360	80	89559	41188	80864	39677	-8695	0.90	1.96	225	1011
11	IRRI Paddy + Wheat	360	74	82800	35082	74549	39467	-8251	0.90	2.12	207	1007
12	IRRI Paddy+Sunflower	360	84	86147	38846	73339	34493	-12808	0.85	1.89	204	873
Sindh												
1	Sugarcane	488	71	95334	30037	113355	83318	18021	1.19	3.77	232	1597
2	Seed Cotton	240	18	52041	16047	49238	33192	-2803	0.95	3.07	205	2735
3	IRRI Paddy	180	56	38300	13822	37967	24145	-334	0.99	2.75	211	678
4	Wheat	180	12	35877	13025	40173	27148	4296	1.12	3.08	223	3348
5	Sunflower (spring)	180	22	42280	17908	40300	22393	-1980	0.95	2.25	224	1832
6	Seed Cotton + Wheat	420	30	87918	29071	89411	60340	1493	1.02	3.08	213	2980
7	Seed Cotton+Sunflower	420	40	94321	29071	89538	60467	-4783	0.95	3.08	213	2238
8	IRRI Paddy+ Wheat	360	68	74177	26847	78139	51293	3962	1.05	2.91	217	1149
9	IRRI Paddy+Sunflower	360	78	80581	31729	78267	46537	-2314	0.97	2.47	217	1003

Notes for Annex - VI

1. The economic analysis presented in the above exercise is based on the input-output prices applicable for 2015-16 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, 2015-16 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 2015-16 crops. To incorporate the escalations in input prices, which occurred during the growing period of 2015-16 crops, some marginal revisions have been made as under:
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 minimum guaranteed price of wheat at Rs 1300 per 40 kgs, as maintained by the government for 2015-16 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 1320 and Rs 801 per 40 kgs, respectively. While, the average price of IRRI paddy in Sindh is reported at Rs 713 per 40 kgs.
 - 4.3 The wholesale market prices of seed cotton during the post-harvest months of Sep - Feb 2015-16 in the main producer area markets have averaged at Rs 2626 per 40 kgs in the Punjab and Rs 2461 in Sindh.
 - 4.4 The price of sunflower 2014-15 crop has been reported hovering around Rs 2050/40 kgs and Rs 2375 for canola.
 - 4.5 The market prices of sugarcane at mill-gate in the major cane producing areas are reported to hover around Rs 180 per 40 kgs in the Punjab and Rs 182 per 40 kgs in Sindh.
5. The market prices have been adjusted for the marketing expenses to make them effective at the farm level. These expenses amount to Rs 15 per 40 kgs in Punjab and Rs 14.32 in Sindh for sugarcane, Rs 40 for seed cotton in Punjab and Sindh, Rs 45 for rice paddy in Punjab and Sindh, and Rs 35 for wheat and oilseeds.
6. Gross income = (Yield per acre multiplied by price of principal produce at farm gate) plus (value of by-products per acre).
7. Cost of purchased inputs = Cost incurred on seed and related items, fertilizer, supplementary irrigation including labour, canal water rate, pesticides and weedicides.

**ECONOMIC EFFICIENCY OF RESOURCES USE IN SUGARCANE
PRODUCTION IN PUNJAB**
(Based on import parity prices)

Description	Revenue	Traded Cost	Domestic Factor Cost	Profits
-----Rupees per acre-----				
2010-11				
Private Prices	98901	22711	31412	44778
Social Prices	126062	20274	28870	76919
Transfers	-27161	2438	2542	-32141
2011-12				
Private Prices	83642	29497	42730	11415
Social Prices	93148	26330	39877	26941
Transfers	-9506	3167	2853	-15525
2012-13				
Private Prices	96076	32892	44094	19089
Social Prices	79353	29365	41044	8944
Transfers	16723	3528	3050	10145
2013-14				
Private Prices	96076	33384	45775	16916
Social Prices	75351	29713	42670	2968
Transfers	20724	3671	3105	13948
2014-15				
Private Prices	93250	32818	50495	9936
Social Prices	65964	28813	46532	-9381
Transfers	27285	4005	3963	19317

