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SUGARCANE POLICY ANALYSIS FOR 2008-09 CROP

AGRICULTURE POLICY INSTITUTE
MINISTRY OF FOOD, AGRICULTURE AND LIVESTOCK
GOVERNMENT OF PAKISTAN
ISLAMABAD

July, 2008

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ABBREVIATIONS

API	Agriculture Policy Institute
AARI	Ayub Agricultural Research Institute
AJ&K	Azad Jammu and Kashmir
ALMA	Agricultural and Livestock Marketing Adviser
APCOM	Agricultural Prices Commission
BCR	Benefit Cost Ratio
CBR	Central Board of Revenue
CIF	Cost, Insurance and Freight
COP	Cost of Production
CPI	Consumer Price Index
CRS	Crop Reporting Service
CPR	Cane Procurement Receipt
DAP	Di-Ammonium Phosphate
DRC	Domestic Resource Cost
DPV	Duty Paid Value
ECC	Economic Coordination Committee
E&M	Economics & Marketing
EPC	Effective Protection Coefficient
EPB	Export Promotion Bureau
FAO	Food and Agriculture Organization
FBS	Federal Bureau of Statistics
FCA	Federal Committee on Agriculture
FOB	Free on Board
FYM	Farm Yard Manure
GDP	Gross Domestic Product
GST	General Sales Tax
HYVs	High Yielding Varieties
IPM	Integrated Pest Management
ISO	International Sugar Organization
LSD	Light Speed Diesel
MINFAL	Ministry of Food, Agriculture and Livestock
NARC	National Agricultural Research Centre
NAs	Northern Areas
NFDC	National Fertilizer Development Centre
NPC	Nominal Protection Coefficient
NWFP	North West Frontier Province
OLS	Ordinary Least Squares
PARC	Pakistan Agricultural Research Council
PSMA	Pakistan Sugarmills Association
PSST	Pakistan Society of Sugar Technologists
TCP	Trading Corporation of Pakistan
USDA	United States Department of Agriculture
WPI	Wholesale Price Index
WAPDA	Water and Power Development Authority
WTO	World Trade Organization

SUMMARY OF FINDINGS AND RECOMMENDATIONS

Findings

*S*ugarcane is a tropical crop cultivated mainly in the districts of Jhang, Faisalabad, Sargodha, Kasur, and T.T Singh of Punjab; Hyderabad and Badin of Sindh; and Charsadda and Mardan of NWFP.

2 The cane production has increased from 54.74 million tonnes in 2006-07 to 62.64 million tonnes in 2007-08 mainly due to 12.3 percent expansion in acreage as the yield improved only by 1.9 percent. Perceiving the bumper crop the sugar mills delayed the crushing to create glut and pay low prices to the cane growers.

3. Sugar production from 2007-08 crops was estimated at 4750 thousand tones. Added the opening stock of 986 thousand tones, total availability of sugar for 2008 (up to 30th September) came to 5736 thousand tones against the total requirement estimated at 3887 thousand tones.

4. However, it has been observed that sugar mills generally start crushing in December and sugar requirement for October and November has also to be met from the previous year's production. Therefore, to avoid the price hike likely to happen due to delayed crushing about one million tones of sugar should be available after 30th September, 2008. Thus total sugar requirement up to 30th November would be 4887 thousand tonnes implying there will still be a surplus of about 850 thousand tones.

5. Under the rising trend in sugar prices both in global as well as in domestic markets and less domestic production due to less cultivation under 2008-09 crop it would be advisable for the government to buy this surplus for reserve stock to avoid likely expensive import of sugar during 2009.

6. Based on the analysis of the relevant factors discussed in main text of this Report, likely policy options for sugarcane, 2008-09 crop are given in the following Table:

Price Policy Options

S. No	Basis	Likely prices of sugarcane at mill gate		
		Punjab	NWPF	Sindh
		Rupees per 40 Kgs		
1.	Cost of production of sugarcane (Table-8)	68	60	70
2.	Market price realized by growers (2007-08)	55	58	60
3.	Domestic parity prices worked back from:			
	i) Average wholesale price of "gur" during October-January, 2007-08 (Annex-XIV)	96	93	-
	ii) Average wholesale prices of sugar during 2007-08 (Annex-XV) at Price option:			
	a) Rs 2500 per tonne	51	-	53
	b) Rs 2700 per tonne	57	-	60
	c) Rs 2900 per tonne	64	-	67
	d) Rs 3100 per tonne	71	-	74
4.	If real value of cane price for 2007-08 crop were to be equated with the level of 2000-01	54	55	54
5.	Import parity prices (economic) as worked back form the average fob (London) price of white sugar (Annex-XI): During 2007-08 (October – April)	65	65	67
6.	Export parity price (economic) as worked back from the average fob (London) price of white sugar (Annex- XIII) During 2007-08 (October – April)	46	46	47
7.	Cost of domestic resources (Table –17) involved in:	**Rupees per US $ (At exchange of Rs 61=one US $)**		
	i) Producing cane for sugar import substitution - Based on 2007-08 prices of sugar	48	-	44
	ii) Producing cane for exports of sugar - Based on 2007-08 prices of sugar	73	-	83

7. In view of the foregoing situation, the pricing policy in the context of sugarcane should aim at consolidating the gains and restricting the sugarcane cultivation to the most suitable places. Given the current input-output relationship and the international prices, there is not much scope for increasing the price of sugarcane. In the given situation of: (i) rising trend in market prices of sugar, (ii) poor prospects for exports of sugar, (iii) recurring water shortages and high water requirements of sugarcane, *the top priority of the government pricing policy should be to send the correct signal to farmers to improve crop yield through proper input use and improved crop practices.* The farmers also need to be protected against the malpractices in marketing of sugarcane like purchases of CPRs at discount prices by the middlemen, under-weighment, delayed payments by the sugar mills etc as practiced in the past.

8. In the context of better prices for the growers, problems of the sugar industry like cash credit, stocks and imports regulation have assumed crucial importance. The Cost Accounts Organization or the Ministry of Industries should estimate the ex-mill cost of sugar keeping in view the cost of sugarcane, processing cost, sucrose recovery etc. The imports of sugar should be so regulated as to ensure the ex-mill price of sugar worked out by the M/o Industries to the sugar mills. The problems of liquidity faced by the industry also need to be addressed.

9. There is also scope for providing relief in the cost of purchased farm inputs through the adjustments of sales taxes and other levies which the Government should seriously consider. In view of the difficulties faced by the growers as well as the industry the current policy of fixing the prices of cane by the provincial governments needs to be reconsidered and the prices of sugarcane be determined by the federal government. The prices once announced after due consideration of relevant factors should be ensured to the growers.

RECOMMENDATIONS

- Prices of Sugarcane, 2008-09 Crop

10. In view of the problems faced by the growers as well as the sugar industry, the current policy of fixing the cane prices by the provincial governments needs to be reconsidered. The prices of sugarcane as in case of other crops should be determined by the Federal Government.

- Linking Prices of Sugarcane to its Quality

11. As per previous practice, cane is purchased on weight basis instead of its quality. improve by sugarcane industry. It is imperative that the price of cane be linked to its sucrose content. This is the only solution of the problems being faced. The efforts being done in this connection need to be emphasized at Federal level.

- Improving Marketing of Sugarcane

12. The problems of under-weighment, delayed payments purchase of CPRs role of middle men etc which were subsided last year due to short supply of sugarcane are again observed during API's mini field survey in the month of January 2008.

- Value-addition in Sugar Industry

13. In the wake of fast approaching globalization and WTO requirements, sugar industry which relies on manufacturing sugar in Pakistan needs to further concentrate on value-addition. The industry should pay full attention to produce ethanol to reduce the cost of production of sugar. Other by-products include; citric acid, casino, monosodium, liquid sugar, yeast from molasses, while bagasse can be used in the production of chipboards, paper, compressed fiber, and electricity.

- Improving Productivity

14. Statistics shows a vast scope of improvement in cane yield and sucrose content in Pakistan as it lies much below in comparison with other sugarcane and producing countries.

- **Varietals Development**

15. The Government should pursue the PSMA and provincial research institutes to emphasize on cane varietals development. Provincial governments should take strict measures to implement the ECC decision regarding the release and utilization of "Cess Fund" in this regard.

- **Improved Cultural Practices**

16. Provincial departments of agriculture extension should take the following steps in this regard:

- ❖ Promote use of deep tillage for seedbed preparation for sugarcane cultivation.
- ❖ Practises recommended 'row to row' distance in sugarcane fields for effective weed control.
- ❖ Discourage cultivation of un-approved varieties of sugarcane.
- ❖ Motivate farmers for 'Hot Water Treatment' of sugarcane setts for disease control.
- ❖ Apprise the farmers for achieving the desirable plant population per acre.
- ❖ Educate sugarcane growers for using different fertilizers in recommended dosage.

- **Role of Sugar Industry in Cane Development**

17. To promote sugarcane crop, the sugar industry of Pakistan should: i) Take concrete measures to multiply and disseminate high sucrose varieties along with necessary extension work for development of sugarcane crop; ii) Take immediate steps to increase supply of improved varieties of cane seed among the farmers in addition to government efforts in this regard; iii) 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; iv) Discourage the role of middlemen in cane marketing;

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July 12, 2008

SUGARCANE POLICY ANALYSIS FOR 2008-09 CROP

INTRODUCTION

18. Sugarcane is cultivated on more than one million hectares with the production of around two million tonnes. It provides raw material to the 2nd largest agro-based industry comprising 78 sugar mills. Besides a major source of live stock fodder during winter it plays a crucial role in providing employment to millions of rural forming and non-farming population through forward and backward linkages and add billions of rupees in the rural income..As an import substitution it helps save billions of dollars by meeting the sugar requirement of population of more than 160 million.

19. At global level especially under WTO regime, efficient use of resources is the prime need. Pakistan has been unable to achieve yield potential of sugarcane that ranges from 70 to 80 tonnes per hectare. Sugarcane is high water delta crop so its horizontal propagation will not be feasible; therefore, this crop needs to be developed through enhancement of yield per hectare. However, subsidies granted by the developed countries to their sugar sector have distorted the international market having negative impact on the competitiveness of developing countries. Therefore, under the circumstances the only option for improving competitiveness of Pakistan's sugar sector is to reduce cost of production of sugarcane and sugar through enhancing productivity of these enterprises.

20. The rising prices of inputs are the most important driving force in moving the cost of production in upward direction. Had the increased costs been neutralized by the output prices the cane growers would have applied balanced inputs. But since the cane prices announced by the provinces are not properly implemented, the growers have to be at receiving end particularly during good crop year leading to tense relationship between growers and the millers. This dispute may only be solved when both stakeholder will take interest at their ends i.e. growers will sow high yielding varieties with high sucrose recovery and the miller should also concentrate to utilized by-products of sugarcane by converting these into the value added products so that cost of production of sugar and sugarcane can be reduced. These matters were discussed in detail in the API's Standing

Committee meeting held on 25th March, 2008 with the conclusions that: i) Cost of production of sugarcane should be reduced by cultivating high yielding varieties of the core; ii) Reduced cost of production of sugar by converting by products into value added products; ii) Government should increase subsidy on the inputs.

21. This document entails a comprehensive background and economic analysis of all the possible factors impacting on the likely policy options. These include: Optimum planting times; major cane producing districts; Cost of production of sugarcane with major contributing inputs; Market prices of sugarcane and sugar; Parity prices estimated from domestic and international prices of sugar; Efficiency of domestic resource use in sugarcane enterprise; Ranking among competing enterprises; Alternate payment system based on sucrose contents; and Productivity and Marketing issues of sugarcane crop.

22. The analysis of the above mentioned factors and the issues as entailed in this report may provide the workable policy options to the Federal as well as Provincial Governments.

2. SUGARCANE PLANTING AND HARVESTING SEASONS

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

Table-1: Planting Times of Sugarcane by Province

Province	Planting Time	
	Spring crop	**Autumn crop**
Punjab	15th February to 3rd week of March	September
Sindh	1st February to 15th March	September to 15th October
NWFP	15th February to 3rd week of March	September

Source: Sugarcane Coordinator, NARC, Islamabad.

24. Harvesting of sugarcane generally commences in October and lasts upto April-May depending upon the crop size. In Sindh the crop matures a couple of weeks earlier than in the Punjab and the NWFP.

3. PROVINCIAL SHARE IN AREA AND PRODUCTION OF SUGARCANE

25. Provincial shares in area and production of sugarcane have been worked out on the basis of three years average of 1997-98 to 2007-08 and changes therein are discussed in Table-2 .

Table-2: Comparison of Provincial Shares in Area and Production of Sugarcane: 1997-98 to 1999-00 and 2005-06 to 2007-08

Country/Province	Area		Production	
	1997-98 to 1999-00	2005-06 to 2007-08	1997-98 to 1999-00	2005-06 to 2007-08
	---------- Percent ----------			
Pakistan	**100.0**	**100.0**	**100.0**	**100.0**
Punjab	66	69	60	68
Sindh	24	21	31	23
NWFP	10	10	09	09

Source: Annex-I.

4. IMPORTANT SUGARCANE PRODUCING DISTRICTS

26. Sugarcane is mainly produced in 26 districts of Punjab, 11 of Sindh and 7 of NWFP. These districts collectively account for 98 per cent of the sugarcane's area and production (Annex-II).

