Annex-II

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SUPPORT PRICE POLICY

FOR

SUGARCANE, 2001-2002 CROP

AGRICULTURAL PRICES COMMISSION
GOVERNMENT OF PAKISTAN
ISLAMABAD
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ABBREVIATIONS

AARI	:	Ayub Agricultural Research Institute
AJ&K	:	Azad Jummu & 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
DPV	:	Duty Paid Value
ECC	:	Economic Co-ordination Committee of the Cabinet
EPB	:	Export Promotion Bureau
FBS	:	Federal Bureau of Statistics
FCA	:	Federal Committee on Agriculture
FID	:	Fertilizer Imports Directorate
FOB	:	Free on Board
FYM	:	Farm Yard Manure
GDP	:	Gross Domestic Product
GST	:	General Sales Tax
HYV	:	High Yielding Variety
IPM	:	Integrated Pest Management
ISO	:	International Sugar Organization
LSD	:	Light Speed Diesel
MINFAL	:	Ministry of Food, Agriculture and Livestock
NAs	:	Northern Areas
NWFP	:	North West Frontier Province
OLS	:	Ordinary Least Squares
PARC	:	Pakistan Agricultural Research Council
PSMA	:	Pakistan Sugar Mills 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

SUPPORT PRICE POLICY FOR SUGARCANE 2001-2002 CROP

INTRODUCTION

Sugarcane, one of the important food and cash crops in the country, is cultivated on about one million hectares. It accounts for 5 per cent of the cropped area and 12-15 per cent of the value-added by major crops. Sugarcane tops, by-product of its cultivation, are valuable source for feeding livestock. Sugarcane farming is the major source of raw material for sugar industry, second largest agro-based industry of Pakistan. Sugarcane farming and its processing not only contribute handsomely to public exchequer through various taxes and levies but also provide employment in both urban and rural areas. The performance of sugarcane crop impacts on growth rates of agriculture and industrial sectors. The low growth rate recorded in the large scale manufacturing sector during 1999-2000 is attributable to poor crop of sugarcane, as sugar production fell from 3.53 million tonnes in 1998-99 to 2.4 million in 1999-2000.

2. The Government annually reviews the support price of sugarcane which is designed to provide a minimum but guaranteed price to the growers. The actual prices paid by the mills till 1996-97, influenced by the demand and supply of sugarcane and trade policy, by and large, had been higher than the support prices. The prices realized by the growers in 1997-98 and 1998-99 were, however, much less than the guaranteed prices. In the 2000-2001 crop season prices, due to short supply of sugarcane, have been much higher than the support price of Rs 35 per 40 kgs for the Punjab and NWFP and Rs 36 for Sindh and Balochistan.

3. In connection with formulation of policy proposals for the 2001-2002 sugarcane crop, contained in this Report, following steps were taken by APCom:

i) To update the cost of inputs and cultural operations a survey was conducted in the first week of January, 2001 in the important sugarcane growing regions. During the course of survey detailed discussions were also held with the growers, crop experts and mill management on issues relating to production and marketing of sugarcane.

ii) Annual meeting of the APCom's Standing Committee on Sugarcane was held on January 13, 2001 at Hyderabad. It was presided over by the Federal Minister for Food, Agriculture and Livestock and attended by researchers, progressive growers, representatives of farmers' organizations and sugar industry. The participants discussed at length various issues concerning with cultivation and marketing of sugarcane, current crisis in sugar industry and future prospects. The views expressed in the meeting have been duly considered in formulating proposals contained in this Report.

iii) The data on area, yield, production and prices of sugarcane; domestic as well as world production, demand, stocks, prices and trade of sugar were collected from various relevant sources and analysed. The policy proposals presented in the Report weigh heavily on this information.

4. With sugarcane area of over one million hectares, its intensive requirements of water and impending shortages thereof, there is not much rationale for expanding its cultivation. At the same time, there is a dire need to raise its yield through judicious use of inputs and improved crop management, for which there is plenty of scope.

5. Sugarcane is well integrated in the existing cropping patterns and farmers are well versed with its production technology. Sugar industry with capacity to produce over 5 million tonnes of sugar, annually, involves huge investments. The growth rate in the industry depends heavily on the capacity utilization and availability of raw material. The domestic requirements of sugar are currently estimated at about 3 million tonnes. In view of the above situation, and volatility in international prices of sugar, a policy of relying on unbridled market forces is bound to result in lot of instability in the sugar sector as witnessed in the last 4 to 5 years. In view of the ground realities, a policy aiming at providing a level playing field and fair margins to all the stakeholders, reducing price risk and uncertainty of growers so as to maintain regular supply of raw material to the mills is the need of the day.

6. All the stakeholders must base their relationship on mutual trust and appreciation of each other's problems for sustained production of sugarcane and sugar to meet the domestic requirements. The mills can promote production of sugarcane through research and development efforts and technical guidance to the farmers. Sugar industry in Pakistan is quite well organized. Majority of farmers, small and unorganized, may not have clout in policy making circles but their collective response to various decisions of the industry and Government policy determines the supply of raw material to sugar mills. The sugar industry must realise the role of enlightened management in securing adequate supply of raw material. At the same time farmers must appreciate that healthy industry is in their interest as sick industry cannot play effective role in the crop development.

7. The sugar sector, at present, is characterised by a number of distortions, and inefficiencies, both in production and processing of sugarcane. There is also a wide gulf between the growers and mills in their perceptions of problems and prospects of the sector. It is imperative not only to remove the inefficiencies afflicting the sector but also to abridge the gulf between the industry and farmers there is a need for mutual trust, appreciation of each other's problems as well as role. It is in the interest of industry as well as the growers to stabilize sugarcane production in line with the domestic requirements as the country may not have comparative advantage in sugar exports but over reliance in imports is not in the interest of the industry/country either. With this background, the Commission has recommended a number of steps in addition to support price for the 2001-2002 crop for the consideration of the Government.

(Dr. Abdul Salam)
Member (Economics)

February 8, 2001

2. SUMMARY OF FINDINGS AND RECOMMENDATIONS

2.1 Findings

Provincial Shares in Area and Production

8. Punjab's shares in area and production of sugarcane are estimated at 66 and 60 per cent, those of Sindh at 24 and 31 per cent and of the NWFP at 10 and 9 per cent, respectively. The shares of Punjab, Sindh and NWFP in the production of sugar are estimated at 57, 39 and 4 per cent respectively.

Important Sugarcane Producing Districts

9. Districts of Faisalabad, Hyderabad, Badin, Jhang, Sargodha, Kasur, T.T.Singh and Charsadda contribute 51 per cent of the total sugarcane production, 32 mills are located in these districts.

Area, Yield and Production

- **Long-term changes: 1990-91 to 2000-01**

10. During the period 1991-2001 sugarcane production is estimated to have increased @ 2.7 per cent per annum on account of 1.5 per cent expansion in area and 1.1 per cent improvement in yield. The production of sugarcane in the Punjab, Sindh and NWFP has increased at the rates of 4, 0.9 and 1.1 per cent and yield at the rates of 1.5, 1.3 and 0.6 per cent respectively. The area in the Punjab and NWFP has increased at the rates of 2.5 and 0.4 per cent per year but declined in Sindh @ 0.4 per cent.

- **Medium Term Changes: 1995-96 to 2000-01**

11. During medium term (1995-96 to 2000-01) sugarcane production at the national level is estimated to have increased at a nominal rate of 0.1 per cent per year.

- **Short-term changes: 2000-2001 vs 1999-2000**

12. According to the Second Estimates, sugarcane production from the 2000-2001 crop is reported at 42.5 million tonnes, 3.8 million (8.2%) less than the harvest of 46.3 million in 1999-00 which was also a low crop year. The short fall in production is entirely due to contraction in area, as the yield is at last year's level. In the Punjab, production is down by 7.2 per cent, attributable entirely to 13.6 per cent contraction in area as the yield is up by 7.4 per cent. In Sindh, production is down by 12.8 per cent, entirely on account of 15.8 per cent short fall in yield while area increased by 3.6 per cent. In the NWFP, there is no change in the level of production (4.9 million tonnes).

Targets Vs Achievements

13. As per Second Estimates sugarcane production reported at 42.5 million tonnes would fall short of the target by 17.6 per cent. In the Punjab, Sindh and NWFP, the production is below the target by 18.6, 20.7 and 2.7 per cent, respectively. Failure to realize the area targets in Punjab and Sindh and yield targets in all the provinces are the causes of under achievement in production.

Cost of Production

14. In the Punjab, growing of sugarcane in 2001-02 is estimated to cost Rs 16705 per acre inclusive of land rent. These estimates represent an increase of Rs 2675 as compared to the cost estimates of the previous crop. Based on the average yield of 515.52 maunds of 40 kgs each, cost of production of sugarcane at farm level would be Rs 32.40 per 40 kgs. Adding marketing expenses including development cess @ Rs 4.90 per 40 kgs, the mill-

gate cost would work out to Rs 37.30 per 40 kgs, reflecting an increase of Rs 6.15 (19.7 per cent) over the respective cost estimates of 2000-01 crop.

Sindh

15. The estimated cost of cultivating one acre of sugarcane in Sindh, during 2001-02 crop season would be about Rs 18010, with land rent, reflect an increase of Rs 2371 over the corresponding estimates of the 2000-01 crop. Farm level unit cost, based on the average yield of 592.58 maunds, is expected to be Rs 30.39 per 40 kgs. Adding marketing cost including development cess and drainage charges @ Rs 4.90 per 40 kgs, the cost at mill gate would come to Rs 35.29, higher by Rs 4.97 or 16.4 per cent as compared to the last year's cost estimated at Rs 30.32 per 40 kgs.

NWFP

16. The cost of raising one acre of sugarcane in the NWFP for the 2001-02 crop year has been estimated at Rs 16650, including land rent. Based on the average yield of 515.61 maunds of 40 kgs each, farm level cost of producing 40 kgs comes to Rs.32.29. Accounting for marketing charges including development cess @ Rs 3.97 per 40 kgs, the mill-gate cost estimates would be Rs 36.26, showing an increase of Rs 6.78 or 23.0 per cent over the respective cost of Rs 29.48 of the preceding year's crop.

17. Keeping in view the average decline in the yield of 3 and 5 per cent in the Punjab and Sindh during 1997-98 to 2000-01, the COP estimates in these provinces for the 2001-02 crop work out at Rs. 38.21 and 36.70 per 40 kgs respectively. It may be noted that yield of sugarcane in NWFP during the aforesaid period has somewhat increased.