**ECONOMIC EFFICIENCY OF RESOURCES USE IN SUGARCANE
PRODUCTION IN SINDH**
(Based on import parity prices)

Description	Revenue	Traded Cost	Domestic Factor Cost	Profits
-----Rupees per acre-----				
2010-11				
Private Prices	133510	27804	37399	68307
Social Prices	169386	25296	32903	111187
Transfers	-35875	2509	4497	-42881
2011-12				
Private Prices	112554	36467	47891	28197
Social Prices	120362	33033	42718	44611
Transfers	-7808	3434	5172	-16414
2012-13				
Private Prices	126412	40905	49602	35905
Social Prices	104131	36926	44109	23097
Transfers	22281	3979	5493	12808
2013-14				
Private Prices	123032	41579	51892	29561
Social Prices	102577	35738	45986	20852
Transfers	20456	5841	5906	8709
2014-15				
Private Prices	121680	41447	58469	21764
Social Prices	91450	35005	51335	5110
Transfers	30231	6442	7135	16654

**ECONOMIC EFFICIENCY OF RESOURCES USE IN SUGARCANE
PRODUCTION IN PUNJAB**

(Based on export parity prices)

Description	Revenue	Traded Cost	Domestic Factor Cost	Profits
-----Rupees per acre-----				
2010-11				
Private Prices	98901	22711	31412	44778
Social Prices	104332	20274	28870	55189
Transfers	-5431	2438	2542	-10411
2011-12				
Private Prices	83642	29497	42730	11415
Social Prices	76866	26330	39877	10659
Transfers	6776	3167	2853	757
2012-13				
Private Prices	96076	32892	44094	19089
Social Prices	62941	29365	41044	-7468
Transfers	33135	3528	3050	26557
2013-14				
Private Prices	96076	33384	45775	16916
Social Prices	54322	29713	42670	-18061
Transfers	41753	3671	3105	34977
2014-15				
Private Prices	93250	32818	50495	9936
Social Prices	45393	28813	46532	-29952
Transfers	47857	4005	3963	39889

**ECONOMIC EFFICIENCY OF RESOURCES USE IN SUGARCANE
PRODUCTION IN SINDH**
(Based on export parity prices)

Description	Revenue	Traded Cost	Domestic Factor Cost	Profits
-----Rupees per acre-----				
2010-11				
Private Prices	133510	27804	37399	68307
Social Prices	141663	25296	32903	83465
Transfers	-8153	2509	4497	-15158
2011-12				
Private Prices	112554	36467	47891	28197
Social Prices	100805	33033	42718	25054
Transfers	11749	3434	5172	3143
2012-13				
Private Prices	126412	40905	49602	35905
Social Prices	84419	36926	46810	683
Transfers	41993	3979	2792	35222
2013-14				
Private Prices	123032	41579	51892	29561
Social Prices	76767	35738	45986	-4957
Transfers	46265	5841	5906	34518
2014-15				
Private Prices	121680	41447	58469	21764
Social Prices	65944	35005	50040	-19100
Transfers	55736	6442	8430	40864

PER CAPITA AVAILABILITY (CONSUMPTION OF SUGAR: 2012-13 TO 2014-15
(October - September)

S. No	Items	2012-13	2013-14	2014-15
		-----Thousands tonnes-----		
1	Opoening stocks as on 1st October	1394	844	1197
2	Production	5063	5615	5331
3	Imports	8	8	14
4	Export	1029	735	580
5	Closing stocks as on 30th September	844	1197	1362
6	Net availability (item 1+2+3-4-5)	4592	4535	4600
		-----Million-----		
7	Population	191.31	194.53	198.32
		-----Kgs per annum-----		
8	Per capita availability (consumption)	24.00	23.31	23.19
9	Average per capita availability Average (2011-12 to 2013-14)		23.50	

Note:

a) Population of AJ& K, NAS and Afghanrefuges have also been included.