5. AREA YIELD AND PRODUCTION OF SUGARCANE

27. During the decade ending 2007-08, area under sugarcane at country level has ranged between 908 to 1155 thousand hectares (2244 to 2854 acres) and the production of sugarcane has ranged between 44 to 63 million tones with an average yield of 45 to 54 tonnes per hectare. The change in the long and short terms is presented in Tables 3 & 4:

Table-3: Average Annual Growth Rates of Area Yield and Production of Sugarcane: 1997-98 to 2007-08

Country/Province	Area	Yield	Production
	Percent per annum		
Pakistan	**(-) 0.2**	**(+) 1.1**	**(+) 0.9**
Punjab	(+) 0.3	(+) 2.1	(+) 2.5
Sindh	(-) 1.9	(-) 0.6	(-) 2.5
N.W.F.P	(-) 0.2	(-) 0.1	(-) 0.3
Balochistan+	(-) 4.5	(-) 1.6	(-) 6.2

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

Table-4: Area, Yield and Production of Sugarcane: 2006-07 and 2007-08 Crops

Country/ Province	Area		Changes	Yield		Changes	Production		Changes
	2006-07	2007-08		2006-07	2007-08		2006-07	2007-08	
	000 ha		Per cent	Kgs per ha		Per cent	000 tonnes		Per cent
Pakistan	**1028.8**	**1155.1**	**(+)12.3**	**53**	**54**	**(+) 1.9**	**54741.4**	**62644.6**	**(+) 14.4**
Punjab	711.8	800.9	(+)12.5	53	54	(+) 2.7	37541.9	43378.5	(+) 15.5
Sindh	214.7	245.4	(+) 14.3	58	58	(-) 0.3	12529.2	14279.0	(+) 14.0
NWFP	101.8	108.3	(+) 6.4	46	46	(+) 0.3	4645.0	4959.0	(+) 6.8
Balochistan	0.5	0.5	(+) 0.0	51	56	(-) 11.1	25.3	28.1	(+) 11.1

Source: Annex-I.

5.1 Domestic and Global Sugarcane Yield Gap

28. Sugarcane is grown nearly in all tropical and subtropical regions of the world. The area, production and yield statistics on of top 20 sugarcane producing countries during 2006 have been provided in Table-5 below.

Table-5: Area, Yield and Production of Sugarcane During 2006

S. No.	Country	Area (Million/hect.)	Yield (Tones/hect.)	Production (Million tones)
1	Columbia	0.426	93.542	39.849
2	Australia	0.415	91.973	38.169
3	China	1.220	82.528	100.684
4	Indonesia	0.370	81.486	30.150
5	Mexico	0.668	75.744	50.597
6	Brazil	6.153	73.995	455.291
7	U.S.A.	0.364	73.723	26.835
8	India	4.200	66.945	281.170
9	Argentina	0.285	65.961	18.799
10	Philippines	0.393	61.947	24.345
11	Viet Nam	0.285	55.014	15.679
12	Thailand	0.936	50.917	47.658
13	**Pakistan**	**0.907**	**49.246**	**44.666**
World total		**16.622**	**71.000**	**1173.892**

Source: FAOSTAT.

29. A comparison world's major sugarcane producing countries indicates that Pakistan is 5th in terms of area, 6th in production but falls at the bottom in terms of productivity in Pakistan should therefore explore about the technology used in the countries with high productivity.

5.2 Sugarcane Crushed and Sugar Made in Pakistan

30. The sugarcane crushed and sugar made in Pakistan along with percent recovery during 2001-02 to 2007-08 is given in the Table-6 below:

Table-6: Sugarcane Crushed and Sugar Made in Pakistan: 2001-02 to 2007-08

Year	Cane crushed		Sugar made		Recovery (Per cent)
	(000 tones)	% Share	(000 tones)	% Share	
Pakistan					
2001-02	36708.6	100.0	3197.8	100.0	8.71
2002-03	41786.7	100.0	3654.7	100.0	8.75
2003-04	43661.3	100.0	3997.1	100.0	9.15
2004-05	32101.7	100.0	2922.1	100.0	9.10
2005-06	30090.6	100.0	2588.1	100.0	8.60
2006-07	40468.0	100.0	3516.5	100.0	8.70
2007-08	52716.2	100.0	4728.6	100.0	8.97
Avg.	**39647.6**	**100.0**	**3515.3**	**100.0**	**8.85**

Note: Rounding of figures may result in slight differences.

Source: PSMA Statement CP # 12/2007-08 as on 31-05-2008

31. The perusal of the table-6 reveals that sugarcane and in turn sugar production has widely fluctuated during the period under analysis leading to marginal exports in surplus years and import in deficit particularly in 2004-05 and 2005-06. However, record production of sugar from 2007-08 crop (4.7 m. tonns) against the estimated consumption requirement of 3.9 m. tonnes may provide an export surplus.

6. TARGETS VS ACHIEVEMENTS: 2007-08 CROP

32. Federal Committee on Agriculture (FCA) had fixed sugarcane production target for 2007-08 crop at 55.9 million tonnes. As per second estimates of Provincial Agriculture Departments, sugarcane production is reported at 62.6 million tones, showing 12.1 percent more than the target. Excessive achievement is contributed due to 11.1 percent in area and 0.9 percent in yield. (Table-7).

Table-7: Targets and Estimated Achievements of Area, Yield and Production of Sugarcane: 2007-08 Crop

Country/ Province	Area		Deviation from the target	Yield		Deviation from the target	Production		Deviation from the target
	Target	Achieve-ment		Target	Achieve-ment		Target	Achieve-ment	
	--- 000 ha ---		Per cent	Tonnes/ha		Per cent	-- 000 tonnes --		Per cent
Pakistan	1039.5	1155.1	(+) 11.1	53.8	54.2	(+) 0.9	55876.0	62644.6	(+) 12.1
Punjab	700.0	800.9	(+) 14.4	53.6	54.2	(+) 1.1	37500.0	43378.5	(+) 15.7
Sindh	230.0	245.4	(+) 6.7	57.4	58.2	(+) 1.4	13200.0	14279.0	(+) 8.2
NWFP	109.1	108.3	(-) 0.7	47.2	45.8	(-) 3.1	5153.5	4959.0	(-) 3.8

Sources: 1. For targets: Working paper of the 87th Meeting of FCA.
2. For achievements: Annex-I.

7. COST OF PRODUCTION OF SUGARCANE

33. The estimation of cost of production of sugarcane 2008-09 crop cultivated in the Punjab, Sindh and NWFP is based on the input-output parameters as used in the COP estimates for the 2007-08 crop and the latest prices of various inputs and custom hire rates of cultural operations collected through field survey conducted by API in the foremost sugarcane growing areas of the Punjab, Sindh and NWFP during January 2008. These rates were reviewed in the light of discussion held in the meeting of the API's Standing Committee on sugarcane, held on 25th March 2008 at Islamabad. A summary of these estimates along with their corresponding estimates for 2007-08 crop are presented in table-8.While their details are given in Annexes-III to V.

Table-8: Average Farmers' Cost of Production of Sugarcane: 2007-08 and 2008-09 Crops

Items	Unit	Cost estimates		Increase in 2008-09 over 2007-08
		2007-08 Crop	2008-09 Crop	
Punjab				
1. Cost of cultivation	Rs/acre	28819	34666	5847
2. Yield	40 kgs/acre	565.15	565.15	-
3. Cost of production at farm level	Rs/40 kgs	50.99	61.34	10.35
4. Marketing cost	"	6.50	7.25	0.75
5. Cost of production at mill-gate	"	57.49	68.59	11.10
Sindh				
1. Cost of cultivation	Rs/acre	34972	42093	7121
2. Yield	40 kgs/acre	676.02	676.02	-
3. Cost of production at farm level	Rs/40 kgs	51.73	62.27	10.53
4. Marketing cost	"	6.57	7.32	0.75
5. Cost of production at mill-gate	"	58.30	69.71	11.28
NWFP				
1. Cost of cultivation	Rs/acre	26734	30901	4167
2. Yield	40 kgs/acre	585.46	585.46	-
3. Cost of production at farm level	Rs/40 kgs	45.66	52.78	7.12
4. Marketing cost	"	6.52	7.27	0.75
5. Cost of production at mill-gate	"	52.18	60.05	7.87

Source: Annex-III to V.

34. The escalated cost of production of sugarcane in all the three provinces have mainly resulted from unexpected increases in the prices of phosphoric fertilizers. The rises in the charges of cultural operations, wage rates, land rent in line with inflationary trend in the economy have also caused increase in the cost of production.

7.1 Cost of major operations/inputs

35. The shares of different operations and farm inputs in the total cost of cultivation of sugarcane 2007-08 and 2008-09 crops in the Punjab, Sindh and NWFP are shown in the Table-9 :

Table-9: Cost of major operations/inputs of Sugarcane: 2007-08 and 2008- 09 Crops

Operations/inputs	2007-08 crop	2008-09 crop	Shares in the increased cost
	Rs/acre		Per cent
	Punjab		
1. Land preparation	2910 (10)	3269 (10)	6.46
2. Seed and sowing operations	3257 (11)	3353 (10)	1.72
3. Intercultural and earthling-up	755 (3)	858 (2)	1.85
4. Plant protection	190 (1)	192 (1)	0.04
5. Irrigation	3550 (12)	3723 (11)	3.13
6. Fertilizer including FYM	3578 (12)	6815 (20)	58.18
7. Land rent	6500 (23)	7042 (20)	9.74
8. Harvesting and stripping	3916 (14)	4476 (13)	10.06
9. "Others"	4163 (14)	4655 (13)	8.83
10. Total cost	**28819 (100)**	**34383 (100)**	**100.00**
	Sindh		
1. Land preparation	3715 (11)	4125 (10)	5.68
2. Seed and sowing operations	5322 (15)	5471 (13)	2.17
3. Intercultural and earthling-up	1493 (4)	1694 (4)	2.79
4. Plant protection	270 (1)	275 (1)	0.06
5. Irrigation	1598 (5)	1796 (4)	2.75
6. Fertilizer including FYM	5139 (15)	9173 (22)	55.99
7. Land rent	7333 (21)	8000 (19)	9.25
8. Harvesting and stripping	4732 (14)	5408 (13)	9.38
9. "Others"	5370 (14)	6236 (14)	12.02
10. Total cost	**34972 (100)**	**42178 (100)**	**100.00**
	NWFP		
1. Land preparation	1605 (6)	1761 (6)	3.74
2. Seed and sowing operations	4536 (16)	4652 (15)	2.78
3. Intercultural and earthling-up	1496 (6)	1707 (6)	5.06
4. Plant protection	264 (1)	269 (1)	0.12
5. Irrigation	2653 (10)	2890 (9)	5.70
6. Fertilizer including FYM	3736 (14)	6026 (20)	55.05
7. Land rent	7500 (28)	8125 (26)	15.02
8. Harvesting and stripping	943 (4)	1077 (3)	3.24
9. "Others"	4001 (15)	4387 (14)	9.28
10. Total cost	**26734 (100)**	**30894 (100)**	**100.00**

Notes:

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

7.2 Prices of major farm inputs

36. The prices of major farm inputs applied in calculation of the cost of production of sugarcane for the 2007-08 and 2008-09 crops are given as below:

Items	Units	2007-08 crop	2008-09 crop	Per cent change
		Punjab		
1. HSD	Rs/litre	38.80	44.20	13.92
2. Power tariff	Rs/kwh	3.28	3.28	-
3. DAP	Rs/bag	908	2780	206.17
4. Urea	Rs/bag	532	615	15.60
5. Seed	Rs/40 kgs	87	87	-
		Sindh		
1. HSD	Rs/litre	38.80	44.20	13.92
2. Power tariff	Rs/kwh	3.28	3.28	-
3. DAP	Rs/bag	848	2800	230.19
4. Urea	Rs/bag	542	610	12.55
5. Seed	Rs/40 kgs	78	78	-
		NWFP		
1. HSD	Rs/litre	38.80	44.20	13.92
2. Power tariff	Rs/kwh	3.28	3.28	-
3. DAP	Rs/bag	920	2700	193.48
4. Urea	Rs/bag	530	610	15.09
5. Seed	Rs/40 kgs	95	95	-

8. MARKET PRICES OF SUGARCANE

37. The API conducted field visits in the important sugarcane growing areas of the Punjab, Sindh and the NWFP provinces, during January 2008. During the course of the field survey, the sugarcane growers informed about the difficulties and the problems encountered by them in selling their sugarcane.

38. The Government of Punjab fixed sugarcane price at Rs 60 per 40 kgs but prices received by growers ranged between Rs 48 – 51 per 40 Kgs at private purchasing centers. However at mill gate they reported to get about Rs55.

39. In Sindh sugarcane is mostly purchased by the middlemen and the prices as reported by the growers have ranged from Rs 58 to 60 per 40 kgs against Rs 63 per 40 kgs announced by the provincial government.

40. In the NWFP, it was observed that due to depressed market prices of gur during the current season, supply of cane was normal and regular compared to last year. It was also reported that the cess fund is not being utilized for the purpose of development of the infrastructure.

9. NOMINAL AND REAL INDICATIVE AND MARKET PRICES OF SUGARCANE: 2000-01 TO 2007-08

41. The overtime changes in the purchasing power of sugarcane have been ascertained from its nominal prices deflated by the Consumer Price Index (CPI). The details of estimation are given in Table-10 and depicted in figures 1 to 4.

Table-10: Nominal and Real Indicative and Market Prices of Sugarcane realized by the Growers in the Punjab and Sindh: 2000-01 to 2007-08

Crop year	Nominal prices				Consumer Price Index (CPI)	Real Prices			
	Punjab		Sindh			Punjab		Sindh	
	Indicative *	Market	Indicative*	Market		Indicative	Market	Indicative	Market
1	2	3	4	5	6	7=(2/6)x 100	8=(3/6)x 100	9=(4/6)x 100	10=(5/6)x 100
	---- Rs per 40 kgs ----				2000-01=100	---- Rs per 40 kgs ----			
2000-01	35	45	36	50	100.00	35	45	36	50
2001-02	40	37	43	47	103.54	39	36	42	45
2002-03	40	35	43	36	106.75	37	33	40	34
2003-04	40	34	41	35	111.63	36	30	37	31
2004-05	40	40	43	41	121.98	33	33	35	34
2005-06	45	60	60	60	131.18	35	46	46	46
2006-07	60	60	67	67	142.36	42	42	47	47
2007-08	60	55	63	60	153.46	39	36	41	39

Sources:
1. Economic Survey of Pakistan, 2006-07.
2. For 2007-08 (July-January), State Bank of Pakistan.