18. The rises in the rates of cultural operations, tube-well irrigation, transportation because of increases in the prices of diesel and escalation in the prices of seed, fertilizers, management cost and land rental are the major sources of increases in the cost of production of sugarcane for the 2001-02 crop.

Nominal and Real Support Prices of Sugarcane: 1990-91 to 2000-01

19. The nominal support price of sugarcane has increased from Rs 15.75 per 40 kgs in 1990-91 to Rs 36 per 40 kgs in 2000-01, an overall increase of 129 per cent. During the same period, the cumulative inflation in terms of CPI, has been 136 per cent. Consequently, the real value of the support price of sugarcane for 2000-01 crop, estimated at Rs 15.28 per 40 kgs in terms of 1990-91 prices shows a decline of 2.98 per cent in relation to the real value of Rs 15.75 in 1990-91 crop.

20. Since 1998-99 the support prices of sugarcane have not been revised. The real value of support price of sugarcane for 2000-01 crop, estimated at Rs 15.28 per 40 kgs, reflects an erosion of 13 per cent in its purchasing power during the last three crop years.

Economics of Fertilizer Use on Sugarcane

21. The economics of fertilizer use on sugarcane has been studied through estimating Benefit Cost Ratio (BCR) and parity ratio between the market prices of fertilizers and both market/support prices of sugarcane. The results are summarised below:

- **Benefit Cost Ratio**

22. Based on the support price of sugarcane and corresponding market prices of fertilizers, BCRs of fertilizer use in sugarcane farming had shown a deteriorating trend upto 1996-97. However, due to significant increase in the support price of sugarcane in 1997-98 these ratios improved. But thereafter due to increasing fertilizer prices and stagnant support price the profitability of fertilizer use on sugarcane has been declining.

23. However, the prices of cane actually received by growers were much less than the support price during 1997-98 and 1998-99 and higher than support price in 1999-2000 and 2000-01. Taking into account the actual prices of sugarcane received by the growers and the prevailing market prices of fertilizers, BCRs at various response ratios work out to be

lower than those estimated at support price for 1997-98 and 1998-99 but higher for the last two years as compared to the corresponding BCRs at different response ratios.

- Parity Between Prices of Fertilizers and Sugarcane

24. The purchasing power of sugarcane crop in terms of fertilizers both N and P_2O_5 experienced a declining trend during the period 1991 to 1997. Highest parity ratios were observed during 1996-97 when 22.31 and 32.30 units of sugarcane were required to purchase one unit of N and P_2O_5 respectively. However, the ratios, both for N and P fertilizers, improved in favour of sugarcane in the following years as compared with 1996-97. The overall analyses indicate that in case of nitrogen the purchasing power of sugarcane has not changed much but for phosphatic fertilizer it has deteriorated. This might lower the use of P resulting in widening of the N: P ratio.

Comparative Economics of Sugarcane and Competing Crops

Punjab

25. The overall economics of sugarcane farming calculated in terms of 2000-01 prices appears to be quite favourable as compared to competing crops. Sugarcane out-performs cotton and rice combinations in terms of returns to overall investment, and purchased inputs. However, cotton combinations outrank sugarcane in terms of revenue per day of crop duration and per unit of irrigation water. The economics of rice combinations does not compare favourably with sugarcane, primarily because of low prices of rice paddy received by the growers during the harvest season.

Sindh

26. Sugarcane generally performs better than the competing enterprises in Sindh too, and has a definite edge over the cotton and rice combinations in respect of returns to overall investment, purchased inputs and crop duration. In terms of returns to irrigation

water, sugarcane excels rice combinations but lags behind those of cotton. IRRI combinations seem to be the least profitable among the competing enterprises.

Prices of Sugarcane on the Basis of "Gur" Prices

27. Mill-gate price of sugarcane worked back from the average wholesale price of gur during crushing season of 2000-01 (October-December) comes to Rs 60.17 per 40 kgs with license fee for cane crushers, and Rs 62.87 per 40 kgs without license fee in NWFP and Rs 54.40 per 40 kgs in Punjab.

Prices of Sugarcane Worked Back from Wholesale Market Prices of Sugar

28. Average wholesale price of sugar during crushing season of 2000-01 as reported by different sugar mills averaged at Rs 26,000 per tonne or Rs 26.00 per kg. The mill gate prices of sugarcane were worked back after taking into account wholesaler's margin, sales tax, and processing costs and using bench mark recoveries of 8.50 per cent for Punjab and NWFP and 8.70 per cent for Sindh. The financial prices of sugarcane work back to Rs 48.62 per 40 kgs in Punjab and NWFP and Rs 49.76 in Sindh.

Domestic Demand Supply and Stock

29. Sugarcane production during 2000-01 is reported at 42.5 million tonnes which is 8.2 per cent less than that of previous year. Considering the decline in sugarcane production, increasing trend in gur making, sugar production during the current season is estimated to range from 2.1 to 2.4 million tonnes. Adding opening stocks of 0.507 million tonnes, total availability of sugar during 2000-01 may range from 2.607 to 2.907 million tonnes.

30. The domestic requirements (for a population of 145.64 million as on 1st April 2001) based on the annual per capita availability of 21.4 kgs work out to 3.117 million

tonnes. Keeping the end year stocks at last year's level, gross domestic requirements should be (3,117 + 507) 3.624 million tonnes.

Behaviour of Sugar Prices in Domestic Market

- **Short term: 1999 and 2000**

31. During 1999 monthly average of wholesale prices of sugar ranged between Rs 1,600 per 100 kgs in Hyderabad market (March 1999) and Rs 1,993 in Peshawar market (October, 1999). During the year 2000, average wholesale prices ranged between Rs 1,646 per 100 kgs in Karachi market (January 2000) and Rs 2,838 in Peshawar and Karachi market (November 2000). The overall average of important markets come to Rs 1,861 and Rs 2,336 per 100 kgs for 1999 and 2000 respectively.

- **Long term: 1989-90 through 2000-01**

32. The whole sale prices of sugar show a rising trend, increasing at the rate of 8.6 per cent per annum during the years of 1990 through 2001. The annual increase in average prices has ranged from 1.4 to 24.4 per cent during the period under review, with declines of 4.2 and 13.6 per cent during 1990-91 and 1997-98, respectively.

Seasonal Variations

33. The prices of sugar generally tend to rise during May and continue rising upto September. With the start of new crushing season from October onward, the prices generally start falling.

World Demand, Supply, Stocks and Trade Situation

34. Global production of sugar (Raw) for 2000-01 is forecast at 124.47 million tonnes, 10 million tonnes less than the 1999-00 level. Consumption is projected at 128.72 million tonnes. Lower production by 4.25 million tonnes than expected consumption would result in

short fall in end year stocks. The end year stocks would be 30.45 million tonnes compared with the previous year's stocks of 38.43 million. tonnes. In view of the tightening of stocks position, prices of sugar may tend upward.

International Prices of Sugar

35. The fob prices of raw sugar reported at US $263 per tonne during 1988-89, increased to US $ 301 in 1989-90. The prices continuously kept declining during next three years and suddenly rose to the level of US $ 302 per tonne in 1994-95. Since than prices continuously declined and averaged at US $ 159 per tonne in 1999-00.

36. The fob prices of white sugar have followed the same pattern as of raw sugar. These are reported at US $ 351 per tonne during 1988-89, at US $ 402 per tonne during 1989-90, at US $ 397 per tonne in 1994-95 and at US $ 202 per tonne in 1999-00. The differential between prices of raw and white sugar during 1988-89 through 1999-00 has ranged between US $ 54 in 1997-98 to US $ 114 per tonne in 1995-96.

Import and Export Parity Prices

37. Since Pakistan has been importer in some years and exporter in the others, both the import and export parity prices of sugarcane have been estimated for analysing support price policy options for the next crop season. Import and export parity prices have been calculated on the basis of fob (London) prices. These are summarised below:

Import Parity Prices

Period	Base price	Mill-gate prices of sugarcane in			
		Punjab and NWFP		Sindh	
		Economic price	Financial price	Economic price	Financial price
	US$/tonne	---------------------- Rs per 40 kgs ---------------			
1. 1995-96 to 1999-00	279	49.69	56.94	50.85	58.28
2. 2000-01 (Oct-Dec)	248	45.16	51.68	46.22	52.89

Export Parity Prices

Period	Base price	Mill-gate prices of sugarcane	
		Punjab and NWFP	Sindh
	US$/tonne	---- Rs per 40 kgs ----	
1. 1995-96 to 1999-00	279	30.55	31.29
2. 2000-01 (Oct-Dec)	248	26.90	27.53

Note: i) Inter-bank exchange rate is Rs 59.00 = $ 1 on 29 January 2001.

ii) Open market exchange rate is Rs.62.00 = $ 1 on 29 January 2001.

Sources: Annexes XVI to XVIII

2.2. Recommendations

2.2.1 The Support Price

38. In view of the analysis and discussion alongwith the conclusion drawn in paras-140 to 151 the following support prices for 2001-02 crops of sugarcane at mill gates in the Punjab, Sindh, NWFP and Balochistan are recommended.

Province	2000-01 (Actual)	2001-02 (Proposed)
	Rupees per 40 kgs at mill gate	
Punjab and NWFP	35.00	42
Sindh and Baloshistan	36.00	43

39. The above recommended prices provide a margin of about 12 per cent over average cost of production.

Quality Premium

40. The quality premium for sugarcane 2001-02 crop should be paid @ Rs. 0.50 per 40 kgs of cane for each 0.1 per cent additional recovery over the provincial bench marks of 8.5 per cent for Punjab and NWFP; and 8.7 per cent for Sindh and Balochistan for the cane procured at the above support prices.

Sugarcane Payment System

41. Millers and growers should agree to adopt a feasible modus operandi for changing the present system of payment of cane: from weight basis to the payment of price of cane by mills to growers on the basis of sucrose contents of individual consignments. A Committee comprising of representatives of millers, growers organizations and experts be constituted to design and propose a modus operandi of adoption of the new system through testing of individual consignments by a neutral agency.

2.2.2 Improving Productivity

42. The following recommendations are made to improve the productivity and production of sugarcane.

- **Sugarcane Breeding**

43. Provincial Governments should be asked to implement the decision of the ECC taken in its meeting held on 14-07-2000 to allocate 15 per cent of sugarcane cess fund for research and development.

44. To facilitate the utilization of cess fund for research and development, the provincial governments should notify the procedure for the utilisation and release of cess fund alongwith its availability, allocation to different areas, disciplines etc. and agencies responsible for scrutinising, processing and according approval of the schemes/projects to be financed from the cess fund allocation.