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, 2014-15. |
| 4. For population of AJ&K and Nas: | Population Census Organization, Islamabad. |
| 5. For population of Afghan refugees: | Kasmir Affairs and Northern Areas and States and Frontier Regions Division, Government of Pakistan, Islamabad. |

ANNEX- XII
DOMESTIC AVERAGE WHOLESALE PRICES OF SUGAR IN MAJOR
DOMESTIC MARKETS: 2015 AND 2016

Month	Lahore	Fasilabad	Karachi	Hyderabad	Peshawar	Average
2015						
	----- Rupees per 100 kgs-----					
January	5095	5136	5000	5300	5400	5186
February	5209	5179	5000	5000	5400	5158
March	5225	5191	5000	4800	5250	5093
April	5213	5459	5200	5300	5400	5314
May	5782	5715	5400	5300	5800	5599
June	6025	5851	5800	5800	5975	5890
July	6164	6214	6050	5800	6400	6126
August	7312	6287	6200	6300	6600	6540
September	6300	6308	6100	6300	6550	6312
October	6300	5878	5600	5800	6250	5966
November	5930	5675	5400	5200	5625	5566
December	5650	5788	5250	5200	5438	5465
Average	5850	5723	5500	5508	5841	5685
2016						
January	5453	5713	5400	5300	5800	5533
February	6935	5800	5800	5800	6250	6117
March	5874	5800	5900	5800	6300	5935
April	6100	6188	5950	5850	8500	6518
May	6076	6208	6100	6150	6300	6167
June	6127	6208	6100	6200	6500	6227
Average	6094	5986	5875	5850	6608	6083

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

**AVERAGE WHOLESALE PRICES OF SUGAR IN MAJOR DOMESTIC MARKETS:
2001-02 TO 2015-16 (October- September)**

Year	Lahore	Fasilabad	Karachi	Hyderabad	Peshawar	Average	Increase(+) decrease(-) in average price over
	----- Rupees per 100 kgs-----						Percent
2001-02	2069	2042	2063	2022	2073	2054	-
2002-03	1939	1906	1892	1872	1972	1916	-6.70
2003-04	1813	1769	1788	1743	1853	1793	-6.42
2004-05	2417	2410	2373	2345	2411	2391	33.35
2005-06	3359	3342	3243	3223	3349	3303	38.14
2006-07	2932	2901	2884	2818	2933	2894	-12.40
2007-08	2444	2410	2390	2346	2473	2413	-16.63
2008-09	4049	3997	3998	3938	4090	4014	66.39
2009-10	6203	6161	6138	6084	6276	6173	53.76
2010-11	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	5583	10.04
2015-16 (Oct-Jun)	6049	5917	5722	5700	6329	5944	6.46

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

AVERAGE INTERNATIONAL PRICES OF SUGAR: 2001-02 to 2015-16 (OCT-SEP)

Years	ISA Daily price of Raw sugar (Fob and stowed Caribbean ports in bulk)		London Daily price of White sugar (Fob and stowed European ports in bags of 50 kgs)		Difference between White and raw sugar prices		
	US Cents/ lb	US\$/ tonne	US Cents/ lb	US\$/ tonne	US Cents/ lb	US\$/ tonne	Per cent of White Sugar
2001-02	6.85	151.01	10.59	232.48	3.74	81.47	35.32
2002-03	8.12	179.03	10.36	228.35	2.24	49.32	21.62
2003-04	6.57	144.84	10.16	223.93	3.59	79.09	35.33
2004-05	8.97	197.75	12.48	275.06	3.51	77.31	28.13
2005-06	14.84	327.14	18.34	407.75	3.50	80.61	19.10
2006-07	10.43	229.90	14.80	326.82	4.38	96.92	29.55
2007-08	12.38	273.02	15.62	344.44	3.24	71.42	20.73
2008-09	15.42	340.02	18.94	417.56	3.52	77.54	18.57
2009-10	20.41	450.03	26.07	574.68	4.86	107.23	17.66
2010-11	26.56	585.45	32.29	711.93	5.74	126.49	17.77
2011-12	22.68	499.96	27.54	607.20	4.86	107.23	17.66
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	14.75	325.23	18.98	418.35	4.22	93.12	22.26
Oct	13.91	306.66	17.62	388.45	3.71	81.79	21.06
Nov	14.55	320.77	18.18	400.79	3.63	80.03	19.97
Dec	14.64	322.75	18.56	409.17	3.92	86.42	21.12
Jan	14.05	309.74	18.86	415.78	4.81	106.04	25.50
Feb	13.28	292.77	17.62	388.45	4.34	95.68	24.63
Mar	15.44	340.39	19.79	436.29	4.35	95.90	21.98
Apr	15.23	335.76	19.89	438.49	4.66	102.73	23.43
May	16.92	373.02	21.29	469.36	4.37	96.34	20.53

Source: International Sugar Organization (ISO), London.