* Minimum purchase price of sugarcane at mill-gate fixed by the Provincial Governments.

9.1 Nominal and Real Indicative and Market Prices in the Punjab

42. The numeric of the table 9 indicate that the real purchasing power of sugarcane in terms of indicative prices and in reference to the year 2000-01 improved by 11 percent in 2001-02 but subsequently it continued deteriorating upto 2004-05 mainly because indicative prices remained stagnant during this period. Resultantly sugarcane production declined sharply in 2004-05 and 2005-06 which led to enhanced indicative price from Rs 45 to Rs 60 per 40 kgs for sugarcane 2006-07 crop. This jump in prices improved the purchasing power of sugarcane by 20 percent. However, foreseen the bumper crop in 2007-08, provincial governments did not raise the indicative price. Hence real prices declined by 7 percent. The purchasing power of sugarcane in terms of market price entails a more deteriorating effect.

9.2 Nominal and Real Indicative and Market Prices in Sindh

43. In Sindh the nominal and real Indicative and market prices of sugarcane for the period 2000-01 to 2007-08 are set out in Table-8 and are also shown in figures 3 and 4.

44. The perusal of the table 9 reveals that the real Indicative price of sugarcane for 2007-08 showed a surge of 21 per cent over 2000-01 crop, while it remained below its previous year's level by 7 %. The purchasing power of sugarcane during the period under analysis has experienced ups and downs, touching the lowest level of Rs 35 per 40 kgs in 2004-05 and the highest level of Rs 47 per 40 kgs in 2006-07 crops in terms of 2000-01 prices.

45. In terms of market prices the purchasing power of sugarcane has deteriorated from Rs 50 per 40 kgs in 2000-01 to Rs 47 in 2006-07 and further to Rs 39 per 40 kgs in 2007-08.

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

46. Expenditure on sugar is one of the important items in average household budget. Sugar is also included in the basket of goods used in estimating the Consumer Price Index (CPI). Any change in sugar price affects the household budget and CPI as well (Table-11).

- Impact on CPI

47. The Federal Bureau of Statistics has estimated the changes in CPI as a result of increase in sugar price over the base price of Rs 25 per kg. The impact of increase in sugar price on CPI is given in Table-11.

Table-11: 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 consumption @ 15 kgs per year	
		Per person	Per household
Rs per kg	Per cent	----------- Rupees -----------	
25 (Base price)			
26	0.08	15	101
27	0.16	30	203
28	0.24	45	304
29	0.32	60	405
30	0.40	75	506
31	0.48	90	607
32	0.57	105	709
33	0.65	120	810
34	0.73	135	911
35	0.81	150	1013

Note: Average size of household comprises 6.75 members.

Sources: 1. Federal Bureau of Statistics (FBS), Karachi.
2. Agricultural Statistics of Pakistan.

48. It is evident from the Table that every increase of rupee 1 per kg over the base price of Rs 25 per kg is expected to raise the CPI by 0.08 per cent, other things remaining the same. Accordingly, the CPI is likely to increase by 0.40 and 0.81 per cent, if sugar price is increased by Rs 5 and Rs 10 per kgs.

- **Impact on Household Expenditure**

49. According to the Household Integrated Economic Survey (HIES) by the FBS, the average household in Pakistan consists of 6.75 members. The annual per capita consumption of sugar as reported in Agriculture Statistics of Pakistan is 15 Kgs. Based on these numerates the impact of increases in sugar price on the average household expenditure has been worked out and summarized in Table-11.

50. It may be seen from the Table that every increase of Re 1 in sugar price over the base level of Rs 25 per kg would raise the CPI by 0.08 per cent. In addition, the per head and average household expenditure would increase by Rs 15 and Rs 101 per annum with rise in sugar price by Re 1 per kg, other things remaining the same. Accordingly, an increase of Rs 5 over the base level would increase the per head and average household expenditure by Rs 75 and Rs 506 per annum.

11. COMPARATIVE ECONOMICS OF SUGARCANE AND COMPETING CROPS

51. A farmer decides regarding allocating resources amongst the competing enterprises fundamentally induced by certain economic considerations like gross cost, gross income, gross margin, net income, output-input ratio, etc. The farmer opts for the combination which can give best returns for the investment. Sugarcane is planted in the irrigated regions of the country and being an annual crop, it competes for land, water and other farm resources with both the 'kharif' and 'rabi' crops as the land under sugarcane may not be available for growing other crops in a given year.

52. The economics of sugarcane and competing crops/combinations has been analyzed in terms of output-input prices paid and received by the growers during the 2007-08 crop year. Details of the analysis for the Punjab and Sindh are presented in Annex-VI. A summary of various economic indicators is provided in Tables-13 and 14. The results of the analysis are briefly discussed in the following paragraphs:

- **Punjab**

53. The API's field survey revealed that sugarcane growers, unlike the previous year, have been facing unfavorable conditions particularly in getting permits from the mills. This along with other factors more specifically higher prices for other competing crops received by the farmers has resulted lower returns to overall investment on sugarcane crop as compared to all the crop combinations. Sugarcane also has lost its edge over the crop combinations of sunflower with seed cotton, basmati paddy & IRRI paddy and cotton + wheat in terms of returns to purchased inputs. However, its position in context of this indicator is better than wheat combinations with rice paddy.

54. Similarly, all the crop combinations have got a significant edge over sugarcane in terms of returns to crop duration. Returns to irrigation water have been observed quite significant in the cotton combinations. However, sugarcane has out competed both the wheat & rice combinations in this respect (Table-12).

Table-12: Economics of Sugarcane and Competing Crops at Prices Realized by the Growers in the Punjab: 2007-08 Crops

Crop/crop combination	Output-input ratio	Gross revenue per rupee of purchased inputs cost	Gross revenue per day of crop duration	Gross revenue per acre-inch of irrigation water used
		---------- Rupees ----------		
1. Sugarcane	1.0	3.1	70	571
2. Cotton+wheat	1.4	3.2	104	1289
3. Cotton+sunflower	1.7	4.4	128	1118
4. Basmati+wheat	1.4	2.8	110	566
5. Basmati+sunflower	1.8	3.9	139	562
6. IRRI+wheat	1.4	2.7	96	467
7. IRRI+sunflower	1.7	3.9	123	476

- **Sindh**

55. The growers in Sindh have faced identical situation. Economic position of sugarcane has become quite uneconomical as compared to other crops. Sugarcane has lost its edge over the entire crop combinations in terms of overall investment. Also, sugarcane has observed lower returns against all the combinations in terms of crop duration and irrigation water. Returns to purchased inputs are also observed better in context of all the combinations while those are equal in context of wheat + IRRI (Table-13).

Table-13: Economics of Sugarcane and Competing Crops at Prices Realized by the Growers in Sindh: 2007-08 Crops

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	1.1	3.6	74	509
2. Cotton+wheat	1.4	3.7	98	1376
3. Cotton+sunflower	1.8	5.2	128	1225
4. IRRI+wheat	1.6	3.6	97	513
5. IRRI+sunflower	2.0	5.4	132	546

12. INTER PROVINCIAL COMPARISON OF SUGARCANE ECONOMICS

56. The returns to overall investment in sugarcane farming, as reflected by the output/input ratio are higher in Sindh (10%) as compared to the Punjab primarily due to higher yields and relatively better price gains.

57. In view of its longer duration, the crop in Sindh requires more water and other inputs against the Punjab. Chemical fertilizers in Sindh are used on higher side by 89 % nitrogenous and 15 % phosphates. Similarly, cost of purchased inputs is also higher in Sindh by 12 per cent. However, in both the provinces, sugarcane fails to compete with all the competing enterprises at varying degree.

58. The higher yield in Sindh by 20 % resulting from the greater use of inputs has compensated to a certain extent for the additional expenses. Overall returns to purchased inputs and crop duration have been relatively better in Sindh. However, despite of higher crop yield, sugarcane farming in terms of water use efficiency does not offer promising returns in Sindh as it lags behind the Punjab by almost 11 percent (Table-14).

Table-14: Inputs Use and Crop Yield in Sugarcane Cultivation in Sindh versus Punjab: 2007-08 Crop

Item	Unit	Sindh	Punjab	Difference/Edge in Sindh over Punjab (Per cent)
Output-Input ratio	Ratio	1.1	1.0	(+) 10
Crop duration	Crop days	488	394	(+) 24
Irrigation water	Acre-inches	71	48	(+) 48
Inputs use (purchased)	Rs/acre	10006	8809	(+) 12
Crop yield	40 kg units	676	565	(+) 20
Fertilizer Use:	Nutrient Kgs			
N	"	104	55	(+) 89
P	"	39	34	(+) 15

13. DOMESTIC DEMAND, SUPPLY, STOCK AND PIECES OF SUGAR

13.1 Domestic demand, supply and stock

59. The data on sugar production, trade consumption and stocks during 1996-97 to 2006-07 are given in Annex-VII. The sugar production from 2007-08 crop has been estimated at 4750 thousand tonnes. Adding 986 thousand tonnes of left over stocks from 2006-07, total sugar supply for 2008 consumption year comes to 5737 thousand tonnes. Based on average total per capita consumption of sugar estimated at 23 Kgs total domestic requirement for a population of 169 million has been worked out to 3887 thousand tonnes upto 30th September 2008. However, keeping in view the likely delay in crushing season by about 2-3 months and rising trend in prices about one million tonnes of sugar shall be required. Thus total requirement for the current consumption year would be 4887 thousand tonnes leaving a surplus of 850 thousand tonnes.

13.2 Behaviour of sugar prices in domestic market

60. The monthly average wholesale prices of sugar prevailed in major domestic markets during 2007 and 2008 are given in Annex-VIII. During 2007 these prices averaged at Rs 2766 per 100 kgs but started declining during 2008 and reached to the level of Rs 2283 per 100 kgs in the month of April. However, in May average prices again increased to the level of Rs 2625 per 100 kgs. Looking at healthy international prices behaviour domestic market price of sugar may rise to Rs 3000 or more in the latter months of 2008.

61. The annual average wholesale market price (Annex-IX) stood at Rs 1625 per 100 kgs in 1995-96 in Hyderabad market which increased to Rs 3359 per 100 kgs in Lahore market during 2006-07. However, during 2007-08 sugar prices have declining trend.

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

14.1 Supply, demand, stocks and trade

62. The data on world balance sheet of sugar (raw equivalent), for the period of 2005-06 to 2007-08 are presented in Table-15:

Table-15: World Balance Sheet of Sugar (Raw Equivalent):2005-06 to 2007-08 (Oct-Sept)

S.No	Item	2005-06	2006-07 (Estimated)	2007-2008 (Forecast)	Changes over 2006-07
		------- Million tonnes ---------			Per cent
1.	Opening stocks	57.56	56.82	67.95	(+) 19.59
2.	Production	150.18	166.03	168.44	(+) 1.45
3.	Total supply (1+2)	207.74	222.85	236.39	(+) 6.08
4.	Disappearance (consumption)	150.88	154.82	159.13	(+) 2.78
5.	Stock Adjustment *	(-) 0.04	(+) 0.08	(-) 3.31	0.00
6.	Ending stocks (3-4+5)	56.82	67.95	73.95	(+) 8.83
7.	Trade (export)	48.11	46.13	49.31	(+) 6.89
8.	Trade (import)	48.07	46.05	46.03	(+) 0.04

Note: * Including adjustment for unknown net trade.
Source: Sugar: International sugar organization, Quarterly Review, February 2008.

63. World sugar production during 2006-07 estimated at 166.03 million tonnes is 10.55 per cent higher than production during 2005-06. Accounting for opening stocks of 57.56 million tonnes, global supply of sugar in 2006-07 was reported 7.27 per cent higher over the corresponding supply in 2005-06.

64. The world consumption reported in 2006-07 is 2.61 per cent higher than that of previous year. End year stocks in 2006-07 are estimated at 56.82 million tones.

14.2 International Prices of Sugar

65. The international prices of raw (fob Caribbean ports) and white (fob London) sugar from 1997-98 to 2007-08 are presented in Annex-X.

15. IMPORT AND EXPORT PARITY PRICES OF SUGARCANE:

66. Estimation of the import parity prices of a commodity is helpful in determining the opportunity cost of resources used in its domestic production while 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.

67. Both the import and export parity prices have been calculated on the basis of white sugar price (fob London). However, financial and economic analysis has been carried out for working out import parity price, while calculations of export parity price are based on economic analysis only. Inter-bank exchange rate selling for import parity and buying for export parity prices has been used in the calculations. Detailed calculations in this connection are given at Annexes-XI and XIII, while results are summarized in Table-16.

Table-16: Import/Export Parity Prices of Sugarcane as Worked Back from Average fob (London) Prices of Sugar

Period	Base price	Mill-gate prices of sugarcane in			
		Punjab and NWFP		Sindh	
		Economic	Financia	Economic	Financial
	US $/tone	--------------------- Rs per 40 kgs ---------------			
Import Parity Prices					
1. During 2002-03 to 2006-07	292.38	59.92	70.41	61.33	72.07
2. During 2007-08 (Oct-April)	325.52	65.14	76.70	66.67	78.51
3. During April 2008	352.52	69.39	83.71	71.03	85.68
Export Parity Prices					
1. During 2002-03 to 2006-07	292.38	41.52	-	42.49	-
2. During 2007-08 (Oct-April)	325.52	46.39	-	47.48	-
3. During April 2008	352.52	50.36	-	51.54	-

Source: Annexes-XI to XIII.