- **Improved Seed**

i) The sugar industry should provide incentive to the growers for growing cane of high sucrose varieties in the form of quality premium.

ii) The responsibility of production, multiplication and distribution of certified seed of sugarcane be assigned to the sugarmills, as they are the sole beneficiaries of increased production of sugarcane and sugar. For this purpose sugar mills should establish their Cane Development Centres either individually or collectively. These centres in collaboration with the progressive growers and sugarcane researchers should undertake the multiplication and distribution of certified cane seed.

iii) The sugarmills should provide the facilities of hot water treatment of cane sets to the growers alongwith technical guidance for using the technique.

iv) The Cane Development Centres of the sugar mills should also function as regular institutions for extending technical advisory services to sugarcane growers in co-operation with the provincial agricultural research and extension departments.

- **Balanced Use of Fertilizer**

45. Provincial governments should launch campaigns to educate growers about the importance of the use of balanced doses of various fertilizers beside providing soil analysis facilities and arranging availability of all types of fertilizers at the proper time of their application.

- **Use of Press Mud/Organic Matter**

46. Provincial governments and PSMA should persuade sugar mills to adopt policies which discourage burning of press mud as fuel and promote its use as organic matter/manure by the farmers. Facilitating its availability to growers should help this.

- **Biological Control of Sugarcane Pests**

47. The government should encourage the PSMA to propagate the adoption of the techniques as well as ensure establishment of programme of artificial rearing of predators by sugar mills individually or jointly in different regions for their distribution amongst sugarcane growers of the area.

- **Bio Fertilizer for Sugarcane**

48. PARC and provincial soil bacteriologists should undertake research on the isolation of strain of bacteria Acetobacter diazatotropicus to develop and supply its inoculum to research institutes for testing its efficiency as nitrogen fixing in sugarcane cultivation. Furthermore, Federal and Provincial Research Institutes should cooperate to achieve the objective.

- **Sugarcane Development by Improving Agronomic Practices**

i) Agriculture Extension Departments should educate growers for improving various agronomic practices like timely sowing of the crop, using quality seed at recommended rates, timely irrigation, balanced use of fertilizers etc. alongwith improved cultural practices. The adoption of each recommended technology/practice on atleast 20 per cent of the sugarcane area in each year be ensured.

ii) Sugar mills should strengthen their development staff and also organise development programmes either individually or collectively by area/region or on provincial level.

- **Fluctuations in sugar and sugarcane production**

49. In order to minimize fluctuations in sugar and sugarcane production, proper development of sugar/sugarcane sector is essential. For this it is recommended that,

1. Mills should appreciate the role of growers in providing raw material while growers need to give due credit to the industry in providing a market for their produce.
2. It is in the interest of the industry to help the growers stabilize sugarcane production in line with the domestic requirements and promote their well being. For this, emphasis needs to be on mutual trust, confidence and respect amongst themselves.
3. The cost of sugar production in the country may be lowered by improving the cane yield and quality as sugarcane constitutes almost 66 per cent of the cost of sugar.

2.2.3 Improving marketing

- **Payment of quality prices for sugarcane**

50. For enhancing the per acre production of sugar, it is necessary that Pakistan should shift to the payments of cane price according to the quality of produce. For this purpose government should sponsor a project to locally manufacture sampling device and constitute a committee of experts, millers, technologists and farmers to work out a feasible system for payment of sugarcane price by the mills to growers on the basis of sucrose contents of individual consignments.

- **Quantity Specific Contract**

51. To encourage quantity specific contracts between millers and growers, legal coverage be provided by amending the rules.

- **Uniformity in Sugarcane Cess Fund**

52. APCom reiterates its earlier recommendation for adoption of uniform policy for levy of sugarcane cess in all the provinces.

- **Support Price for Sugar**

53. The proposal of working out the ex-mill price of sugar by Ministry of Industries keeping in view the cost of cane, processing cost of sugar, recoveries of by-products and equity of the sugar mills already approved by the ECC in its meeting held on 14-07-2000 be implemented and Government may consider to fix the minimum ex-mill price of sugar.

Amendment in Sugar Factories Control Act, 1950

54. Amendments in this Act are needed to provide for the provision of contract system between growers and mill-owners, payment of price of cane by mills to growers on the basis of sucrose content of individual consignments, removal of provision regarding prohibition of 'Gur' making, removal of provisions relating to zoning, enhancement of penalties, etc.

3. SUGARCANE PLANTING AND HARVESTING SEASONS

55. Sugarcane crop requires a moderate temperature, around $20C^0$, for proper germination and growth and about two months of dry and cool weather towards the end of growth period for maturity. The climatic conditions in Pakistan provide a growing season of 8 to 10 months for sugarcane in a year. The recommended times of planting Spring and Autumn crops of sugarcane in different provinces are given in Table-1.

Table-1: Planting Times of Sugarcane by Province

Province	Planting Time	
	Spring Crop	Autumn Crop
Punjab	15 Feb to 15 March	1 Sept to 10 October
Sindh	5 Feb to 10 March	1 Sept to 10 October
NWFP	February - March	15 Sept to 15 October

Source: Provincial Agricultural Departments

56. The planting time for the autumn crop, however, depends on the monsoon rains. Accordingly, it can be advanced to August and may last upto November in some areas.

57. Sugarcane harvesting generally commences in October and may extend upto April depending upon the crop situation.

4. PROVINCIAL SHARES IN AREA AND PRODUCTION

58. During three years period ending 1999-2000, area under sugarcane averaged at 1.1 million hectares (2.7 million acres) and production at 51.5 million tonnes with an average yield of 48 tonnes per hectare or 19.4 tonnes per acre (Table-2).

Table-2: Provincial Shares in Area and Production of Sugarcane: (Average of 1997-98 to 1999-2000).

Country/ Province	Area		Production	
	000 ha	Percent	000 tonnes	Percent
Pakistan	**1074** (2653)	**100.0**	**51543**	**100.0**
Punjab	713 (1761)	66.4	30858	59.9
Sindh	254 (628)	23.7	15780	30.6
NWFP	106 (262)	9.9	4864	9.4

Note:- Figures in parentheses are in thousand acres.
Source:- Worked out from data in Annex-I.

59. Sugarcane is cultivated in the Punjab, Sindh and NWFP. The Punjab's shares in its area and production are estimated at 66 and 60 per cent, those of Sindh at 24 and 31 per cent and of the NWFP at 10 and 9 per cent, respectively. The provincial shares in area and production of sugarcane are depicted in Figures 1 and 2.

4.1 Provincial Shares in Sugar Production

60. On the basis of three year's average i.e. 1997-98 to 1999-00, the average annual production of sugar produced from sugarcane in the country comes to 3.17 million tonnes (Table-3).

PROVINCIAL SHARES IN AREA & PRODUCTION OF SUGARCANE : AVG OF 1997-98 TO 1999-00

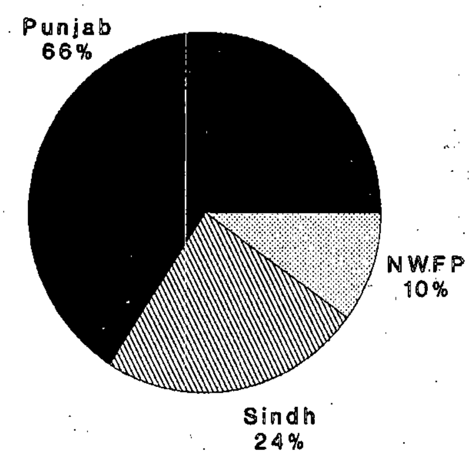

Fig-1: SHARES IN AREA

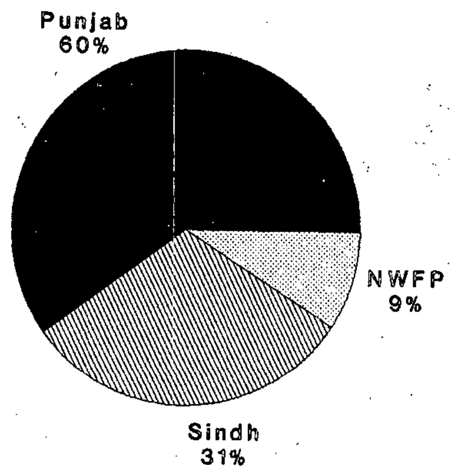

Fig-2: SHARES IN PRODUCTION

Table-3: Provincial Shares in Sugar Production:
(Average of 1997-98 to 1999-2000)

Country/Province	Sugar production *			Average	Share
	1997-98	1998-99	1999-00		
	------ 000 tonnes ------				Percent
Pakistan	**3549**	**3531**	**2415**	**3165**	**100.0**
Punjab	2066	2033	1316	1805	57.0
Sindh	1375	1353	996	1241	39.2
NWFP	108	145	103	119	3.8

Note:- * Production from sugarcane only.
Source:- PSMA, Islamabad.

61. The shares of the Punjab, Sindh and the NWFP in the average production of sugar, (from sugarcane only) estimated at 3.17 million tonnes, work out to 57, 39 and 4 per cent, respectively.

5. IMPORTANT SUGARCANE PRODUCING DISTRICTS

62. Sugarcane cultivation is confined to irrigated areas of Punjab, Sindh and NWFP. Districts which annually produce more than 500 thousand tonnes of sugarcane are Faisalabad, Jhang, Sargodha, Kasur, T.T.Singh, Okara, Bahawalnagar, Mandi Bahauddin, Rahim Yar Khan, Bhakkar, Sheikhupura, Sahiwal, Vehari, Layyah and Pakpattan from the Punjab; Hyderabad, Badin, Thatta, Noushero Feroze, Nawab Shah, Mirpurkhas, Sanghar and Khairpur from Sindh; and Charsadda, Mardan and Peshawar from the NWFP (Annex-II). These 26 districts account for 89 per cent of area and 91 per cent of the sugarcane production in the country. However, districts of Faisalabad, Hyderabad, Badin, Jhang, Sargodha, Kasur, T.T.Singh and Charsadda, contribute 51 percent of the total sugarcane production, and 32 mills are located in these districts (Annex-III).

63. Sugarcane producing districts in descending order of production, are arranged in Annex-II.

6. AREA, YIELD AND PRODUCTION

64. During the decade ending 2000-01, area under sugarcane at country level, has ranged from 884 to 1155 thousand hectares (2184 to 2854 thousand acres) and production varied between 36 and 55 million tonnes. During this period, average yield has been 41 to 50 tonnes per hectare (16.5 to 20.4 tonnes per acre). The changes in area, yield and production of sugarcane in the long, medium and short term perspectives are described hereunder:

6.1 Long-term Changes: 1990-91 to 2000-2001

65. During the period 1991-2001, sugarcane production is estimated to have increased @ 2.7 per cent per annum, attributable to 1.5 per cent expansion in area, 1.1 per cent improvement in yield (Table-4).