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

S.No	Item	'May 2016		2015- 16 (Oct-May)		During 2012-13 to 2014-15	
		US \$ per tonne					
1.	Average fob (London) price	469.35		418.35		456.37	
2.	Exchange rate (Rs/\$)	104.59		104.59		104.59	
3.	Average fob Karachi price (assuming equivalent to fob London price)	49089		43755		47732	
4.	Transport charges from interior Sindh to port, special packing, inspection transit insurance, loading and unloading, clearing and forwarding and port terminal charges	1800		1800		1800	
5.	Bank commission @ 1.25 % of fob price	614		547		597	
6.	Inspection charges	429		429		429	
7.	Ex-mill price of sugar (item 3 minus items 4 through 6)	46247		40979		44906	
		Punjab	Sindh	Punjab	Sindh	Punjab	Sindh
8.	Processing cost of sugar (a)	15724	15724	13933	13933	15268	15268
9.	Value of cane to produce one of sugar (item 7-item 8)	30523	30523	27046	27046	29638	29638
10.	Provincial base sugar recovery (Percent)	9.94	10.65	9.94	10.65	9.94	10.65
11.	Quantity of cane in tonnes required to produce one tonne of sugar ((100/ item 10)	9.79	10.50	9.79	10.50	9.79	10.50
12.	Price of one tonne of sugarcane (item 9/ item 11)	3117.76	2906.94	2762.65	2575.84	3027.38	2822.67
13.	Price of 40 kgs of cane	124.71	116.28	110.51	103.03	121.10	112.91

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 Agency, Karachi.

Note

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

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

PRICE OF WHITE SUGAR

No	Item	May 2016		2015-16 (Oct-May)		During 2012-13 to 2014-15	
----- US \$ per tonne -----							
1.	Average fob (London) price	469.35		418.35		456.37	
2.	Freight charges upto Karachi	60		60		60	
3.	C & f cost at Karachi port	529		478		516	
4.	Exchange rate (Rs/\$)	104.59		104.59		104.59	
----- Rs per tonne -----							
5.	C & f cost at Karachi port (Pak rupees)	55365		50031		54007	
6.	Marine insurance @ 0.23 % of c & f cost	127		115		124	
7.	Cif cost at Karachi port	55492		50146		54131	
8.	Landing charges @1% of Cif Value	555		501		541	
9.	L.C opening charges @0.04% of C&f Value	22		20		22	
10.	Bank services charges @0.1% of C&F value	55		50		54	
11.	Provision of shortage & unforeseen losses @0.25% of C&F	138		125		135	
12.	Stevedoring charges	725		725		725	
13.	Clearing & forwarded charges	8		8		8	
14.	Misc: Exp 0.05% of of C&F value	28		25		27	
15.	Wharfage & Weightment	54		54		54	
16.	Importer's profit 2% of C&F value	1107		1001		1080	
17.	Transport charges for up country	2200		2200		2200	
18.	Incidental charges incurred on imported sugar	4893		4709		4846	
19.	Ex-mill/ market cost of imported sugar	60385		54855		58977	
		Punjab	Sindh	Punjab	Sindh	Punjab	Sindh
20.	Processing cost of sugar (a)	20531	20531	18651	18651	20052	20052
21.	Value of cane to produce one of sugar (item 19-item 20)	39854	39854	36204	36204	38925	38925
22.	Provincial base sugar recovery (Percent)	9.94	10.65	9.94	10.65	9.94	10.65
23.	Quantity of cane in tonnes required to produce one tonne of sugar ((100/ item 22)	9.79	10.50	9.79	10.50	9.79	10.50
24.	Price of one tonne of sugarcane (item 21/item 23)	4070.89	3795.62	3698.08	3448.02	3976.01	3707.15
25.	Price of 40 kgs of cane	162.84	151.82	147.92	137.92	159.04	148.29

Sources:

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

Note

- (a) Ratio of cost of cane to processing cost has been estimated at 66:34 from publication " Cost of Production of Sugar " jointly prepared in 1998 by APCOM and Business & Consultancy Services.