16. MILL-GATE PRICES OF SUGARCANE BASED ON DOMESTIC WHOLE SALE PRICES OF SUGAR

68. Sugarcane prices have also been estimated from various wholesale prices of sugar prevailed in the domestic markets and are presented in Table-17. This price option is based on: actual sucrose recovery as reported by the PSMA; processing cost of sugar discussed in detail in various meetings of the PSMA and MINFAL; export prices of molasses as reported by FBS; and General Sales Tax of Rs 3.15 per Kg of sugar. A summary of sugarcane prices estimated under this scenario from various wholesale prices of sugar is presented in Table-17 while details are given in Annex-XIV & XV.

Table- 17: Sugarcane Prices Estimated from Various Wholesale Prices of Sugar

Wholesale Price of Sugar	Estimated Cane Prices at Mill gate	
	Punjab At recovery of 8.91%	Sindh At recovery of 9.36%
Rupees per Kg	Rupees per 40 Kgs	
25	51	53
27	57	60
29	64	67
31	71	74

17. ECONOMIC EFFICIENCY IN SUGARCANE PRODUCTION

69. The economic efficiency in sugarcane production has been evaluated by estimating the most commonly used economic parameters, viz. Nominal Protection Coefficient (NPC), Effective Protection Coefficient (EPC) and Domestic Resource Cost coefficient (DRC) through Policy Analysis Matrix (PAM). These parameters have been estimated under situation of both imports and exports of sugar, and are based on the cost of production of sugarcane data as used in API's Sugarcane Policy Papers. To ascertain the impact of overtime changes in input-output prices, the analysis has been carried out for 2002-03 to 2007-08 crops. To capture regional variations in the resource use efficiency, the parameters have been calculated for major cane growing provinces of Punjab and Sindh. Numeric of these coefficients are summarized in Table-18 while the details of PAM are given in Annexes-XVI and XVII.

17.1 Nominal Protection Coefficient (NPC)

70. The numeric of the Table-18 reveal that except in 2006-07 the NPCs estimated under importing scenario have been less than one during the period under analysis implying that cane growers have not received economic prices. Accordingly, cane growers were implicitly taxed to the extent from 8-12 per cent.

71. The NPCs estimated under exporting situation have ranged from 1.15 to 1.61 implying that the prices realized by the growers have been much higher than the corresponding export parity/economic prices. This further reflects that sugarcane cultivation for exporting sugar is not an economic proposition. ***The overall situation suggest that production of sugar be restrained at domestic consumption level.***

17.2 Effective Protection Coefficient (EPC)

72. Effective Protection Coefficient is the ratio between the value-added in producing a commodity at private prices and at social prices. Unlike the NPC, which ignores the distortions in the input markets, EPC also takes into account the impact of policy interventions in the input markets. Thus, it is a more meaningful measure for analysing the protection/taxation of a given commodity/sector.

73. The analysis of the EPCs estimated under importing country scenario reveals that the EPCs have also been less than one during the period under study implying that cane growers were implicitly taxed through input/output pricing policies. However, the EPCs estimated under the exporting scenario reveal a positive support to sugarcane (Table-18).

Table-18: Economic Efficiency Coefficients for Sugarcane: 2002-03 to 2007-08

Province/Year	Based on					
	Import Parity Prices			Export Parity Prices		
	NPCs	EPCs	DRCs	NPCs	EPCs	DRCs
PUNJAB						
2002-03	0.87	0.80	0.82	1.35	1.46	1.44
2003-04	0.86	0.75	0.90	1.61	1.92	1.65
2004-05	0.83	0.73	0.71	0.73	0.61	0.60
2005-06	0.90	0.85	0.51	1.30	1.38	0.84
2006-07	1.01	0.97	0.74	1.28	1.36	1.04
2007-08	0.84	0.74	0.73	1.22	1.28	1.10
2002-03	0.88	0.77	0.71	1.36	1.61	1.42
SINDH						
2003-04	0.87	0.74	0.82	1.35	1.62	1.65
2004-05	0.83	0.72	0.60	1.19	1.27	1.07
2005-06	0.88	0.81	0.52	1.15	1.17	0.72
2006-07	1.11	1.12	0.74	1.48	1.77	1.12
2007-08	0.83	0.72	67	1.23	1.35	1.26

Source: Annexes-XVI and XVII.

*74. **The policy option emerged from the analysis would be to discourage sugarcane cultivation and maintain the domestic production upto self-sufficiency level through enhancing productivity instead of horizontal expansion.***

17.3 Domestic Resource Cost (DRC)

75. The DRC indicates the opportunity cost of domestic resources used per unit of the value-added at social prices in the production of a commodity. The numerator in these calculations is the opportunity cost of non-tradable factors used in domestic production while denominator is the value addition calculated at social prices. DRC coefficient of greater than one indicates a "comparative disadvantage" in domestic production as the cost associated with its domestic production is greater than the economic cost of corresponding imports. A situation of DRC less than one implies "comparative advantage" in domestic production as it can save/generate foreign exchange at costs less than the corresponding cost of imports. It may however be pointed out that DRCs are sensitive to the changes in the opportunity cost of non-tradable inputs as well as the border prices of outputs and inputs.

76. The DRCs for sugarcane crop estimated at import parity prices are less than one, both in the Punjab and Sindh. It indicates that cane production in both the provinces is efficient in terms of its domestic resource cost. However, the DRC estimated under importing situation do not support the commonly held perception of comparative disadvantage in sugarcane cultivation in Pakistan.

77. Under the exporting scenario, the DRCs of sugarcane production in the Punjab and Sindh have been estimated greater than one. Thus, sugar export is not a viable proposition at the prevailing input – output relationships and the prices.

18. LINKING CANE PRICE WITH ITS SUCROSE CONTENTS

78. The general perception is that the prevailing system of payment for sugarcane is on weight basis irrespective of variety. The prices announced by the Provincial Governments are also considered to be estimated according to base sucrose recovery levels in of 8.5 per cent for the Punjab and NWFP and 8.7 per cent for Sindh. At the end

of the crushing season if the overall recovery of the mill exceeds the base recovery level, the mill is liable to pay quality premium. However, in spite of the fact that the varieties being cultivated in all the provinces are high sucrose varieties, the sugar mills particularly in Punjab& NWFP have never shown the actual recovery above the base level. In Sindh although recovery exceeds the base level yet the mills do not pay the premium. This implies that even weight based system of payment is not being followed in its true spirit. Therefore, transformation of weight based payment system into quality /sucrose based would be the best policy option for improving the situation regarding: i) Cultivation of high sucrose varieties available at research centers; ii) Elimination of middlemen; iii) Increasing productivity of cane and sucrose; iv) Congenial growers - mills relationship; v) Regular supply of cane;

79. The new system of payment explained in Annex-XVIII, has four common elements (a) weightment (b) quality assessment based on sampling and laboratory analysis (c) formula for calculation of recoverable sugar and (d) cane pricing formula.

19. MARKETING OF SUGARCANE

80. As a perishable commodity sugarcane can not be stored after harvesting and is to be processed either into gur at the farms or crushed by sugarmills for sugar manufacture. Its marketing plays an important role in this respect. To update information API conducted an extensive field survey during January, 2008 in the provinces of Punjab, Sindh and NWFP on the issues relating to the production and marketing of sugarcane 2007-08 crop. The survey teams interviewed cane growers, sugarmills management and crop experts. The meeting of API's Standing Committee on sugarcane, held on March 25, 2008, also discussed matters relating to cane marketing. In the following paragraphs, salient observations of the field survey and the meeting of the Standing Committee are summarized.

- **Underweighment**

81. The underweighment and undue deductions on the part of mills and their agents at purchase centers have been widely reported. The private purchase centers and the mills agents are very notorious in this respect. The weighbridges and scales installed at the purchase centers do not record the correct weighment. Mostly the farmers bringing cane remained unaware about the readings of these scales. The quantity of under weighed varies from place to place and for each mill area. ***In order to check the underweighment at weighbridges, the supervisory committees should be more effective. Moreover the use of private/temporary bridges may be banned and district governments should install their own weighbridges in the producing areas at reasonable distances.***

- **Undue deductions**

82. 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**

83. 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**

84. The importance of middlemen in sugarcane marketing cannot be denied as it facilities 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**

85. 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, but mostly ranging between Rs 2 – 5 per 40 kgs of cane price. This practice had 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**

86. 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 purposes.

- Amendments in Sugar Factories Control Act

87. 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.

20. IMPROVING PRODUCTIVITY

88. In view of high water requirement of sugarcane and increasing water shortages, horizontal expansion of this crop is neither feasible nor desirable. However, to maintain the regular supply of raw material (sugarcane) to 2nd largest agro-based sugar industry of Pakistan enhanced productivity is the only way forward. Therefore, API has recommended the following productivity enhancement measures.

20.1 Varietals Development

89. The Government should pursue the PSMA and provincial research institutes to emphasize on cane varietals development. Provincial Governments should take strict measures to implement the ECC decision regarding the release and utilization of 'Cess Fund' in this regard.

20.2 Improved Cultural Practices

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

- Promote use of deep tillage for seedbed preparation for sugarcane cultivation
- Practise recommended 'row to row' distance in sugarcane fields for effective weed control
- Discourage cultivation of un-approved varieties of sugarcane
- Seed of fresh crop 6 – 8 months old gives better results
- Motivate farmers for 'Hot Water Treatment' of sugarcane setts for disease control

- Apprise the farmers for achieving the desirable plant population per acre
- Awareness to the farmers for using press mud to improve oil fertility
- Educate sugarcane growers for using different fertilizers in recommended dosage
- Apprise the growers about use of weedicides needs to be promoted for increasing quantity and quality of the crop
- Awareness campaign to educate sugarcane growers about the benefits of IPM techniques.

20.3 Biological Control

91. The government should emphasize PSMA and provincial research institutes to establish IPM labs for rearing predators for disease control in sugarcane crop.

20.4 Role of Sugar Industry in Cane Development

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

- take concrete measures to multiply and disseminate high sucrose varieties alongwith necessary extension work for development of sugarcane crop.
- Take immediate steps to increase supply of improved varieties of cane seed among the farmers in addition to government efforts in this regard
- Supply press mud free of cost 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

20.5 Low Sugar Recovery

93. Provincial and PARC Research Institutes should determine the reasons for low sugar recovery in lower Sindh.

21. ACKNOWLEDGEMENT

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QADIR BUX BALOCH
Chairman, API

ANNEX- I

PROVINCE-WISE AREA ,PRODUCTION AND YIELD OF SUGARCANE IN PAKISTAN : 1997-98 TO 2007-08

YEAR	PUNJAB	SINDH	NWFP	BALOCH	PAKISTAN
AREA	---- 000 hectares ----				
1997-98	685.3	261.6	108.6	0.7	1056.2
1998-99	780.3	270.8	103.3	0.7	1155.1
1999-00	672.1	230.6	106.3	0.8	1009.8
2000-01	615.5	238.8	105.9	0.6	960.8
2001-02	656.8	240.7	101.5	0.7	999.7
2002-03	735.3	258.6	104.9	0.8	1099.6
2003-04	709.0	259.9	104.8	0.8	1074.5
2004-05	644.7	214.9	106.4	0.4	966.4
2005-06	625.2	183.2	98.6	0.5	907.5
2006-07	711.8	214.7	101.8	0.5	1028.8
2007-08	800.9	245.4	108.3	0.5	1155.1
YIELD	---- Tonnes per hectare ----				
1997-98	46.86	61.16	45.64	53.57	50.28
1998-99	42.78	62.96	45.69	54.43	47.78
1999-00	40.29	61.97	46.26	54.25	45.88
2000-01	43.44	50.46	45.18	53.67	45.39
2001-02	48.42	47.43	47.16	50.00	48.06
2002-03	45.11	53.35	48.13	50.75	47.34
2003-04	47.99	56.22	45.28	48.25	49.72
2004-05	51.26	43.54	45.27	51.20	48.88
2005-06	46.33	61.38	45.02	32.22	49.22
2006-07	52.74	58.36	45.63	50.60	53.21
2007-08	54.17	58.19	45.77	56.20	54.23
PRODUCTION	---- 000 Tonnes ----				
1997-98	32110.6	15999.6	4956.5	37.5	53104.2
1998-99	33382.8	17050.7	4719.5	38.1	55191.1
1999-00	27081.3	14290.8	4917.1	43.4	46332.6
2000-01	26740.0	12049.7	4784.4	32.2	43606.3
2001-02	31803.1	11416.3	4787.2	35.0	48041.6
2002-03	33168.6	13797.6	5049.0	40.6	52055.8
2003-04	34023.0	14611.8	4745.6	38.6	53419.0
2004-05	33048.0	9357.4	4816.2	22.5	47244.1
2005-06	28968.6	11243.4	4439.0	14.5	44665.5
2006-07	37541.9	12529.2	4645.0	25.3	54741.4
2007-08	43378.5	14279.0	4959.0	28.1	62644.6

Sources:
1- For 1997-98 to 2005-06:Agricultural Statistics of Pakistan 2005-06,MINFAL,Islamabad.
2- For 2006-07 :Final estimates provided by respective provincial Agriculture Departments.
3- For 2007-08: 2nd estimates Punjab, Sindh, NWFP and Balochistan provided by respective Provincial Agriculture Departments.