Table-4: Average Annual Growth Rates of Area, Yield and Production of Sugarcane: 1990-91 to 2000-2001

Country/ Province	Area	Yield	Production
		Percent per annum	
Pakistan	**(+) 1.5**	**(+) 1.1**	**(+) 2.7**
Punjab	(+) 2.5	(+) 1.5	(+) 4.0
Sindh	(-) 0.4	(+) 1.3	(+) 0.9
NWFP	(+) 0.4	(+) 0.6	(+) 1.1
Balochistan	(+) 4.0	(+) 1.3	(+) 5.3

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

66. Sugarcane production in the **Punjab,** during the period under reference, is estimated to have increased @ 4 per cent per annum on account of 2.5 per cent enlargement in area and 1.5 per cent rise in yield. During the same period, production in **Sindh** has increased @

0.9 per cent per year entirely due to 1.3 per cent improvement in yield as the area contracted @ 0.4 per cent per year. In the **NWFP** production rose @ 1.1 per cent per year due to increases of 0.4 and 0.6 per cent in area and yield, respectively.

67. The record production of 55.2 million tonnes was obtained in 1998-99. It dropped to 46.3 million tonnes in 1999-2000. As per estimates of the 2000-2001 crop, sugarcane production is reported to drop to 42.5 million tonnes, 23 per cent fall in two years. Accordingly, the long term growth rate in sugarcane production, at country level, has fallen to 2.7 per cent as compared to 4.2 per cent estimated two years ago.

6.2 Medium Term Changes: 1995-96 to 2000-01

68. In the medium term, (1995-96 to 2000-01) sugarcane production at the national level is estimated to have increased at a nominal rate of 0.1 per cent (Table-5).

Table-5: Average Annual Growth Rates of Area, Yield and Production of Sugarcane: 1995-96 to 2000-01

Country/Province	Area	Yield	Production
	----- Percent per annum -----		
Pakistan	**(+) 0.1**	**0.0**	**(+) 0.1**
Punjab	(+) 0.7	(-) 0.5	(+) 0.2
Sindh	(-) 1.5	(+) 1.1	(-) 0.5
NWFP	(+) 0.1	(+) 0.8	(+) 0.9
Balochistan	(+) 3.4	(+) 1.3	(+) 4.7

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

6.3 Short-term Changes: 2000-01 VS 1999-00 Crop

69. According to the Second estimates, sugarcane production from the 2000-2001 crop is reported at 42.5 million tonnes, 3.8 million tonnes (8.2%) less than the harvest of 46.3 million in 1999-00 which was also a low production year. The 8.2 per cent short fall in

production in 2000-01 at the country level is entirely due to contraction in area as the yield is at last year's level (Table-6).

Table-6: Area, Yield and Production of Sugarcane: 1999-2000 and 2000-01 Crops.

Country/ Province	Area		Change in 2000-01 over 1999-00	Yield		Change in 2000-01 over 1999-00	Production		Change in 2000-01 over 1999-00
	1999-00	2000-01		1999-00	2000-01		1999-00	2000-01	
	000 hectares		Per cent	Tonnes/hectare		Percent	000 tonnes		Percent
Pakistan	1009.8	926.2	(-) 8.3	45.9	45.9	0.0	46332.6	42532.7	(-) 8.2
Punjab	672.1	580.9	(-)13.6	40.3	43.3	(+) 7.4	27081.3	25133.0	(-) 7.2
Sindh	230.6	238.8	(+) 3.6	62.0	52.2	(-)15.8	14290.8	12466.2	(-)12.8
NWFP	106.3	105.8	(-) 0.5	46.3	46.3	0.0	4917.1	4897.2	(-) 0.4
Balochistan	0.8	0.7	(-)12.5	54.3	51.9	(-) 4.4	43.4	36.3	(-)16.4

Source:- Annex-I.

70. In the Punjab, production reported at 25.1 million tonnes in 2000-2001 is 7.2 per cent less than 27.1 million tonnes in last year. Lower production is attributable to 13.6 per cent contraction in area as the yield has improved by 7.4 per cent.

71. In Sindh, production estimated at 12.5 million tonnes during the current crop year is 12.8 per cent less as compared to last year's production of 14.3 million tonnes. The fall in sugarcane production is entirely on account of 15.8 per cent shortfall in yield as area increased by 3.6 per cent.

72. In the NWFP, sugarcane production in the current season is almost the same as in last year i.e. 4.9 million tonnes.

7. TARGETS VS ACHIEVEMENTS: 2000-01 CROP

73. Federal Committee on Agriculture (FCA) in its meeting held on 31-10-2000 had fixed sugarcane production target for 2000-01 crop at 51.6 million tonnes. As per second estimates of Provincial Agriculture Departments production reported at 42.5 million tonnes would fall short of the target by 17.6 per cent (Table-7).

Table-7: Targets and Estimated Achievements of Area, Yield and Production of Sugarcane: 2000-01 Crop.

Country/ Province	Area		Devia-tion from target	Yield		Devia-tion from target	Production		Devia-tion from target
	Target	Achieve-Ment		Target	Achieve-Ment		Target	Achieve-Ment	
		000 hectares	Per cent	Tonnes/hectare		Per cent	000 Tonnes		Percent
Pakistan	1000.0	926.2	(-) 7.4	51.6	45.9	(-) 11.0	51613.0	42532.7	(-)17.6
Punjab	650.0	580.9	(-)10.6	47.5	43.3	(-) 8.8	30858.0	25133.0	(-)18.6
Sindh	250.0	238.8	(-)4.5	62.9	52.2	(-) 17.0	15720.0	12466.2	(-)20.7
NWFP	100.0	105.8	(+) 5.8	50.4	46.3	(-) 8.1	5035.0	4897.2	(-) 2.7

Sources:-
1. For targets: Minutes of the 73rd Meeting of FCA held on 31-10-2000 at Islamabad.
2. For achievements: Annex-I.

74. Sugarcane production targets have not been achieved in any of the province. Actual production is below the corresponding targets by 18.6, 20.7 and 2.7 per cent in the Punjab, Sindh and NWFP, respectively. Failure to realize the yield targets is the main cause of under achievement in production.

8. FACTORS CONSIDERED IN DETERMINING THE SUPPORT PRICE

75. In formulating the price policy proposals for the 2001--02 crop of sugarcane, following factors have been considered and analysed.

- 8.1 Cost of Production
- 8.2 Real Support Prices of Sugarcane
- 8.3 Economics of Fertilizer Use
- 8.4 Comparative Economics of Sugarcane and Competing Crops
- 8.5 Prices of Sugarcane on the Basis of 'Gur' Prices
- 8.6 Prices of Sugarcane on the Basis of Average Wholesale Prices of Sugar
- 8.7 Domestic Demand, Supply, Stocks and Prices of Sugar
- 8.8 World Supply, Demand, Stocks, Trade and Price Situation of Sugar
- 8.9 Import and Export Parity Prices

8.1 Cost of Production

76. Empirical estimation of the cost of production of farm produce in general and for price policy purposes in particular is problematic because of several conceptual and practical difficulties involved in the exercise. In case of sugarcane, problem is further compounded as the fresh and ratoon crops with different durations and husbandry practices are grown. Moreover, fresh crop is sown at two different periods in the country, i.e., in spring and autumn with varying duration of growth periods, inputs use level and resultant crop yields.

77. The cost of production estimates, for the 2001-02 crop, have been synthesized by adopting the input-output parameters from the Sugarcane Support Price Policy for the 2000-01 crop, in conjunction with the latest custom hire rates of cultural operations, input prices and marketing costs obtained through a field survey conducted by APCom in the major sugarcane growing areas of the Punjab, Sindh and NWFP during January, 2001. These rates were also discussed in the meeting of APCom's Standing Committee on sugarcane, held at Hyderabad on 13th January, 2001 and supplemented with the information provided in the meeting by the

farmers' and provincial governments' representatives. The cost estimates for the Punjab, Sindh and NWFP alongwith the changes therein over the corresponding estimates for the 2000-01 crop are presented in Annexes IV to VI, while a summary of the results is provided in Table-8.

Table-8 : Average Farmers' Cost of Production of Sugarcane: 2000-01 and 2001-02 Crops

Item	Unit	Cost estimates		Increase in 2001-02 over 2000-01
		2000-01 crop	2001-02 crop	
Punjab				
1. Cost of cultivation	Rs/acre	14030.28	16704.82	2674.54
2. Yield	40 kgs/acre	515.52	515.52	0.00
3. Cost of production at farm level	Rs/40 kgs	27.22	32.40	5.18
4. Marketing cost including development cess	"	3.93	4.90	0.97
5. Cost of production at mill-gate	"	31.15	37.30	6.15
Sindh				
1. Cost of cultivation	Rs/acre	15638.57	18009.94	2371.37
2. Yield	40 kgs/acre	592.58	592.58	0.00
3. Cost of production at farm level	Rs/40 kgs	26.39	30.39	4.00
4. Marketing cost including development cess	"	3.93	4.90	0.97
5. Cost of production at mill-gate	"	30.32	35.29	4.97
NWFP				
1. Cost of cultivation	Rs/acre	13667.34	16650.11	2982.77
2. Yield	40 kgs/acre	515.61	515.61	0.00
3. Cost of production at farm level	Rs/40 kgs	26.51	32.29	5.78
4. Marketing cost including development cess	"	2.97	3.97	1.00
5. Cost of production at mill-gate	"	29.48	36.26	6.78

Source: Annexes IV to VI.

Punjab

78. As per information summarized in the Table-8, the cost of cultivating sugarcane in the Punjab in the 2001-02 crop year is expected to increase to Rs.16705 per acre, including land rent, as compared to the corresponding cost of Rs 14030 during the 2000-01. Distributing the cost of cultivation over the average yield of 515.52 maunds of 40 kgs each, farm level cost of production of sugarcane works out to Rs 32.04 per 40 kgs. Adding the marketing expenses

including development cess @ Rs 4.90 per 40 kgs, the mill-gate cost would come to Rs 37.30 per 40 kgs, representing an increase of Rs 6.15 (19.7 per cent) over the mill gate cost of Rs 31.15 in 2000-01.