MIL-GATE PRICES OF SUGARCANE WORKED BACK FROM THE EXPECTED WHOLESALE MARKET PRICES
OF SUGAR DURING 2015-16

S.No	Item	WORKED BACK PRICES OF SUGARCANE					
		-----Rupees per tonne-----					
1.	Average wholesale market prices of sugar (a)	60000	65000	70000			
2.	Wholesale dealer margin @5% on net price	2655	2876	3097			
3.	Federal excise duty @ 8%	4248	4602	4956			
4.	Net price of sugar (items 1-2-3)	53097	57522	61947			
		Punjab	Sindh	Punjab	Sindh	Punjab	Sindh
5.	Processing cost of sugar (a)	18053	18053	19558	19558	21062	21062
6.	Value of cane to produce one tonne of sugar (item 4-item 5)	35044	35044	37965	37965	40885	40885
7.	Provincial base sugar recovery (Percent)	9.94	10.65	9.94	10.65	9.94	10.65
8.	Quantity of cane in tonnes required to produce one tonne of sugar ((100/ item 7)	9.79	10.50	9.79	10.50	9.79	10.50
9.	Price of one tonne of sugarcane (item 6/item 8)	3580	3338	3878	3616	4176	3894
10.	Price of 40 kgs of cane	143.18	133.50	155.12	144.63	167.05	155.75

Note

- (a) Ratio of cost of cane to processing cost has been estimated at 58:34 from publication " Cost of Production of Sugar " jointly prepared in 1996 by APCoM and Business & Consultancy Services, Islamabad

Sources:

- For prices: Annex-XIII
For FED: FBR, Islamabad.

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

S. No.	Name of variety	Name of institute	Year of Release	Maturity	Cane Yield (t/ha)	Sugar recovery (%)
Punjab						
1.	BF-162	AARI, Fsd.	1990	Early	100	10.5
2.						
2.	SPSG-26	SRI, Jhang	1991	Early	100	10.2
3.	BF-129	AARI, Fsd.	1996	Mid	100	8.8
4.	CP-43-33	AARI, Fsd.	1996	Early	90	10.8
5.	CP-72-2086	AARI, Fsd.	1996	Early	90	12.0
6.	CP-77-400	AARI, Fsd.	1996	Early	100	12.7
7.	CPF-237	AARI, Fsd.	2000	Early	95	12.5
8.	SPF-213	AARI, Fsd.	2000	Mid	100	11.0
9.	HSF-240	AARI, Fsd.	2002	Early	130	12.5
10.	SPF-234	AARI, Fsd.	2002	Early	100	11.6
11.	SPF-245	AARI, Fsd.	2004	Early	100	11.0
12.	HSF-242	AARI, Fsd.	2006	Early	108	12.4
13.	CPF-243	AARI, Fsd.	2006	Early	102	12.7
14.	NSG-555	SRI, Jhang	2008	Mid	119	10.1
15.	NSG-311	SRI, Jhang	2008	Mid		
16.	CPF-246	AARI, Fsd.	2010	Early	105	12.0
17.	CPF-247	AARI, Fsd.	2010	Early	105	12.5
Sindh						
18.	Ghulabi-95	ARI, Tandojam	1996	Early	200	10.7
19.	NIA-96	NIA, Tandojam	1998	Mid	180	10.5
20.	Thatta-10	NSCRI, Thatta	2004	Early	180	11.0
21.	NIA-2004	NIA, Tandojam	2004	Mid	170	9.5
22.	LRK-2001	QAARI, Larkan	2005	Early	200	11.0
KPK						
22.	CPM-13	SCRI, Mardan	1989	Early	70	12.5
23.	CO-1321	SCRI, Mardan	1989	Early	70	12.0
24.	Mardan -92	SCRI, Mardan	1992	Mid	100	12.0
25.	Mardan -93	SCRI, Mardan	1993	Early	100	12.5
26.	CP-77-400	SCRI, Mardan	1996	Mid	80	12.7
27.	Jn-88/1	SBS, Dargai	1996	Early	70	12.7
28.	Abid-96	SBS, Dargai	1996	Early	70	12.5
29.	SN-98	SCRI, Mardan	1998	Early	72	12.2
30.	MCP-421	SCRI, Mardan	2003	Mid	80	12.5
31.	Mardan-2005	SCRI, Mardan	2005	Early	80	12.2
32.	KB-2010	ARS, Bannu	2010	Early		

Source:PARC