ANNEX-I-A

PROVINCE-WISE AREA ,PRODUCTION AND YIELD OF SUGARCANE IN PAKISTAN : 1997-98 TO 2007-08

YEAR	PUNJAB	SINDH	NWFP	BALOCH	PAKISTAN
AREA		------ 000 acres ------			
1997-98	1693.4	646.4	268.4	1.7	2610.0
1998-99	1928.2	669.2	255.3	1.7	2854.4
1999-00	1660.8	569.8	262.7	2.0	2495.3
2000-01	1521.0	590.1	261.7	1.5	2374.2
2001-02	1623.0	594.8	250.8	1.7	2470.4
2002-03	1817.0	639.0	259.2	2.0	2717.2
2003-04	1752.0	642.2	259.0	2.0	2655.2
2004-05	1593.1	531.0	262.9	1.1	2388.2
2005-06	1545.0	452.7	243.7	1.1	2242.4
2006-07	1758.9	530.5	251.6	1.2	2542.3
2007-08	1979.0	606.4	267.7	1.2	2854.4
YIELD		------ Tonnes per acre ------			
1997-98	18.96	24.75	18.47	21.68	20.35
1998-99	17.31	25.48	18.49	22.03	19.34
1999-00	16.31	25.08	18.72	21.95	18.57
2000-01	17.58	20.42	18.28	21.72	18.37
2001-02	19.60	19.19	19.09	20.23	19.45
2002-03	18.25	21.59	19.48	20.54	19.16
2003-04	19.42	22.75	18.32	19.53	20.12
2004-05	20.74	17.62	18.32	20.72	19.78
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	21.92	23.55	18.52	22.74	21.95
PRODUCTION		------ 000 Tonnes ------			
1997-98	32110.6	15999.6	4956.5	37.5	53104.2
1998-99	33382.8	17050.7	4719.5	38.1	55191.1
1999-00	27081.3	14290.8	4917.1	43.4	46332.6
2000-01	26740.0	12049.7	4784.4	32.2	43606.3
2001-02	31803.1	11416.3	4787.2	35.0	48041.6
2002-03	33168.6	13797.6	5049.0	40.6	52055.8
2003-04	34023.0	14611.8	4745.6	38.6	53419.0
2004-05	33048.0	9357.4	4816.2	22.5	47244.1
2005-06	28968.6	11243.4	4439.0	14.5	44665.5
2006-07	37541.9	12529.2	4645.0	25.3	54741.4
2007-08	43378.5	14279.0	4959.0	28.1	62644.6

Sources:
1- For 1997-98 to 2005-06 : Agricultural Statistics of Pakistan 2005-06,MINFAL, Islamabad.
2- For 2006-07 :Final estimates provided by respective provincial Agriculture Departments.
3- For 2007-08: 2nd estimates Punjab, Sindh, NWFP and Balochistan provided by respective Provincial Agriculture Departments.

DISTRICT- WISE AREA, YIELD AND PRODUCTION OF SUGARCANE
AVERAGE OF 2005-06 TO 2007-08

ANNEX-II

Area: 000 ha
Production: 000 tonnes
Yield: Tonnes/hectare

S.No	Province/ District/ Agency	Area	Production	Share in total production	Yield
	PUNJAB				
1	Faisalabad	115.62	6240.04	11.55	53.97
2	Jhang	98.05	4910.64	9.09	50.08
3	R.Y.Khan	70.70	4491.22	8.31	63.53
4	Sargodha	69.75	3380.34	6.26	48.46
5	Kasur	49.09	2404.99	4.45	48.99
6	T.T.Singh	39.52	2221.77	4.11	56.22
7	Muzaffargarh	32.90	1730.56	3.20	52.60
8	M.B.Din	34.54	1619.28	3.00	46.88
9	Vehari	18.63	1076.80	1.99	57.80
10	Okara	22.92	1071.77	1.98	46.76
11	Bahawalnagar	20.64	980.70	1.82	47.52
12	Nankana Sahib	20.10	837.62	1.55	41.68
13	Bhakkar	15.26	678.31	1.26	44.44
14	Layyah	13.48	625.73	1.16	46.42
15	Khanewal	10.93	569.96	1.06	52.16
16	Bahawalpur	9.58	520.96	0.96	54.38
17	Pakpattan	8.64	468.61	0.87	54.24
18	Sahiwal	11.32	461.08	0.85	40.72
19	Rajanpur	8.24	460.34	0.85	55.89
20	Khushab	9.71	451.51	0.84	46.48
21	Hafizabad	6.62	312.97	0.58	47.28
22	Mianwali	4.31	191.16	0.35	44.39
23	Gujrat	3.23	138.41	0.26	42.89
24	Multan	2.96	136.37	0.25	46.07
25	Sheikhupura	3.09	132.32	0.24	42.82
26	D.G.Khan	2.28	125.25	0.23	54.86
27	Gujranwala	2.69	99.80	0.18	37.10
28	Narowal	2.55	82.51	0.15	32.31
29	Sialkot	2.56	80.65	0.15	31.54
30	Lodhran	1.48	75.96	0.14	51.33
31	Lahore	0.84	35.70	0.07	42.50
32	Jhelum	0.20	8.43	0.02	42.17
33	Attock	0.20	7.92	0.01	39.60
	Sub Total	**712.63**	**36629.68**	**67.81**	**51.40**
	SINDH				
1	Hyderabad	59.03	3621.35	6.70	61.35
2	Badin	41.19	2445.21	4.53	59.37
3	Thatta	25.95	1581.41	2.93	60.94
4	Nawabshah	21.58	1272.59	2.36	58.97
5	N.Feroze	16.97	1039.04	1.92	61.24
6	Khairpur	15.97	872.85	1.62	54.65
7	Mirpurkhas	14.04	779.20	1.44	55.49
8	Sanghar	10.61	608.33	1.13	57.35
9	Ghotki	3.14	163.63	0.30	52.18
10	Dadu	2.12	106.53	0.20	50.20
11	Sukkur	1.93	102.22	0.19	52.88
12	Tharparkar	1.02	47.38	0.09	46.33
13	Larkana	0.66	33.84	0.06	51.19
14	Jacobabad	0.12	5.18	0.01	44.54
15	Shikarpur	0.11	5.07	0.01	47.52
	Sub Total	**214.43**	**12683.85**	**23.48**	**59.15**
	NWFP				
1	Charsadda	32.00	1426.36	2.64	44.58
2	Mardan	29.84	1407.47	2.61	47.16
3	Peshawar	11.92	613.66	1.14	51.49
4	D.I.Khan	11.79	516.11	0.96	43.77
5	Nowshera	5.07	257.54	0.48	50.84
6	Malakand	4.81	195.79	0.36	40.68
7	Swabi	3.64	145.81	0.27	40.09
8	Bannu	0.77	30.68	0.06	39.67
9	Bunir	0.65	19.93	0.04	30.88
10	Mohmand AG.	0.69	18.84	0.03	27.43
11	Khyber AG.	0.59	13.23	0.02	22.25
12	Tank	0.30	7.99	0.01	26.25
13	Dir Lower	0.21	6.44	0.01	30.33
14	Haripur	0.14	4.63	0.01	33.73
15	Kohat	0.11	4.49	0.01	39.47
16	F.R.Bannu	0.09	3.41	0.01	36.54
17	F.R.D.I.Khan	0.10	2.22	0.00	22.46
18	N.Waziristan	0.07	2.17	0.00	31.00
19	Lakki Marwat	0.04	1.95	0.00	48.02
20	Bajour AG.	0.07	1.57	0.00	23.56
21	Hangu	0.01	0.45	0.00	52.46
22	Mansehra	0.00	0.15	0.00	36.33
23	F.R.Peshawar	0.00	0.12	0.00	31.08
24	Swat	0.00	0.00	0.00	0.00
	Sub Total	**102.92**	**4681.01**	**8.67**	**45.48**
	BOLUCHISTAN				
1	Sibi	0.27	12.59	0.02	46.94
2	Nasirabad	0.10	5.26	0.01	51.90
3	Lasbela	0.07	4.02	0.01	60.23
4	Jaffarabad	0.01	0.76	0.00	57.00
	Sub Total	**0.45**	**22.63**	**0.04**	**50.32**
	Pak Total	**1030.43**	**54017.17**	**100.00**	**52422.07**

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

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

AVERAGE FARMERS' COST OF PRODUCTION OF SUGARCANE IN THE PUNJAB: 2007-08 AND 2008-09 CROPS

Sr. No.	Operations / inputs	Avg No. of oprs/units/ acre	2007 - 08 Crop Cost per unit	2007 - 08 Crop Cost per acre	2008 - 09 Crop Cost per unit	2008 - 09 Crop Cost per acre	Change in 2008-09 over 2007-08
1	2	3	4	5=3*4	6	7=3*6	8=7-5
				---------Rupees---------			
1	Land preparation:						
	1.1 Deep ploughing	0.476	600.00	285.60	680.00	323.68	38.08
	1.2 Rotavator	0.152	660.00	100.32	750.00	114.00	13.68
	1.3 Ploughing	7.847	220.00	1726.34	250.00	1961.75	235.41
	1.4 Planking	3.309	110.00	363.99	125.00	413.63	49.64
	1.5 Levelling	0.561	290.00	162.69	330.00	185.13	22.44
2	Seed bed preparation:						
	2.1 Ploughing/Furrow making	0.467	220.00	51.37	250.00	58.38	7.01
	2.2 Planking	0.193	110.00	10.62	125.00	12.06	1.45
	2.3 Trench/Ridge making						
	2.3.1 Manual (m.days)	0.106	130.00	6.89	150.00	7.95	1.06
	2.3.2 Tractor	0.7	220.00	77.00	250.00	87.50	10.50
	2.4 Bund making						
	2.4.1 Manual (m.days)	1.655	130.00	107.58	150.00	124.13	16.55
	2.4.2 Tractor	0.158	220.00	17.38	250.00	19.75	2.37
3	Seed and Sowing operations:						
	3.1 40 kg units	6.578	87.00	286.14	87.00	286.14	0.00
	3.2 Marlas	10.64	433.00	2303.56	433.00	2303.56	0.00
	3.3 Harvesting, stripping and making of set (m.days)	4.796	130.00	311.74	150.00	359.70	47.96
	3.4 Transport	-	-	150.00	-	170.00	20.00
	3.5 Sowing of sets (m.days)	0.781	130.00	50.77	150.00	58.58	7.81
	3.6 Contract sowing	-	-	155.00	-	175.00	20.00
4	Interculture and Earthing up:						
	4.1 Manual/binding of plants	0.609	515.00	313.64	585.00	356.27	42.63
	4.2 Bullock/tractor	2.008	220.00	441.76	250.00	502.00	60.24
5	Plant Protection:						
	5.1 Weedicides	0.124	232.00	28.77	235.00	29.14	0.37
	5.2 Granules	0.07	227.00	15.89	230.00	16.10	0.21
	5.3 Sparys	0.331	208.00	68.85	210.00	69.51	0.66
	5.4 Others	0.161	473.00	76.15	480.00	77.28	1.13
6	Irrigation:						
	6.1 Canal	8.9	-	250.00	-	250.00	0.00
	6.2 Private tubewell	4.44	541.00	2402.04	610.00	2708.40	306.36
	6.3 Mixed	2.16	123.00	265.68	140.00	302.40	36.72
	6.4 Labour for irrigation and water course cleaning (m.days)	4.86	130.00	631.80	150.00	729.00	97.20
7	Farm Yard Manure:						
	7.1 Material	-	-	560.00	-	650.00	90.00
	7.2 Transport & application	-	-	500.00	-	570.00	70.00
8	Fertilizers: (bags)						
	8.1 DAP	1.28	908.00	1162.24	2780.00	3558.40	2396.16
	8.2 Urea	1.73	532.00	920.36	615.00	1063.95	143.59
	8.3 Nitrophos	0.35	628.00	219.80	1858.00	650.30	430.50
	8.4 SSP	0.01	259.00	2.59	693.00	6.93	4.34
	8.5 CAN	0.01	391.00	3.91	541.00	5.41	1.50
	8.6 SOP	0.07	956.00	66.92	2227.00	155.89	88.97
	8.7 Gypsum	0.44	40.00	17.60	40.00	17.60	0.00
	8.8 Fert. transport and application	3.89	32.00	124.48	35.00	136.15	11.67
9	Mark up @ 12.0 % per annum for 13 months on items 1 to 8 minus item 6.1	-	-	1818.63	-	2374.53	555.91
10	Land rent for 13 months	-	6000.00	6500.00	6500.00	7041.67	541.67
11	Average weighted land tax @ Rs 131/acre/ annum for 13 months	-	-	142.00	-	142.00	0.00
12	Management charges for 13 months	-	-	732.00	-	806.00	74.00
13	Harvesting & stripping (40 kg units)	565.15	7.00	3916.49	8.00	4475.99	559.50
14	Expected escalation in cost of selected items	-	-	1470.00	-	1310.00	-160.00
15	Total cost (items 1 to 14)	-	-	28818.57	-	34665.84	5847.27
16	Yield (40 kg units)	-	-	565.15	-	565.15	0.00
17	Cost of production at farm level: (Rs/40 kgs)						
	17.1 including land rent	-	-	50.99	-	61.34	10.35
	17.2 excluding land rent	-	-	39.49	-	48.88	9.39
18	Marketing expenses: (Rs/40 kgs)						
	18.1 Transport, etc.	-	-	6.25	-	7.00	0.75
	18.2 Development cess	-	-	0.25	-	0.25	0.00
19	Cost of production at mill-gate: (Rs/40 kgs)						
	19.1 including land rent	-	-	57.49	-	68.59	11.10
	19.2 excluding land rent	-	-	45.99	-	56.13	10.14