79. The major constituents of the cost of cultivation of sugarcane for the 2001-02 crop in the Punjab are: land rent (26 per cent), chemical fertilizers and FYM (16 per cent), seed and sowing operations (14 per cent), harvesting/stripping (10 per cent), cultural operations (10 per cent) and irrigation (9 per cent).

80. In the above increase in cost of cultivation during 2001-02 over 2000-01 crop, the land rent accounts for 50 per cent, costs of chemical fertilizers and FYM (14 per cent), seed and sowing operations (14 per cent), irrigation (11 per cent) and cultural operations (9 per cent).

Sindh

81. The cost of raising one acre of sugarcane during 2001-02 crop season in Sindh is estimated at Rs 18010, higher by Rs 2371 (15 per cent) than that of the 2000-01 crop. Distributing the cost of cultivation over the average yield of 592.58 maunds of 40 kgs each, the cost of production of sugarcane, at farm level, comes to Rs 30.39 per 40 kgs. Adding marketing expenses, including development and drainage cesses, @ Rs 4.90, the cost of sugarcane at the mill-gate would be Rs 35.29 per 40 kgs, reflecting an increase of Rs 4.97 (16.4 per cent) over the corresponding cost of of Rs 30.32 in 2000-01.

82. The chief components of the cost of cultivation of sugarcane in Sindh during 2001-02 crop year are: seed and sowing operations (22 per cent), chemical fertilizers and FYM (19 per cent), land rent (15 per cent), harvesting and stripping (12 per cent) and cultural operations (11 per cent)

83. The increase in cost of cultivation of sugarcane over last year is primarily attributed to increases in the costs of seed and sowing operations (36 per cent), land rent (32 per cent), chemical fertilizers and FYM (21 per cent) and cultural operations (7 per cent).

NWFP

84. The cost of growing sugarcane in the NWFP during the 2001-02 crop year is calculated at Rs 16650 per acre, including land rent, showing an increase of Rs 2983 over estimated cost of Rs 13667 in 2000-01. At the average per acre yield of 515.61 maunds of 40 kgs each, farm level cost of production of sugarcane for the 2001-02 crop would come to Rs 32.29 per 40 kgs. Accounting for the marketing charges, including development cess, @ Rs 3.97 per 40 kgs, the cost of produce at mill-gate comes to Rs 36.26, reflecting a rise of Rs 6.78 per 40 kgs (23.0 per cent) over the previous year's estimates worked at Rs 29.48.

85. During 2001-02 crop year, the major components of the cost of cultivation of sugarcane, in the NWFP are : land rent (30 per cent), seed and sowing operations (21 per cent), chemical fertilizers and FYM (16 per cent), irrigation (9 per cent) and cultural operations (6 per cent).

86. The increase in the cost of cultivation over last years is primarily attributed to higher value of land rent (60 per cent), costs of seed and sowing operations (22 per cent), chemical fertilizers and FYM (13 per cent), cultural operations (2 per cent).

Impact of declining trend in yield on the cost of production of sugarcane: 2001-02 crop

87. The severe drought in the recent past and water shortage have adversely affected the crop yield. There are no signs of improvement on the water front in the next crop year either. Accordingly, it is important to provide for the impact of such a situation on crop yield and its likely impact on COP. During the course of discussion in the meeting of APCom's Standing Committee on Sugarcane held on 13th January, 2001, it was also pointed out that yield of sugarcane has shown a declining trend because of the facts mentioned above.

88. Keeping in view the levels of various inputs as were used for estimating COP of sugarcane (discussed in the previous section) and declining trend in yield during last 3 years, the COP estimates for sugarcane in the Punjab and Sindh during 2001-02 are given in the Table-9. It may be noted that yield of sugarcane in NWFP during last 3 years has somewhat increased.

Table-9: Impact of Declining Trend of Yield on COP of Sugarcane: 2001-02 crop

Items	Unit	COP on the basis of yields obtained through survey	COP on the basis of decline in yield	Difference
		Punjab		
1. Cost of cultivation	(Rs/acre)	16704.82	16704.82	0.00
2. Yield	(40 kgs/acre)	515.52	500.00	(-)15.52
3. Cost of production at mill-gate	(Rs/40 kgs)	37.30	38.21	0.91
		Sindh		
1. Cost of cultivation	(Rs/acre)	18009.94	18009.94	0.00
2. Yield	(40 kgs/acre)	592.58	563.00	(-)29.58
3. Cost of production at mill-gate	(Rs/40 kgs)	35.29	36.70	1.41

89. Keeping in view the average decline in yield of 3 and 5 per cent in the Punjab and Sindh during 1997-98 to 2000-01, the COP estimates to Rs 38.21 per 40 kgs in the Punjab and Rs 36.70 in Sindh.

8.2 Real Support Prices

90. The government annually reviews the support price of sugarcane. The changes in the prices of sugarcane in relation to the general price hike in the economy influence the purchasing power, farm income and welfare of sugarcane growers. To examine changes in the real prices of sugarcane during 1990-91 to 2000-01, nominal support prices were deflated by the Consumer Price Index (CPI), the most commonly used measure of inflation in the economy. Results of exercise are set out in Table-10. The movements in the real value of support prices of sugarcane are also presented in figure-3.

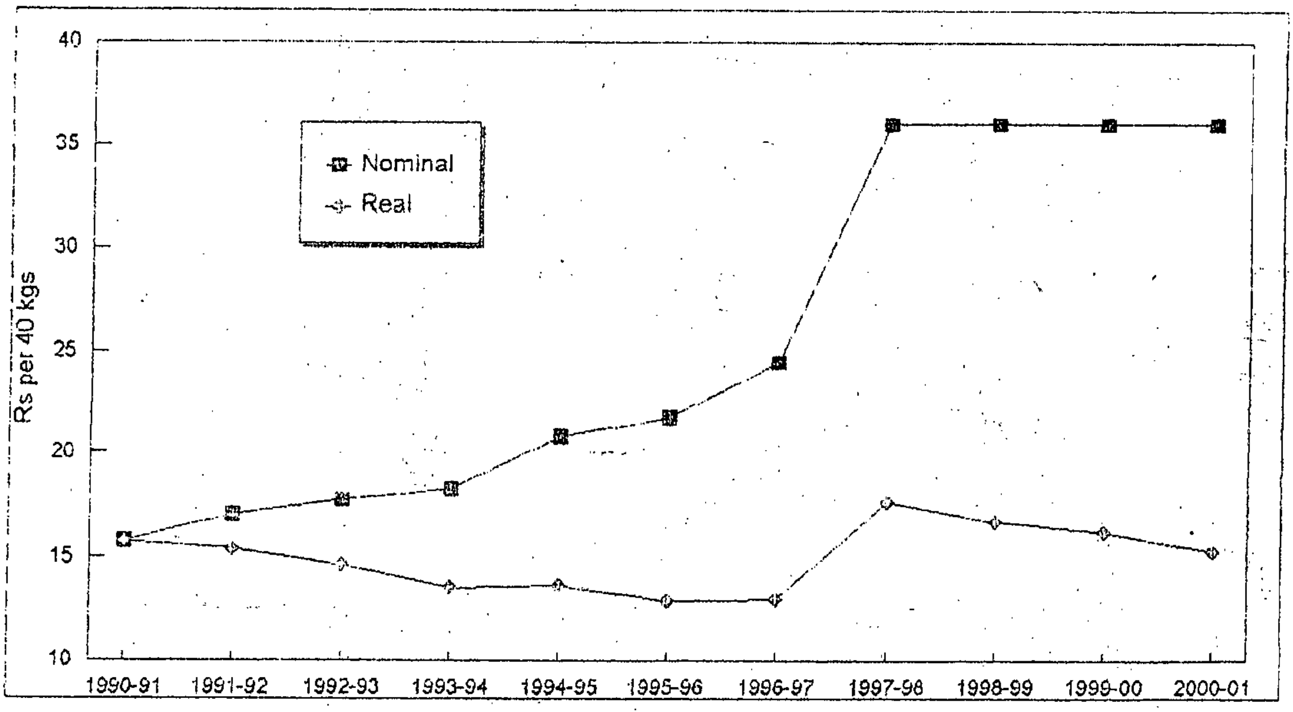

Fig-3: NOMINAL AND REAL SUPPORT PRICES OF SUGARCANE : 1990-91 TO 2000-01

Table-10: Nominal and Real Support Prices of Sugarcane: 1990-91 to 2000-01

Crop year	Consumer Price Index (CPI)	Support price of sugarcane	
		Nominal	Real
1	2	3	4 = (3/2)x100
	1990-91=100	----- Rupees per 40 kgs ------	
1990-91	100.00	15.75	15.75
1991-92	110.58	17.00	15.37
1992-93	121.45	17.75	14.62
1993-94	135.14	18.25	13.50
1994-95	152.73	20.75	13.59
1995-96	169.21	21.75	12.85
1996-97	189.18	24.50	12.95
1997-98	203.96	36.00	17.65
1998-99	215.68	36.00	16.69
1999-00	223.02	36.00	16.14
2000-01	235.62	36.00	15.28

Source: Economic Survey of Pakistan: 1999-00.

Notes: i) CPI for 2000-01 has been projected in view of the average rise in CPI during last 3 years.

ii) There is a small difference in support prices of sugarcane for the Punjab, NWFP and Sindh. The analysis presented here is based on the support price applicable for Sindh.

91. Table-10 reveals that the nominal support price of sugarcane has increased from Rs 15.75 per 40 kgs in 1990-91 to Rs 36 per 40 kgs in 2000-01, an overall increase of 129 per cent. During the same period, the cumulative inflation in terms of CPI, has been 136 per cent. Consequently, the real value of the support price of sugarcane for 2000-01 crop, estimated at Rs 15.28 per 40 kgs in terms of 1990-91 prices shows a decline of 2.98 per cent in relation to the corresponding price of Rs 15.75 for 1990-91 crop.

92. During 1990-91 to 1996-97, the support price of sugarcane increased by 56 per cent while CPI rose by 89 per cent. As a result, the real value of the support price of sugarcane crop declined by 18 per cent. In the wake of 47 per cent increase in the nominal support price of sugarcane for 1997-98 crop, its real value jumped by 36 per cent

to reach Rs 17.65 per 40 kgs in terms of 1990-91 prices, the highest level observed during the period under review. The support prices of sugarcane have not since been revised and its purchasing power overtime has been eroded. The real value of support price for 2000-01 crop is estimated at Rs 15.28, reflecting a fall of 13 per cent in the last three crop years.

93. If the real support price of sugarcane for 2000-01 crop were to be equated with the level of 1990-91, the nominal value should have been Rs 37 per 40 kgs instead of Rs 36 per 40 kgs.

8.3 Economics of Fertilizer Use

94. The judicious use of fertilizers is essential for increasing farm production. However, sustainable use of fertilizers requires conducive economic environment and returns from its use which are large enough to pay for the direct and indirect costs involved in its use. In the present context economics of fertilizer use on sugarcane has been studied through estimating Benefit Cost Ratio (BCR) and parity ratio between the prices of fertilizers and sugarcane. The results are discussed below:-

8.3.1 Benefit Cost Ratio (BCR)

95. BCR refers to the ratio between value of additional produce resulting from using a certain dose of fertilizers and the costs thereof, both direct and indirect. The direct cost of fertilizers in the present analysis refers to the weighted average cost of 10 nutrient Kgs of N and P fertilizers in the ratio of 2:1. The indirect costs include: (i) transportation and application charges of this additional dose of fertilizers; (ii) expenses on the harvesting, stripping, transport, loading, unloading, development cess, etc on the additional produce; and (iii) mark up on the direct cost of fertilizers applied. The BCRs of: less than one implies the use of fertilizers is not economical, equal to one a break even point for the growers, and greater than one means that benefits are higher than the costs entailed in the process. To encourage fertilizer use under low risk farming conditions (irrigated) a BCR of 2:1 or above is generally recommended by agronomists.

96. In view of the wide variations in the types of land, water availability, quality of seed, climatic conditions, etc. BCRs have been estimated for a range of cane-nutrient response ratios i.e. 50:1, 70:1, 90:1 and 110:1.

97. Based on the support prices of sugarcane fixed by the Government for 1991-92 to 2000-01 crops and the corresponding market prices of fertilizers, BCRs at various cane-nutrient response ratios have been worked out and summarized in Table-11. The details of estimation for 2000-01 crop are given in Annex-VII.

Table-11. Benefit Cost Ratios (BCRs) of Fertilizer Use on Sugarcane at Support Price and at Different Response Ratios: 1991-92 to 2000-01 Crops

Crop year	BCR at response ratios (sugarcane: Nutrient) of			
	50:1	70:1	90:1	110:1
1991-92	1.63	1.98	2.24	2.45
1992-93	1.45	1.73	1.94	2.11
1993-94	1.36	1.65	1.86	2.03
1994-95	1.39	1.69	1.93	2.12
1995-96	1.26	1.56	1.79	1.98
1996-97	1.19	1.47	1.70	1.89
1997-98	1.48	1.85	2.15	2.40
1998-99	1.47	1.84	2.14	2.39
1999-00	1.38	1.74	2.03	2.28
2000-01	1.42	1.77	2.06	2.30

Sources: **1.** For 1991-92 to 1999-2000 respective Support Price Policy Reports on Sugarcane.

2. For 2000-01: Annex-VII

98. The data presented in table-11 reveal that economics of fertilizer use on sugarcane, experienced a deteriorating trend from 1992-93 to 1996-97, resulting from relatively higher increases in fertilizer prices. In 1997-98, when the support price of sugarcane was raised by 46 per cent or so, the economics of fertilizer use on sugarcane

improved substantially, the BCRs which had reached at the lowest in 1996-97 rose to 1.48, 1.85, 2.15 and 2.40 at 50:1, 70:1, 90:1 and 110:1 cane nutrient response ratios respectively. Since then support prices of sugarcane has not been revised whereas prices of fertilizer have moved up. Resultantly, BCRs started declining in 1998-99 and in 2000-01 reached at 1.42, 1.77, 2.06 and 2.30 respectively at various cane-nutrient response ratios.

99. It may be mentioned that due to excess supply of cane during 1998-99 the sugar mills in the Punjab by adopting different tactics purchased cane at prices below the support price. The BCRs calculated at these prices (Table-12) for that year work out to be much lower than that estimated at the support price (Table-11). In Sindh, the cane during 1998-99 was marketed at the support price, hence the BCRs of fertilizer use remained around the level estimated in Table-11. Against this BCRs during 2000-2001 crop harvest season works out to be very high when calculated at actual prices prevailing in the market (Table-12).

Table-12:- Benefit Cost Ratios (BCRs) of Fertilizer Use on Sugarcane at Market Prices: 1997-98 to 2000-01 Crops

Crop Year	BCR at Response ratios (sugarcane: Nutrient) of							
	50:1		70:1		90:1		110:1	
	Punjab	Sindh	Punjab	Sindh	Punjab	Sindh	Punjab	Sindh
1997-98	1.46	1.63	1.83	2.03	2.12	2.36	2.36	2.63
1998-99	1.34	1.50	1.67	1.88	1.94	2.18	2.16	2.43
1999-00	1.37	1.65	1.73	2.07	2.02	2.42	2.26	2.71
2000-01	1.80	2.00	2.26	2.51	2.63	2.92	2.93	3.26

Note: Market prices of sugarcane i.e. the prices actually received by the growers as collected during the field survey by APCom have been used for computing the BCRs for the respective crop years.

8.3.2 Parity Between Prices of Fertilizer and Support Prices of Sugarcane

100. The relationship between prices of fertilizers and support prices of sugarcane indicates the purchasing power of sugarcane crop in terms of fertilizers. In order to present overtime picture regarding purchasing power of sugarcane, the parity between prices of fertilizer nutrients and that of sugarcane has been worked out for the period from 1991-92 to 2000-01 (Table-13)

Table-13. Ratio Between Prices of Fertilizers (Nutrients) and Price of Sugarcane: 1991-92 to 2000-01

Crop year	Prices of fertilizer nutrients		Average support price of sugarcane	Quantity of sugarcane needed to buy one nutrient tonne of	
	N	P_2O_5		N	P_2O_5
1	2	3	4	5	6
	Rs. Per nutrient tonne		Rs/tonne	Tonnes	
1991-92	8083	8157	421	19.10	19.38
1992-93	8478	7552	440	19.27	17.16
1993-94	8696	8423	452	19.24	18.63
1994-95	10145	11103	515	19.70	21.56
1995-96	10360	13240	540	19.19	24.50
1996-97	13478	19509	604	22.31	32.30
1997-98	15510	18710	883	17.56	21.19
1998-99	15140	18860	883	17.15	21.36
1999-00	15220	24910	883	17.24	28.21
2000-01	14780	22480	883	16.74	25.46

Notes: 1. The prices of N and P, have been worked out from those of Urea and DAP, which were used in estimating the cost of production of sugarcane in the respective support price policy papers.

2. Support price of sugarcane is the average of support price for Punjab, Sindh, and NWFP fixed for respective years.

101. The parity ratio between prices of N fertilizer and cane prices upto 1995-96 remained swinging between 19 and 20 units, (Col-5 of Table-13) implying marginal

fluctuation in the cane units required to buy one nutrient unit of nitrogenous fertilizer. However, a sharp increase in price of N in 1996-97 resulted in much higher quantity of the produce required to buy the same amount of fertilizer although the prices of the latter had also increased from Rs. 540 per tonne to Rs. 604. In that year 22.31 tonnes of cane were required to buy one nutrient tonne of nitrogen. However, this adverse situation did not last long as the government announced 46 per cent increase in cane prices for 1997-98 crop. Accordingly, the purchasing power of sugarcane improved dramatically and only 17.56 tonnes of cane were sufficient to buy one nutrient tonne of nitrogen fertilizer. The situation further improved in 1998-99 in favour of sugarcane crop when the N-prices fell from Rs. 15510 per tonne to Rs. 15140 per tonne. After rising marginally in 1999-2000, the prices of N-fertilizer experienced another fall in 2000-01 improving the purchasing power of sugarcane further. It may be pointed out that the above analysis is based on market prices of fertilizer and support prices of sugarcane. The recent survey has indicated that actual prices received by the cane growers for their 2000-01 crop have remained much higher than the support prices announced by the government which happened due to short cane production. As a result the parity ratio for N prices to market prices of cane decreased from 16.74 at average support price to 11.82 in Sindh to 13.14 in Punjab. Under such circumstances growers would find more opportunities to increase the N-doses for their coming cane crop.

102. The data in Table-13 reveal that purchasing power of sugarcane in terms of phosphatic fertilizer has fluctuated rather widely. To buy one nutrient tonne of P_2O_5 in 1991-92, 19.38 tonnes of sugarcane were required but in the following year as P-prices fell from Rs. 8157 to Rs. 7552 per tonne and sugarcane price rose, only 17.16 tonnes of sugarcane were required to purchase one tonne of P_2O_5. Subsequently as prices of P_2O_5 rose from Rs. 7552 to Rs. 13240 in 1995-96 and to Rs. 19509 per tonne in 1996-97, quantity of cane to buy one tonne of P_2O_5 increased to 24.50 tonnes in 1995-96 and then to 32.30 tonnes in 1996-97. In the wake of quantum increase in support price of sugarcane, the purchasing power of sugarcane improved considerably and in 1997-98 21.19 tonnes of sugarcane were sufficient to buy one tonne of P_2O_5. Both sugarcane and P_2O_5 prices remained unchanged in 1998-99 but in 1999-2000 sudden jump in the prices

of phosphatic fertilizers adversely affected the purchasing power of cane as to buy one nutrient tonne of P_2O_5 28.21 tonnes of sugarcane had to be sold. The situation in 2000-01 improved in favour of sugarcane due to fall in P_2O_5 prices as 25.46 tonnes of cane could buy one nutrient tonne of P_2O_5. The parity ratios at market prices of cane reported in the field survey, referred to earlier, further reduced to 17.98 in Sindh, and to 19.98 in Punjab for the 2000-01 crop. This reflects rise in the purchasing power of sugarcane by 27 to 30 per cent over that estimated at average support price in Table-13.

8.4 Comparative Economics of Sugarcane and Competing Crops

103. The resource allocation by farmers among the competing crops is, **inter alia,** governed by a number of economic considerations like gross cost, cash expenses, gross margins, net income, output-input ratio and returns to purchased inputs, etc. The estimation of these indicators may provide useful insights to the policy makers about the behaviour of growers in selecting alternative crops.

104. The use of multiple indicators in the economic analysis may provide conflicting signals. Moreover, the economic indicators are derived from the farm management and input-output prices data which are subject to change over time and space. These limitations of data and analysis need to be kept in view while interpreting the resutls of comparative analysis.

105. Sugarcane, the annual crop, occupies land round the year and competes for land, water and other farm resources with 'kharif' and 'rabi' crops as the land planted to sugarcane would not be available for growing other crops. Accordingly, in analysing the comparative economics of sugarcane viz-a-viz competing crops, the combination of kharif and rabi crops would have to be considered. The relevant combinations in this context are cotton+ wheat, rice+wheat, cotton+sunflower and rice+sunflower.