For S.No.15 add 6.1 and subtract 4.2

AVERAGE FARMERS' COST OF PRODUCTION OF SUGARCANE IN SINDH: 2007-08 AND 2008-09 CROPS

Sr. No.	Operations / inputs	Avg No. of oprs/units/ acre	2007 - 08 Crop Cost per unit	2007 - 08 Crop Cost per acre	2008 - 09 Crop Cost per unit	2008 - 09 Crop Cost per acre	Change in 2008-09 over 2007-08
1	2	3	4	5=3*4	6	7=3*6	8=7-5
				---------Rupees---------			
1	Land preparation :						
	1.1 Deep ploughing	0.523	710.00	371.33	790.00	413.17	41.84
	1.2 Ploughing	5.606	360.00	2018.16	400.00	2242.40	224.24
	1.3 Planking	1.577	180.00	283.86	200.00	315.40	31.54
	1.4 Levelling	0.972	360.00	349.92	400.00	388.80	38.88
2	Seed bed preparation:						
	2.1 Ploughing/Furrow making	1.136	360.00	282.18	400.00	313.54	31.35
	2.2 Planking	1.34	180.00	166.43	200.00	184.92	18.49
	2.3 Trench/ridge making						
	2.3.1 manual (m.days)	0.074	130.00	6.64	150.00	7.66	1.02
	2.3.2 tractor (hrs)	0.174	295.00	35.42	330.00	39.62	4.20
	2.4 Bund making (m.days)						
	2.4.1 manual (m.days)	0.403	130.00	36.15	150.00	41.71	5.56
	2.4.2 tractor (hrs)	0.812	295.00	165.28	330.00	184.89	19.61
3	Seed and Sowing operations:						
	3.1 40 kg units	64.118	78.00	3450.83	78.00	3450.83	0.00
	3.2 Ghuntas	0.685	1898.00	897.09	1898.00	897.09	0.00
	3.3 Harvesting, stripping and making of set (m.days)	4.42	130.00	396.47	150.00	457.47	61.00
	3.4 Transportation	-	-	270.00	-	310.00	40.00
	3.5 Sowing of sets (m.days)	0.588	130.00	52.74	150.00	60.86	8.11
	3.6 Contract sowing	-	-	255.00	-	295.00	40.00
4	Interculture and Earthing up:						
	4.1 Manual	1.762	495.00	872.19	570.00	1004.34	132.15
	4.2 Bullock/tractor	1.725	360.00	621.00	400.00	690.00	69.00
5	Plant Protection :						
	5.1 Weedicides	0.344	313.00	107.67	320.00	110.08	2.41
	5.2 Granules	0.342	217.00	74.21	220.00	75.24	1.03
	5.3 Sprays	0.398	222.00	88.36	225.00	89.55	1.19
6	Irrigation						
	6.1 Canal	20.88	-	181.87	-	181.87	0.00
	6.2 Private tubewell	2.45	267.00	654.15	296.00	725.20	71.05
	6.3 Labour for irrigation and water course cleaning (m.days)	5.859	130.00	761.67	150.00	878.85	117.18
7	Farm Yard Manure:						
	7.1 Material	-	-	840.00	-	975.00	135.00
	7.2 Transport & application	-	-	455.00	-	520.00	65.00
8	Fertilizers: (bags)						
	8.1 DAP	1.512	848.00	1282.18	2800.00	4233.60	2951.42
	8.2 Urea	3.625	542.00	1964.75	610.00	2211.25	246.50
	8.3 Nitrophos	0.376	608.00	228.61	1884.00	708.38	479.78
	8.4 CAN	0.185	385.00	71.23	500.00	92.50	21.28
	8.5 AS	0.046	780.00	35.88	850.00	39.10	3.22
	8.6 SOP	0.085	875.00	74.38	2227.00	189.30	114.92
	8.7 Fert. transport and application	5.829	32.00	186.53	35.00	204.02	17.49
9	Mark up @ 12.0 % per annum for 16 months on item 1 to 8 minus item 6.1	-	-	2776.85	-	3575.96	799.11
10	Land rent for 16 months	-	5500.00	7333.33	6000.00	8000.00	666.67
11	Land tax @ Rs 200/acre/annum for 16 months	-	-	266.67	-	266.67	0.00
12	Drainage cess	-	-	24.00	-	24.00	0.00
13	Management charges for 16 months	-	-	901.00	-	992.00	91.00
14	Harvesting & stripping (40 kg units)	676.02	7.00	4732.14	8.00	5408.16	676.02
15	Expected escalation in the cost of selected items	-	-	1401.00	-	1295.00	-106.00
16	Total cost (items 1 to 15)	-	-	34972.16	-	42093.42	7121.26
17	Yield (40 kg units)	-	-	676.02	-	676.02	0.00
18	Cost of production at farm level: (Rs/40 kgs)						
	18.1 including land rent	-	-	51.73	-	62.27	10.53
	18.2 excluding land rent	-	-	40.88	-	50.43	9.55
19	Marketing expenses: (Rs/40 kgs)						
	19.1 Transport, etc.	-	-	6.25	-	7.00	0.75
	19.2 Development cess	-	-	0.32	-	0.32	0.00
20	Cost of production at mill-gate: (Rs/40 kgs)						
	20.1 including land rent	-	-	58.30	-	69.59	11.28
	20.2 excluding land rent	-	-	47.45	-	57.75	10.30

AVERAGE FARMERS' COST OF PRODUCTION OF SUGARCANE IN NWFP: 2007-08 AND 2008-09 CROPS

Sr. No.	Operations / inputs	Avg No. of oprs/units/ acre	2007 - 08 Crop		2008 - 09 Crop		Change in 2008-09 over 2007-08
			Cost per unit	Cost per acre	Cost per unit	Cost per acre	
1	2	3	4	5=3*4	6	7=3*6	8=7-5
				---------Rupees---------			
1	Land preparation:						
	1.1 Deep ploughing/Rotavator	0.665	680.00	452.20	775.00	515.38	63.18
	1.2 Ploughing	2.776	275.00	763.40	315.00	874.44	111.04
	1.3 Planking	0.435	140.00	60.90	160.00	69.60	8.70
	1.4 Levelling	0.344	275.00	94.60	315.00	108.36	13.76
2	Seed bed preparation:						
	2.1 Ploughing/Furrow making	0.982	275.00	140.43	315.00	160.85	20.43
	2.2 Planking	0.027	140.00	1.97	160.00	2.25	0.28
	2.3 Trech/Ridge making (tractor hrs)	0.039	275.00	5.58	315.00	6.39	0.81
	2.4 Bund making (m.days)	1.274	130.00	86.12	150.00	99.37	13.25
3	Seed and Sowing operations:						
	3.1 40 kg units	76.337	95.00	3771.05	95.00	3771.05	0.00
	3.2 Harvesting, stripping and making of set (m.days)	3.671	130.00	248.16	150.00	286.34	38.18
	3.3 Transport	-	-	240.00	-	275.00	35.00
	3.4 Sowing of sets (m.days)	4.097	130.00	276.96	150.00	319.57	42.61
4	Interculture and Earthing up :						
	4.1 Manual/binding of plants	1.642	600.00	985.20	690.00	1132.98	147.78
	4.2 Bullock/tractor	1.859	275.00	511.23	315.00	585.59	74.36
5	Plant Protection:						
	5.1 Weedicides	0.336	315.00	105.84	320.00	107.52	1.68
	5.2 Granules	0.094	280.00	26.32	285.00	26.79	0.47
	5.3 Sprays	0.306	200.00	61.20	205.00	62.73	1.53
	5.4 Others	0.261	270.00	70.47	275.00	71.78	1.31
6	Irrigation:						
	6.1 Canal	15.19	-	863.00	-	863.00	0.00
	6.2 Private tubewell	2.61	271.00	707.31	282.00	736.02	28.71
	6.3 Private canal (manual labour)	2.43	20.00	48.60	21.00	51.03	2.43
	6.4 Labour for irrigation and water course cleaning (m.days)	7.953	130.00	1033.89	150.00	1192.95	159.06
7	Farm Yard Manure:						
	7.1 Material	-	-	890.00	-	1035.00	145.00
	7.2 Transport & application	-	-	665.00	-	760.00	95.00
8	Fertilizers: (bags)						
	8.1 DAP	0.83	920.00	763.60	2700.00	2241.00	1477.40
	8.2 Urea	1.97	530.00	1044.10	610.00	1201.70	157.60
	8.3 Nitrophos	0.33	650.00	214.50	1830.00	603.90	389.40
	8.4 CAN	0.13	420.00	54.60	541.00	70.33	15.73
	8.5 Fert. transport and application	3.26	32.00	104.32	35.00	114.10	9.78
9	Mark up @ 12.0 % per annum for 15 months months on item 1 to 8 minus item 6.1	-	-	2014.13	-	2472.30	458.17
10	Land rent for 15 months	-	6000.00	7500.00	6500.00	8125.00	625.00
11	Average weighted land tax @ Rs 75/acre/ annum for 15 months	-	-	93.75	-	93.75	0.00
12	Management charges for 15 months	-	-	845.00	-	930.00	85.00
13	Harvesting & stripping (40 kg units)	585.46	7.00	942.59	8.00	1077.25	134.66
14	Expected escalation in cost of selected items	-	-	1048.00	-	858.00	-190.00
15	Total cost (items 1 to 14)	-	-	26734.00	-	30901.29	4167.29
16	Yield (40 kg units)	-	-	585.46	-	585.46	0.00
17	Cost of productionat farm level: (Rs/40 kgs)						
	17.1 including land rent	-	-	45.66	-	52.78	7.12
	17.2 excluding land rent	-	-	32.85	-	38.90	6.05
18	Marketing expenses: (Rs/40 kgs)						
	18.1 Transport, etc.	-	-	6.25	-	7.00	0.75
	18.2 Development cess	-	-	0.27	-	0.27	0.00
19	Cost of production at mill-gate: (Rs/40 kgs)						
	19.1 including land rent	-	-	52.18	-	60.05	7.87
	19.2 excluding land rent	-	-	39.37	-	46.17	6.80

Notes for Annex- III to V

1. The input-output parameters for estimating cost of production for sugarcane 2008-09 Crop have been adopted from the Price Policy for sugarcane 2007-08 Crop, API's Series No. ?.

2. The custom hire rates of farm operations, farm inputs prices, wage rate and land rentals have been revised in the light of data obtained through field surveys conducted by the API in the major sugarcane growing areas of the Punjab, Sindh and NWFP during January 2008 and discussion in the meeting of the Standing Committee on sugarcane, held on 25th 2008 at Islamabad and other sources as narrated below.

3. Seed and related costs (items 2 and 3) for the fresh planted crop have been estimated @ 50, 69 and 52 per cent of their original values for the Punjab, Sindh and NWFP respectively in view of the incidence of ratooning reported @ 50, 31 and 48 per cent during sugarcane's large field survey for 1999-00 crop.

4. The seed prices of sugarcane have been kept on the last year level on account of affecting sugarcane seed by frost though the mill-gate prices of sugarcane during 2007-08 crop year remained depressed through out the season.

5. The increasing trend in the prices of pesticides, insecticides etc. has been arrested on account of new generic and low cost pesticides and insecticides. Therefore, the material cost (90 per cent) of plant protection has not been revised. However, the cost of labour component (10 per cent of the total cost) has been revised in light of new wage rate.

6. The prices of chemical fertilizers have been revised in view of the fertilizers prices published by the Federal Bureau of Statistics, Islamabad for the week ending on 27th March 2008 and supplemented with information provided by the representatives of the farmers' in the meeting of Standing Committee on sugarcane.

7. The management charges for a manager looking after a 25-acre farm and devoting one-fourth of his time to the managerial activities have been worked out at Rs 6208 per month for a Field Assistant at the 10th stages in BPS-6 as per revised scale of July 2007.

8. In view of the 1999-00 Crop survey, about 1 per cent of the acreage under sugarcane was harvested in lieu of sugarcane tops in the Punjab and 77 per cent in NWFP. The expenditure on account of harvesting and stripping has been adjusted accordingly.

9. The likely escalation in the cost of operations like interculture, plant protection, supplementary irrigation, nitrogenous fertilizer, harvesting/stripping and marketing during 2008-09 crop year has been estimated as 11.31 per cent in the Punjab, 10.16 per cent in Sindh and 10.84 per cent in the NWFP on the basis of average weighted annual increase in their costs for the last 4 years.

10. The mark-up rate of 12 per cent is the weighted average rate based on agriculture loans disbursed by different public and private institutions at @ 09 per cent by the ZTBP and 14 per cent of private sector.

11. In the cost of cultivation of sugarcane, land rent is the major item in all the provinces. The land rent is affected by several parameters and substantially varies from place to place. For updating the land rentals there is no precise measure available at hand. However, keeping in view the observations obtained during the field survey of sugarcane and discussion made in the meeting of API's Standing Committee on sugarcane, land rentals have been adjusted accordingly.

ECONOMICS OF SUGARCANE AND COMPETING CROPS AT PRICES REALIZED BY THE GROWERS: 2007-08 CROPS

Province/crops/ crop combination	Crop duration	Water used	Gross cost	Cost of purchased inputs	Gross revenue	Gross margin	Net income	Output-input ratio	Revenue per Rupee of purchased inputs	Revenue per Crop day	Revenue per Acre inch of water
1	2	3	4	5	6	7=6-5	8=6-4	9=6/4	10=6/5	11=6/2	12=6/3
	Days	Acre inches	......Rupees per acre......						......Rupees......		
Punjab											
1 Sugarcane	394	48	27306	8809	27410	18601	104	1.00	3.11	70	571
2 Seed cotton	240	22	18191	7811	25443	17632	7252	1.40	3.26	106	1157
3 Basmati paddy	180	58	13979	8150	21232	13082	7253	1.52	2.61	118	366
4 IRRI paddy	180	62	11715	6689	16189	9500	4474	1.38	2.42	90	261
5 Wheat	180	12	13962	6069	18369	12301	4408	1.32	3.03	102	1531
6 Sunflower (spring)	144	22	11409	3388	23760	20373	12351	2.08	7.01	165	1080
7 Seed cotton + wheat	420	34	32153	13880	43812	29932	11660	1.36	3.16	104	1289
8 Seed cotton + sunflower	384	44	29600	11199	49203	38004	19603	1.66	4.39	128	1118
9 Basmati paddy+wheat	360	70	27940	14219	39601	25382	11661	1.42	2.79	110	566
10 Basmati paddy+sunflower	324	80	25387	11537	44992	33454	19604	1.77	3.90	139	562
11 IRRI paddy + wheat	360	74	25677	12758	34558	21800	8882	1.35	2.71	96	467
12 IRRI paddy+sunflower	324	84	23124	10077	39949	29872	16825	1.73	3.96	123	476
Sindh											
1 Sugarcane	488	71	33509	10006	36120	26114	2610	1.08	3.61	74	509
2 Seed cotton	240	18	17091	5988	25250	19262	8159	1.48	4.22	105	1403
3 IRRI paddy	180	56	10243	4572	18866	14293	8623	1.84	4.13	105	337
4 Wheat	180	12	11851	5129	16035	10906	4184	1.35	3.13	89	1336
5 Sunflower (spring)	144	22	10892	3388	23760	20373	12868	2.18	7.01	165	1080
6 Seed cotton + wheat	420	30	28942	11116	41285	30168	12343	1.43	3.71	98	1376
7 Seed cotton + sunflower	384	40	27983	9375	49010	39635	21027	1.75	5.23	128	1225
8 IRRI paddy+ wheat	360	68	22094	9701	34901	25200	12806	1.58	3.60	97	513
9 IRRI paddy+sunflower	324	78	21135	7960	42626	34666	21491	2.02	5.36	132	546

Notes for Annex - VI

1. The economic analysis presented in the above exercise is based on the input-output prices applicable for 2007-08 crops.

2. The data regarding input-output parameters have been adopted from the APCom's support price policy papers for sugarcane, seed cotton, rice paddy and wheat, 2007-08 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 2007-08 crops. To incorporate the escalations in input prices, which occurred during the growing period of 2007-08 crops, some marginal revisions have been made as under:

   2.1 The cost of supplementary irrigation remained unchanged as there is no any change observed in the power tariff and diesel prices during the period under consideration.

   2.2 The cost of fertilizers has been revised in view of their prices prevailed at the time of application for the respective crops in 2007-08 season.

3. Water use has been estimated from the number of irrigations as reported in the cost of production estimates of the respective crops assuming each irrigation of 3 inches and 'rauni' of 4 inches.

4. The following prices as realized by the growers for different crops are adopted for the analysis:

   4.1 The support price of Rs 625 per 40 kgs as announced by the government for 2007-08 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 reported by the Directorate of Agriculture (E&M), Lahore have averaged at Rs 920 and Rs 481 per 40 kgs, respectively. While, the average price of IRRI paddy in Sindh is reported at Rs 509 per 40 kgs by the Joint Director, Directorate of Agriculture Extension, Hyderabad, Sindh.

   4.3 The wholesale market prices of seed cotton during the post-harvest months of Aug - Feb 2007-08 in the main producer area markets have averaged at Rs 1468 per 40 kgs in the Punjab as reported by the Directorate of Agriculture (E&M), Lahore. In Sindh, the corresponding prices are reported by the PCCC, Karachi averaged at Rs 1445 per 40 kgs.

4.4 The sunflower 2007-08 crop is yet to be harvested. However, it was reported by the PODB Islamabad that All Pakistan Solvent Extraction Association would purchase sunflower at Rs 1600 and canola @ Rs 1225 per 40 kgs during the season.

4.5 The market prices of sugarcane at mill-gate in the major cane producing areas are reported to hover around Rs 55 per 40 kgs in the Punjab and Rs 60 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 6.25 per 40 kgs in Punjab and Sindh for sugarcane, Rs 23 in Punjab and Rs 25 in Sindh for seed cotton, Rs 16 for rice paddy, wheat and oilseeds.

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

ANNES- VII

PER CAPITA AVAILABILITY (CONSUMPTION OF SUGAR: 1996-97 TO 2006-07 (Oct-Sep)

S. No	Items	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
		Thousands tonnes										
1	Opening stocks as on Ist October	104	413	513	371	27	621	637	759	809	578	1311
2	Production	2393	3555	3542	2429	3016	3249	3617	4021	3116	2999	3527
3	Imports	625	447	4	421	633	27	9	12	622	1593	119
4	Exports	0	11	648	22	0	8	80	132	28	47	294
5	Closing stocks as on 30th September	413	513	371	27	621	637	759	809	578	1311	986
6	Net availability (item 1+2+3-4-5)	2709	3891	3040	3172	3055	3252	3424	3851	3941	3812	3677
		Millions										
7	Population as on Ist April (a)	132.96	136.19	139.07	142.34	145.64	149.16	152.87	156.86	160.11	163.15	166.09
		Kgs per annum										
8	Per capita availability (consumption)	20.37	28.57	21.86	22.28	20.98	21.80	22.40	24.55	24.61	23.37	22.14
9	Average per capita availability i) Average 1996-97 to 2006-07)				22.99							

Note (a)

Population of AJ&K, Nas and Afghan refugees have also been included.

Sources

1. For stocks and production: Pakistan Sugar Mills Association, Islamabad.
2. For import and exports: Federal Bureau of statistics, Karachi.
3. For population of Pakistan; Economic Survey of pakistan.
4. For population of AJ&K and NAs:Population Census organisation, Islamabad.
5. For population of Afghan refugees: Kashmir affairs and northern areas and State Frontier Region Division, Islamabad.

ANNEX- VIII

DOMESTIC AVERAGE WHOLESALE PRICES OF SUGAR IN MAJOR DOMESTIC MARKETS: 2007 AND 2008

Month	Lahore	Fasilabad	Karachi	Hyderabad	Peshawar	Average
	----------	----------	Rupees per 100 kgs	----------	----------	
2007						
January	3023	2993	2955	2883	3025	2976
February	2923	2888	2883	2783	2920	2879
March	2890	2865	2785	2768	2898	2841
April	2880	2835	2820	2740	2863	2828
May	2900	2855	2808	2778	2868	2842
June	2668	2613	2594	2538	2638	2610
July	2758	2743	2680	2688	2803	2735
August	2858	2831	2819	2771	2873	2830
September	2840	2835	2800	2690	2850	2803
October	2786	2748	2721	2688	2784	2745
November	2700	2683	2656	2601	2717	2671
December	2459	2437	2457	2317	2478	2429
Average	**2807**	**2777**	**2748**	**2687**	**2810**	**2766**
2008						
January	2385	2352	2282	2328	2426	2354
February	2413	2373	2296	2242	2454	2356
March	2378	2326	2275	2223	2397	2320
April	2355	2288	2225	2188	2360	2283
May	2640	2628	2550	2565	2744	2625
Average	**2434**	**2393**	**2326**	**2309**	**2476**	**2388**

Source: ALMA, Karachi.

ANNEX - IX

ANNUAL AVERAGE WHOLESALE PRICES OF SUGAR IN MAJOR DOMESTIC MARKETS: 1995-96 TO 2007-08 (October- September)

Year	Lahore	Fasilabad	Karachi	Hyderabad	Peshawar	Average	Increase(+) decrease(-) in average price over
	Rupees per 100 kgs						Percent
1995-96	1695	1705	1650	1625	1718	1679	-
1996-97	1988	2020	1975	1923	2110	2003	19.34
1997-98	1745	1713	1720	1643	1835	1731	-13.58
1998-99	1865	1861	1823	1726	1864	1828	5.58
1999-00	2179	2168	2087	2082	2183	2140	17.07
2000-01	2551	2524	2482	2353	2566	2495	16.61
2001-02	2069	2042	2063	2022	2073	2054	-17.69
2002-03	1939	1906	1892	1872	1972	1916	-6.70
2003-04	1813	1769	1788	1743	1853	1793	-6.42
2004-05	2417	2410	2373	2345	2411	2391	33.35
2005-06	3359	3342	3243	3223	3349	3303	38.14
2006-07	2932	2901	2884	2818	2933	2894	-12.40
2007-08 *	2514	2479	2433	2394	2545	2473	-14.54

* **Price are upto May 2008.**

Source: ALMA, Karachi

ANNEX - X

AVERAGE INTERNATIONAL PRICES OF SUGAR: 1997-98 TO 2007-08 (OCT - SEP)

Years	ISA Daily price of Raw su (Fob and stowed Caribbean ports in bulk)		London Daily price of White sugar (fob and stowed European ports in bags of 50 kgs)		Difference between White and raw sugar prices		
Oct - Sep	US Cents/ lb	US$/ tonne	US Cents/ lb	US$/ tonne	US Cents/ lb	US$/ tonne	Per cent of White Sugar
1997-98	9.89	218.03	12.33	271.83	2.44	53.80	19.79
1998-99	6.63	146.20	9.79	215.83	3.16	69.63	32.25
1999-00	7.23	159.30	9.18	202.38	1.95	43.08	21.29
2000-01	9.34	205.91	11.35	250.29	2.01	44.38	17.71
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	21.59
2003-04	6.57	144.84	10.16	223.93	3.59	79.09	35.33
2004-05	8.97	197.75	12.48	275.06	3.51	77.31	28.13
2005-06	14.84	327.14	18.34	407.75	3.50	80.61	19.10
2006-07	10.43	229.90	14.80	326.82	4.38	96.92	29.55
2007-08	**11.72**	**258.28**	**14.76**	**325.52**	**3.05**	**67.24**	**20.65**
October	10.00	220.46	12.70	279.93	2.70	59.47	21.26
November	10.09	222.44	12.94	285.35	2.85	62.91	22.02
December	10.71	236.11	13.80	304.27	3.09	68.16	22.39
January	11.94	263.23	15.33	338.00	3.39	74.77	22.11
February	13.51	297.84	16.56	365.12	3.05	67.28	18.42
March	13.20	291.01	16.03	353.48	2.83	62.47	17.65
April	12.56	276.90	15.99	352.52	3.43	75.62	21.45

Source: International Sugar Organization, London "Monthly Market Reports and Press Summaries" (various reports).

ANNEX-XI

ECONOMIC IMPORT PARITY PRICES OF SUGARCANE AT MILL-GATE AS WORKED BACK FROM AVERAGE FOB (LONDON) PRICE OF WHITE SUGAR

S.No	Item	2002-03 to 2006-07		2007- 08 (Oct-April)		As on April 08	
		.... US $ per tonne					
1.	Average fob (London) price	292.38		325.52		352.52	
2.	Freight charges upto Karachi	60.00		60.00		60.00	
3.	C & f cost at Karachi port	352.38		385.52		412.52	
		OR ... Rs. per tonne (a)...					
		23469		25676		27474	
4.	Marine insurance @0.35 of c&f price	82		90		96	
5.	Landing charges @1% of c&f price	235		257		275	
6.	**Import value (items 3+items 4+5)**	**23785**		**26022**		**27845**	
7.	L/C opening charges @ 0.2% of c&f cost	48		52		56	
8.	Mark up on retirement of documents by bank for 30 days @ 9.75% per annum of c&f cost	188		206		220	
9.	Wharfage, handling and stevedoring charges	229		229		229	
10.	Allowance for shortage and unforeseen expenses @ 1% of c&f cost	235		257		275	
11.	TCP's commission @ 2% of c&f cost	469		514		549	
12.	Transport charges from Karachi to Lahore (b) including loading/unloading	1750		1750		1750	
13	Landed cost at Lahore (items 6+ items 6 to 12).	26704		29029		30924	
		Punjab & NWFP	Sindh	Punjab & NWFP	Sindh	Punjab & NWFP	Sindh
14.	Processing cost of sugar (c)	9079.37	9079.37	9869.97	9869.97	10514.09	10514.09
15.	Value of cane to produce one tonne of sugar (item 13 minus item 14)	17624.66	17624.66	19159.35	19159.35	20409.71	20409.71
16.	Provincial base recovery level (%)	8.50	8.70	8.50	8.70	8.50	8.70
17.	Quantity of cane in tonnes required to produce one tonne of sugar (100 / item 16)	11.76	11.49	11.76	11.49	11.76	11.49
18.	Price of one tonne of sugarcane (item 15 / item 17) (Rs per tonne)	1498.10	1533.35	1628.55	1666.86	1734.83	1775.64
19.	Price of 40 kgs of cane (item 18/25)	59.92	61.33	65.14	66.67	69.39	71.03

Sources:

i) For average fob (London) price: Annex XV.

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

ii) For transport charges: Arian Cargo Transport Agensy, Karachi.

Notes:

a) Selling exchange rate one US $ = 66.60 Pak rupees, announced by State Bank of Pakistan as on May 31, 2008.

b) Assuming that imported sugar will be consumed at Lahore.

c) 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.