106. In the wake of increasing role of private sector, most of the farm commodities are transacted at market prices. However, bulk of the wheat produce is procured by the

government agencies at the support price during the post-harvest. Therefore, the comparative economics of sugarcane and competing crops has been analysed in terms of prices realized by the growers.

107. The details about the comparative economics of sugarcane and competing crops are set out in Annex-VIII. A summary of the economic indicators like output-input ratio and gross revenue per day of crop duration, per rupee of purchased inputs' cost and per unit of irrigation water for relevant crops for the Punjab and Sindh, are provided in Tables 14 and 15, respectively.

Punjab

108. From the data given in Table-14, overall economics of sugarcane farming appears to be quite favourable as compared to competing crops. Sugarcane out-performs the cotton and rice combinations in respect of returns to overall investment and purchased inputs. However, the cotton combinations outrank sugarcane in terms of revenue per day of crop duration and per unit of irrigation water. The economics of rice combinations does not compare favourably with sugarcane, primarily because of low prices of rice paddy received by the growers during the harvest season.

Table-14: Comparative Economics of Sugarcane and Competing Crops at Prices Realized by the Growers in the Punjab: 2000-01 Crops

Crops/crop combinations	Output-input ratio	Gross revenue per		
		Rupee of purchased inputs cost	Day of crop duration	Acre-inch Of water used
	----- Rupees ------			
1. Sugarcane	1.55	4.68	53.30	477.30
2. Cotton+Wheat	1.18	2.78	55.33	595.88
3. Cotton+Sunflower	1.25	3.29	59.50	519.25
4. Basmati+Wheat	0.88	1.80	40.99	196.76
5. Basmati+Sunflower	0.94	2.12	44.34	179.56
6. IRRI+Wheat	0.89	1.83	38.63	176.02
7. IRRI+Sunflower	0.95	2.19	41.71	160.87

Source: Annex- VIII

Sindh

109. It may be seen from Table-15 that sugarcane generally performs better than the competing enterprises in Sindh too. Sugarcane has a definite edge over the cotton and rice combinations in respect of returns to overall investment, purchased inputs and crop duration. In terms of returns to irrigation water, sugarcane excels rice combinations but lags behind the cotton ones. IRRI combinations have been the least profitable among the competing enterprises.

Table-15 : Comparative Economics of Sugarcane and Competing Crops at Prices Realized by the Growers in Sindh: 2000-01 Crops

Crops/crop combinations	Output-input ratio	Gross revenue per		
		Rupee of purchased inputs cost	Day of crop duration	Acre-inch of water used
		----- Rupees -------		
1. Sugarcane	1.79	4.69	55.17	464.22
2. Cotton+Wheat	1.25	3.05	49.48	629.73
3. Cotton+Sunflower	1.29	3.46	54.83	526.36
4. IRRI+Wheat	0.98	2.28	36.94	187.32
5. IRRI+Sunflower	1.02	2.66	41.89	174.01

Source: Annex-VIII

8.5 Prices of Sugarcane on the Basis of "Gur" Prices

110. Sugarcane is also used for "gur" making. A seasonal cottage industry develops for processing sugarcane into "gur" in some sugarcane producing areas of the NWFP and Punjab every year. Mill-gate price of sugarcane worked back from the average wholesale prices of gur during 2000-01 crushing season (October-December) are detailed in Annex-IX and discussed below.

NWFP

111. The wholesale price of gur, received by the growers in NWFP, during October-December 2000-01, averaged at Rs 812 per 40 kgs. After deducting expenses involved in marketing of gur and processing the cane into gur including the cost of chemicals etc. used in the process, net value of 400 kgs of sugarcane required to produce 40 kgs of gur (assuming recovery of 10%) comes to Rs 589 (or Rs 58.90 per 40 kgs). Adding the costs involved in delivering the cane to the mill i.e. Rs 3.70 as transport charges and paisas 27 as development cess, mill gate price of cane in the NWFP comes to Rs 62.87 per 40 kgs. Recently, the government of NWFP has imposed license fees on the cane crushers. Accounting for this fees, mill gate price of cane calculates to Rs 60.17 per 40 kgs (Annex-IX).

Punjab

112. The wholesale price of gur received by the growers in the Punjab during October-December 2000-01 averaged at Rs 725 per 40 kgs. Accounting for the expenses involved in marketing of gur, and processing of sugarcane into gur including the cost of chemicals used in the process, net value of 400 kgs of cane used in making 40 kgs of gur (assuming recovery of 10 per cent of gur making) comes to Rs 495 or 49.5 per 40 kgs of sugarcane at farm-gate. Adding Rs 4.50 on account of transportation and paisas 40 as development cess, the mill gate price of cane in the Punjab works out to Rs 54.40 per 40 kgs.(Annex-IX)

8.6 Prices of Sugarcane on the Basis of Wholesale Prices of Sugar

113. Ex-factory price of sugar during crushing season of 2000-01, as reported by different sugar mills, averaged at Rs 26,000 per tonne or Rs 26.00 per kg. After taking the wholesaler's margin of Rs 1,083 and sales tax (@ 15 per cent (on ex-mill price) net revenue to the sugar mills calculates to Rs 21,667 per tonne or Rs 21.67 per kg. Ratio between the value of raw material i.e. sugarcane and processing cost in the total cost of sugar has been estimated at 66:34 per cent. At this ratio, value of the sugarcane used for

manufacturing one tonne of sugar works out to Rs 14,300. Using provincial bench mark recoveries of 8.50 per cent for Punjab and NWFP and 8.70 per cent for Sindh, mill gate prices of sugarcane in Punjab and NWFP work out to Rs 48.62 and to Rs 49.76 per 40 kgs in Sindh. Details may be seen in Annex-X.

8.7 Domestic Demand, Supply, Stocks and Prices of Sugar

8.7.1 Domestic demand, supply and stocks

114. Data on domestic production, imports, exports, stocks and consumption of sugar during 1990-91 to 1999-00 are detailed in Annex-XI. Annual per capita availability/consumption of sugar, averaging at 20.84 kgs during the last ten years, has shown a rising trend -- increasing from 19.83 during 1990-91 to 21.17 kgs during 1999-00.

115. At the beginning of the year 1999-00 (October-September) country had stocks of 697 thousand tonnes. Sugar production during the year has been reported at 2,426 thousand tonnes and net imports at 397 thousand tonnes. The stocks at the end of 1999-00 have been estimated at 507 thousand tonnes. Net availability, thus comes to 3,013 thousand tonnes.

116. According to the 2nd estimates of 2000-01 crop, sugarcane production has been reported at 42,533 thousand tonnes i.e. 8.2 per cent less as compared to previous year. Forecast of sugar production is at 2,496 thousand tonnes during the year 2000-01 (Annex-XII). However, considering the current reduced cane-supply to the sugarmills, declines in recovery levels over the previous year and expected increase in gur making due to higher gur prices it is estimated that current season sugar production both from

sugarcane and sugarbeet may at best be 2,100 thousand tonnes*. MINFAL also estimates sugar production around 2,100 thousand tonnes, whereas the Pakistan Sugarmills Association estimates that 2,400 thousand tonnes would be produced (including sugar from beet). Adding opening stocks of 507 thousand tonnes, total availability of sugar during 2000-01 (excluding imports) should range from 2,607 to 2,907 thousand tonnes.

117. Trend forecast of per capita sugar consumption comes to 21.40 kgs in 2000-01. Accordingly, domestic requirements for 2000-01, with mid year population of 145.64 million as on 1st April, 2001 would work out to 3,117 thousand tonnes. Keeping the end year stocks at last year's level total domestic requirements should work out to 3,624 (3,117 + 507) thousand tonnes against the availability of 2,607 to 2,907 thousand tonnes from the domestic production and opening stocks.

8.7.2 Behaviour of Sugar Prices in Domestic Markets

118. The behaviour of open market prices of sugar in important domestic markets in short and long runs is discussed below.

8.7.2.1 Short term – 1999 and 2000

119. The monthly average wholesale prices of sugar recorded in Lahore, Faisalabad, Karachi, Hyderabad and Peshawar markets during 1999 and 2000 are presented in Annex-XIII. During 1999 average monthly wholesale prices ranged between Rs 1,600 per 100 kgs (in Hyderabad market during March) and Rs 1,993 (in Peshawar market during October). During the year 2000, average monthly wholesale prices ranged between Rs 1,646 per 100 kgs (in Karachi market during January) and Rs 2,838 (in Peshawar and Karachi markets during November). The overall average of sugar price was Rs 1,861 per 100 kgs during 1999 and Rs 2,335 during 2000 (increase of 26 per cent). Increase in sugar price may be attributed to the short domestic production during the year 2000.

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* About 9 per cent decline due to less sugarcane production and 4 per cent due to low recovery over the previous year.

8.7.2.2 Long term price behaviour: 1989-90 through 2000-01

120. The annual average wholesale prices of sugar in Lahore, Faisalabad, Karachi, Hyderabad and Peshawar markets from 1989-90 to 2000-01 (October-September) are given in Annex-XIV and depicted in Figure-4. The prices by and large showed a rising trend during the period under review. The average annual wholesale price of sugar which stood at Rs 1,059 per 100 kgs in 1989-90 has since increased and averaged at Rs 2,658 in 2000-01, showing increase of 8.56 per cent per year. However, year to year increases in average price ranged from 1.4 to 24.4 per cent except in 1990-91 and 1997-98 when prices actually decreased by 4.2 and 13.6 per cent respectively. During the period under review maximum increase of 24.4 per cent was experienced during 1995-96.

121. The support prices of sugarcane, the principal raw material used in manufacturing of sugar, have in the meantime increased from Rs 13.75 to Rs 35.00 per 40 kgs in Punjab and NWFP and from Rs 14.00 to Rs 36 per 40 kgs in Sindh, showing an annual average increase of 9.79 and 9.90 per cent respectively.

8.7.2.3 Seasonal variations

122. Based on monthly average wholesale price of sugar from 1989-90 to 1999-00, seasonal indices have been calculated and depicted in Figure-5 and given in Table-16. The prices of sugar generally tend to rise in May and continue rising upto September. With the start of new crushing season from October onward, the prices generally start falling.