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ANNEX - XII

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

S.No	Items	2002-03 to 2006-07		2007-08 (Oct-April)		As on April 08	
			.... US $ per tonne				
1.	Average fob (London) price		292.38		325.52		352.52
2.	Freight charges upto Karachi		60.00		60.00		60.00
3.	C & I cost at Karachi port		352.38		385.52		412.52
		OR	------Rs per tonne------				
			23468.51		25675.63		27473.83
4	Marine insurance (actual)		56.17		56.17		56.17
5.	Import value (items 3+4)		23524.68		25731.80		27530.00
6.	Custom duty @25 % of import value		5881.17		6432.95		6882.50
7.	Central excise duty @ 1% of c&f price		234.69		256.76		274.74
8.	Sales tax @ 15% of (I.V+ C.D+C.E.D)		4446.08		4863.23		5203.09
9.	**Duty paid value (DPV)(items 5+6+7+8)**		**34086.61**		**37284.74**		**39890.33**
10.	L/C opening charges @ 0.5% of c&f cost		117.34		128.38		137.37
11.	Foreign Bank charges (actual)		1.00		1.00		1.00
12	Mark up on retirement of documents by bank for 30 days @ 14% per annum of c&f cost		270.05		295.45		316.14
13	Wharfage, handling and stevedoring charges, allowance		234.69		256.76		274.74
14	for shortage and unforeseen expenses @1% of c&f cast						
15	Sindh Govt excise duty @ 0.3% of DPV		102.26		111.85		119.67
16	Service charges of inspection @ 0.5% (cif) value		117.62		128.66		137.65
17	Importer commission @ 1% of c&f cost		234.69		256.76		274.74
18	Transport charges from Karachi to Lahore (b) including loading/unloading		1750.00		1750.00		1750.00
19	**Landed cost at Lahore (Item 9+Items 10 to 18)**		**36914.26**		**40213.58**		**42901.63**
20	Less sales tax @ 15% on domestic production		5537.14		6032.04		5595.87
21	Cost of one tonne of imported sugar after deducting sale tax @ 15% of landed cost at Lahore		31377.12		34181.55		37305.77
		Punjab & NWFP	Sindh	Punjab & NWFP	Sindh	Punjab & NWFP	Sindh
22	Processing cost of sugar (c)	10668	10668	11622	11622	12684	12684
23	Value of cane to produce one tonne of sugar (item 21 minus item 22)	20709	20709	22560	22560	24622	24622
24	Provincial base recovery level (%)	8.50	8.70	8.50	8.70	8.50	8.70
25	Quantity of cane in tonnes required to produce one tonne of sugar (100 / item 24)	11.76	11.49	11.76	11.49	11.76	11.49
26	Price of one tonne of sugarcane (item 26 / item 28) (Rs per tonne)	1760.26	1801.67	1917.58	1962.70	2092.85	2142.10
27	Price of 40 kgs of cane (Rs per 40 Kgs)	70.41	72.07	76.70	78.51	83.71	85.68

Sources:

i) For average fob (London) price: Annex XV.

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

ii) For transport charges: Arian Cargo Transport Agensy, Karachi.

Notes

a) Selling exchange rate one US $ = 66.60 Pak rupees, announced by State Bank of Pakistan as on May 31, 2008.

b) Assuming that imported sugar will be consumed at Lahore.

c) 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.

ANNEX-XIII

ECONOMIC EXPORT PARITY PRICES OF SUGARCANE AT MILL-GATE AS WORKED BACK FROM AVERAGE FOB (LONDON)SUGAR PRICE OF WHITE SUGAR

S.No	Item	2002-03 to 2006-07		2007- 08 (Oct-April)		As on April 08	
		.... US $ per tonne					
1.	Average fob (London) price	292.38		325.52		352.52	
	OR	.... Rs. per tonne (a)					
2.	Average fob Karachi price (assuming equivalent to fob London price)	19443		21647		23443	
3.	Transport charges from interior Sindh to port, special packing, inspection transit insurance, loading and unloading, clearing and forwarding agents commission (b)	600		600		600	
4.	Wharfage	50		50		50	
5.	Bank commission @ 1 % of fob price	194		216		234	
6.	Pre- shipment inspection charges@ 0.5 of fob price	97		108		117	
7.	Ex-mill price of sugar (item 2 minus items 3 through 6)	18502		20672		22441	
		Punjab & NWFP	Sindh	Punjab & NWFP	Sindh	Punjab & NWFP	Sindh
8.	Processing cost of sugar (c)	6290.55	6290.55	7028.61	7028.61	7629.92	7629.92
9.	Value of cane to produce one tonne of sugar (item 7 minus item 8)	12211.07	12211.07	13643.77	13643.77	14811.02	14811.02
10.	Provincial base recovery level (%)	8.50	8.70	8.50	8.70	8.50	8.70
11.	Quantity of cane in tonnes required to produce one tonne of sugar (100 / item 10)	11.76	11.49	11.76	11.49	11.76	11.49
12.	Price of one tonne of sugarcane (item 9 / item 11) (Rs per tonne)	1037.94	1062.36	1159.72	1187.01	1258.94	1288.56
13.	Price of 40 kgs of cane (item 12/25)	41.52	42.49	46.39	47.48	50.36	51.54

Sources:

i) For average fob (London) price: Annex XV.

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

ii) For transport charges: Arian Cargo Transport Agensy, Karachi.

Notes:

a) Buying exchange rate one US $ = 66.50 Pak rupees, announced by State Bank of Pakistan as on May 31, 2008.

b) Assuming that the surplus sugar will be exported from Sindh province.

c) 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.

ANNEX- XIV

MILL GATE PRICES OF SUGARCANE ON THE BASIS OF AVERAGE WHOLESALE PRICES GUR DURING 2007-08 (OCT-MAR)

S.No	Item	Unit	NWFP	Punjab
			(a)	(a)
1		Kgs	40.00	40.00
2	Sale value of gur produced	Rs/40 kgs	1324.00	1108.00
3	Marketing cost of gur including transport, commission, etc	Rupees	69.26	66.71
4	Net value of gur at farm level(Item 2 - item 3)	Rupees	1254.74	1041.29
5	Processing cost inluding crushing	Rupees	302.00	147.00
6	Cost of chemical	Rupees	28.84	3.18
7	Net value of 400 kgs of cane (item 4-items 5 & 6	Rupees	923.90	891.11
8	Value of 40 kgs of sugarcane	Rupees	92.39	89.11
9	Marketing cost of cane i.e. transportand development cess	Rupees	3.72	3.50
10	Maill- gate price per 40 kgs of cane (item 8 + item 9)	Rupees	96.11	92.61

(a) 10 per cent recovery has been taken.

Source:

1 ALMA, Karachi.

2 Minifield Survey of API.

ANNEX- XV

MIL-GATE PRICES OF SUGARCANE WORKED BACK FROM THE AVERAGE WHOLESALE MARKET PRICES OF OF SUGAR DURING 2007-08 (NOVEMBER-JULY)

S.No	Item	WORKED BACK PRICES OF SUGARCANE							
		Rupees per tonne							
1.	Average wholesale market prices of sugar (a)	25000		27000		29000		31000	
2.	Whole sale dealer margin @5% on net price	1041		1136		1231		1326	
3.	Sales tax @ of Rs 3.15/kg	3150		3150		3150		3150	
4.	Net price (item 1minus 2 minus 3)	20810		22714		24619		26524	
		Punjab	Sindh	Punjab	Sindh	Punjab	Sindh	Punjab	Sindh
5	Processing cost of saugar @ Rs 7/kg	7000	7000	7000	7000	7000	7000	7000	7000
6	Development and market fee	700	700	700	700	700	700	700	700
7	Profit margin	1000	1000	1000	1000	1000	1000	1000	1000
8	Value of cane to produce one tonne of sugar (item 7 minus item 8)	12110	12110	14014	14014	15919	15919	17824	17824
9.	Provincial base recovery level (%) (2007-08)	8.91	9.36	8.91	9.36	8.91	9.36	8.91	9.36
10.	Quantity of cane in tonnes required to produce one tonne of sugar (100 / item 9)	11.22	10.68	11.22	10.68	11.22	10.68	11.22	10.68
11.	Price of one tonne of sugarcane (item 8 / item 10) (Rs per tonne)	1079	1133	1249	1312	1418	1490	1588	1668
12.	Price of 40 kgs of cane (item 11/25)	43.16	45.34	49.95	52.47	56.74	59.60	63.52	66.73
13.	Value of by products (molasses)	7.43	7.43	7.43	7.43	7.43	7.43	7.43	7.43
14.	**Total sugarcane price at millgate**	**51**	**53**	**57**	**60**	**64**	**67**	**71**	**74**

Notes:

a) Average price of Lahore, Fasialabad and Hyderabad markets during current crushing seasons.

Sources:

i) For average market price: ALMA, Karachi.

ii) For sales tax: FDR, Islamabad.

ANNEX-XVI

ECONOMIC EFFICIENCY OF RESOURCE USE IN SUGARCANE PRODUCTION IN PUNJAB

POLICY ANALYSIS MATRIX (PAM)

Based on import parity prices

Description	Revenues	Traded Cost	Domestic Factor's Cost	Profits
	--------- Rupees per acre ---------			
2002-03				
Private Prices	17096	6060	12043	-1008
Social Prices	19551	5774	11365	2412
Transfers	-2455	286	678	-3419
2003-04				
Private Prices	16531	6604	12741	-2814
Social Prices	19207	5918	11930	1360
Transfers	-2677	686	811	-4174
2004-05				
Private Prices	19639	7004	13439	-804
Social Prices	23657	6266	12398	4993
Transfers	-4018	738	1041	-5796
2005-06				
Private Prices	30659	7539	15112	8009
Social Prices	34078	6731	14082	13265
Transfers	-3419	808	1030	-5256
2006-07				
Private Prices	30377	9556	17199	3622
Social Prices	30059	8563	15885	5611
Transfers	318	993	1315	-1990
2007-08				
Private Prices	27410	10144	18732	-1466
Social Prices	32585	9159	17212	6214
Transfers	-5176	985	1519	-7680

ANNEX- XVII

ECONOMIC EFFICIENCY OF RESOURCE USE IN SUGARCANE PRODUCTION IN SINDH

POLICY ANALYSIS MATRIX (PAM)

Based on import parity prices

Description	Revenues	Traded Cost	Domestic Factors' Cost	Profits
	--------- Rupees per acre ---------			
2002-03				
Private Prices	21078	8793	12294	-8
Social Prices	23964	8104	11237	4623
Transfers	-2887	689	1056	-4631
2003-04				
Private Prices	20402	9323	13418	-2339
Social Prices	23544	8597	12282	2664
Transfers	-3142	726	1136	-5004
2004-05				
Private Prices	24458	9700	13636	1121
Social Prices	29337	8919	12340	8078
Transfers	-4879	781	1296	-6956
2005-06				
Private Prices	36626	10359	17238	9029
Social Prices	41766	9484	16687	15594
Transfers	-5140	875	550	-6565
2006-07				
Private Prices	41020	12887	19019	9114
Social Prices	36852	11845	18445	6563
Transfers	4167	1042	575	2551
2007-08				
Private Prices	34767	13673	20350	744
Social Prices	42133	12639	19689	9804
Transfers	-7366	1034	661	-9060

ANNEX- XVIII.

SUCROSE BASED PAYMENT SYSTEM

(a) Weightment of Cane

Weightment of cane is done at the weigh bridge of sugar mills at mill gate.

(b) Sampling and Laboratory Analysis

Sampling of growers cane is done with the help of core sampler. Core sampler is a mechanical device which samples the cane from top to bottom at 45 slanting. It has a hallow hydraulic rotating 6" (diameter) drill which goes into the cane load for taking representative sample. A 5 Kg cane sample is taken by the drill representing top, middle and bottom of cane Road. Horizontal representation is also there as the drill moves at 45 slanting. The drill goes one meter deep. The size of drill may be enhanced per requirement as the depth of truck load exceeds significantly in local conditions. About one Kg sample is subjected to laboratory analysis. The sample is pressed at the pressure of 3000 PSI which is equivalent to last mill pressure for two minutes. POL per cent of first expressed juice and Brix per cent of first expressed juice is obtained with the help of Poloremeter and Brix Refractometer. Juice must be allowed to stand for 20 minutes to allow air to rise and soil to settle before screening. The analysis is completed with in 30 minutes. Other technical co-efficient per requirement of the estimating formula are obtained like Purity of extracted juice, Fiber percent cane etc.

© Formula for the Calculation of Recoverable Sugar

CCS (Commercial Cane Sugar) formula

CCS = 1.5 P{1-[F+5]/100}-05 B {1-[F+3]/100} of 94 NT

Where P = POL percent first expressed juice
B = Brix percent first expressed juice
F = Fibre percent cane
NT = Net titre (measure of refinability of sugar)

Louisiana Method

Commercial Recoverable Sugar (CRS) =
TRS X Liquidation Factor.
TRS (Theoretical Recoverable Sugar)
= (Pol % cane / 100) X (Pol Extraction / 100)
(Pol Retention /100) / 0.96
Pol Extraction = 100 - (56.56 X Fiber % cane) / (100- Fiber % cane)
Pol Retention = [1.4 - (40 / Juice purity)] X BHE,
Based on Winter Carp formula on molasses purity of '28.56'
TRS = (0.28P – 0.08B) x (100 – 56.67F/100-F) x BHE x 0.96
(In pounds of sugar per ton of cane)
With molasses purity of 33.5 in local conditions the formula simplifies to
TRS = (0.15 P – 0.05 B) X (100-56.67 F/[100-F]) X BHE x 0.90
(In kgs of sugar per tonne of cane)

(d) Cane pricing formula

1. Estimation of recoverable sugar from laboratory based analysis.
2. Miller: Grower ratio. In case of Australia the cost of producing one tonne of cane is twice the cost of processing it. So the Miller : Grower ratio is 1 :2. In Pakistan sugar milling environment it is generally agreed at 40: 60 or 2:3
3. Co-efficient of work which is generally assessed at 90 per cent In Australia sugar manufacturing
4. Sugar price prevailing at the time of delivery of cane. It would very during the course of crushing season.
5. General level CCS in cane = 9 (suppose)
6. Cane price 0.009 x (CCS - 3.6) x P
7. Unit CCS=0.009 x p
8. Millers share $=\frac{M}{M+G}$ x CCS x COW x P