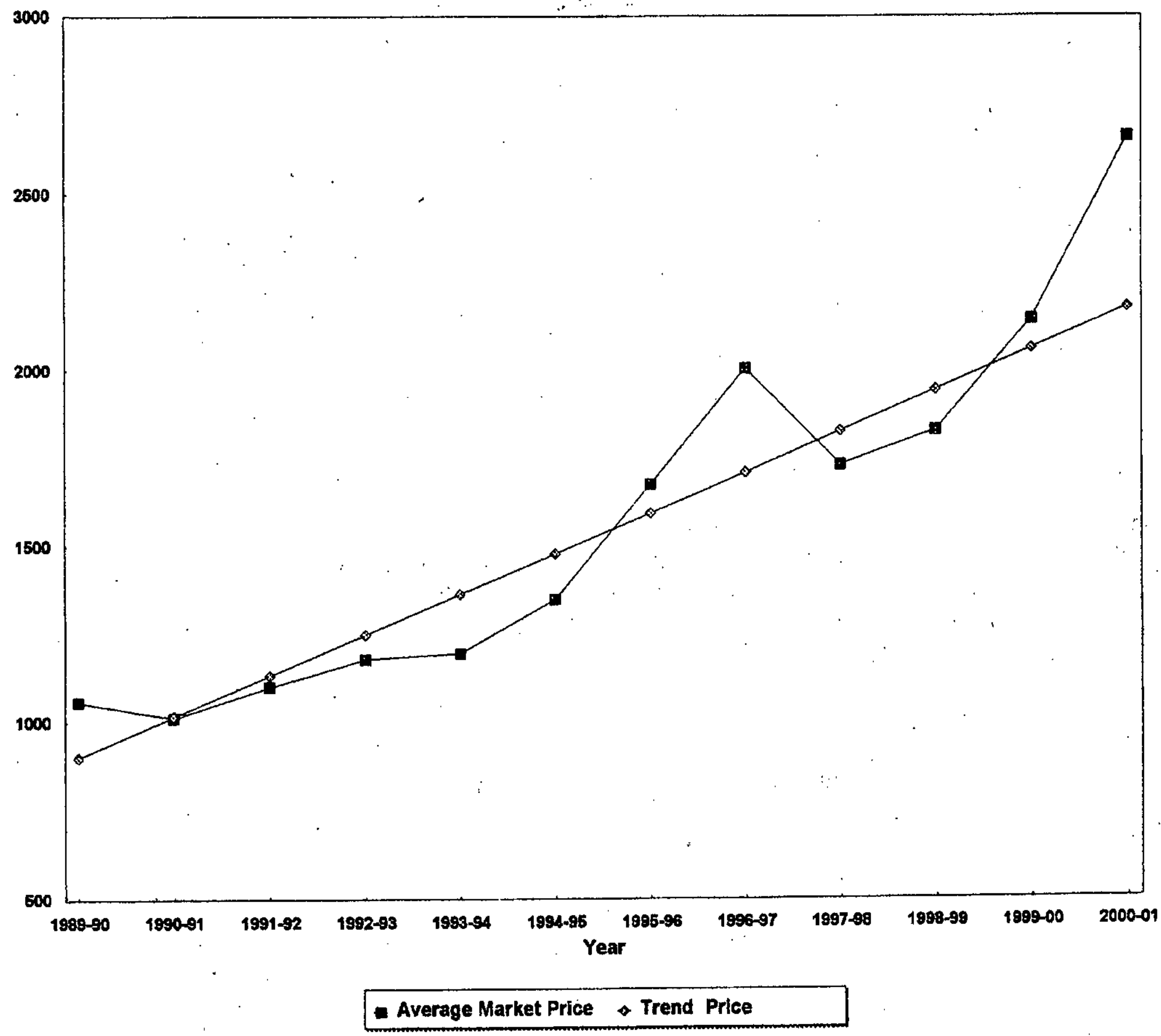

Figure-4: **LONG TERM TREND OF WHOLESALE PRICES OF SUGAR: 1989-90 to 2000-01** i.e. Oct - SEP

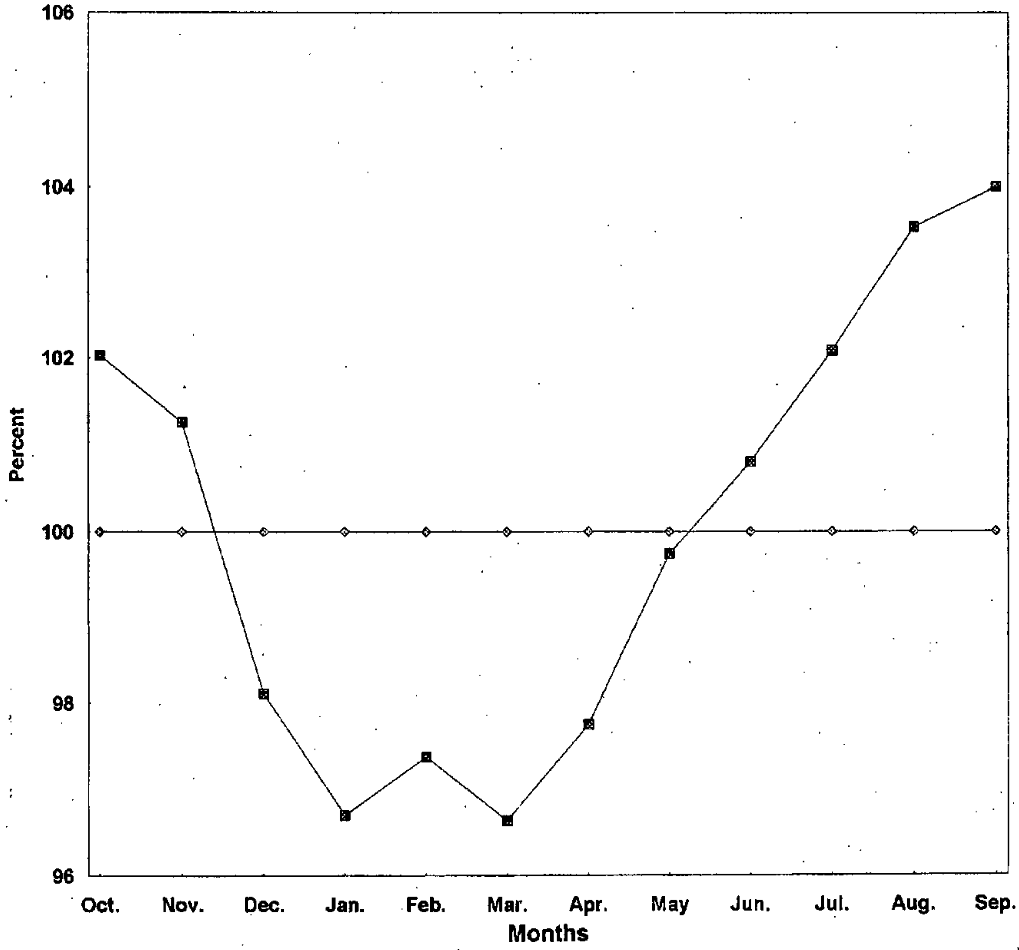

Figure -5: SEASONAL INDICES OF SUGAR PRICES: 1989-90 TO 1999-00

Table-16 : Seasonal Indices of Sugar Prices: 1989-90 to 1999-00 (Oct. – Sep.)

Month	Seasonal Indices (Percent)
October	102.03
November	101.50
December	98.10
January	96.70
February	97.93
March	96.64
April	97.75
May	99.74
June	100.43
July	102.08
August	103.53
September	103.57

Note: Indices have been calculated from average price of Lahore, Faisalabad, Karachi, Hyderabad and Peshawar markets.
Source: ALMA, Karachi.

8.8 World Supply, Demand, Stocks, Trade and Price Situation of Sugar

8.8.1 Supply, demand, stocks and trade

123. The data on world balance sheet of sugar (raw value), for the period of 1998-99 to 2000-01 are presented in Table-17:

Table-17: World Sugar Balance Sheet (Raw Value): 1998-99 to 2000-01 (Oct. – Sept.)

S.No.	Item	1998-99	1999-00 (Estimated)	2000-2001 (Forecast)	Changes in 2000-01 over 1999-00
		------- Million tonnes -------			Per centage
1.	Opening stocks	25.85	30.73	34.70	(+) 12.92
2.	Production	130.42	134.53	124.47	(-) 7.48
3.	**Total supply (1+2)**	**156.27**	**165.26**	**159.17**	**(-) 3.69**
4.	Disappearance (consumption)	124.06	126.83	128.72	(+) 1.49
5.	**Ending stocks (3-4)**	**32.21**	**38.43**	**30.45**	**(-) 20.77**
6.	**Trade (Exports)**	**35.94**	**29.25**	**32.82**	**(-) 16.38**

Note: Opening and end-year stocks may not be equal due to difference in exports and imports and trade in pipeline.

Source: Sugar: World Markets and Trade, USDA, November 2000.

124. The world sugar production during 1999-00 is estimated at 134.53 million tonnes, 3 per cent more than that of 1998-99. With the addition of opening stocks of 30.73, global supply of sugar during 1999-00 stood at 165.26 million tonnes, up by 9 million tonnes over the corresponding supplies of 156.27 million tonnes in 1998-99.

125. The world consumption estimated at 126.83 million tonnes in 1999-00 is 2.77 million tonnes more than the consumption of last year. The end year stocks in 1999-00 increased to 38.43 million tonnes, up by 6.2 million tonnes or 19 per cent over the previous year.

126. According to USDA's Sugar: World Market and Trade Bulletin, November 2000, World sugar production for 2000-01 is forecast at 124.47 million tonnes, less by 10 million tonnes or 7 per cent than the production estimated at 134.53 million tonnes in 1999-00. Consumption is expected to increase from 126.83 million tonnes in 1999-00 to 128.72 million tonnes (one percent increase) in 2000-01 and end year stocks are to decline to 30.45 million tonnes from the previous level of 38.43 million tonnes.

127. Lower production and supplies and hence end year stocks forecast for 2000-01 are indicative that prices of sugar will remain higher during the current year as against the previous year.

8.8.2 International Prices of Sugar

128. The international prices of sugar i.e. fob (Caribbean ports) for raw and fob (London) for white sugar, from 1988-89 to 2000-01 have been presented in Annex-XV and their movements during 1988-89 to 2000 graphically shown in Fig-6.

129. The prices of raw and white sugar fluctuated widely during the period under review. During 1988-89, the fob prices of raw sugar (Caribbean ports) averaging at US $ 263 per tonne, rose to $ 301 in 1989-90, and during the next two years touched the low level of $ 202 per tonne in 1991-92. In 1992-93, prices started recovering and were averaging at $ 302

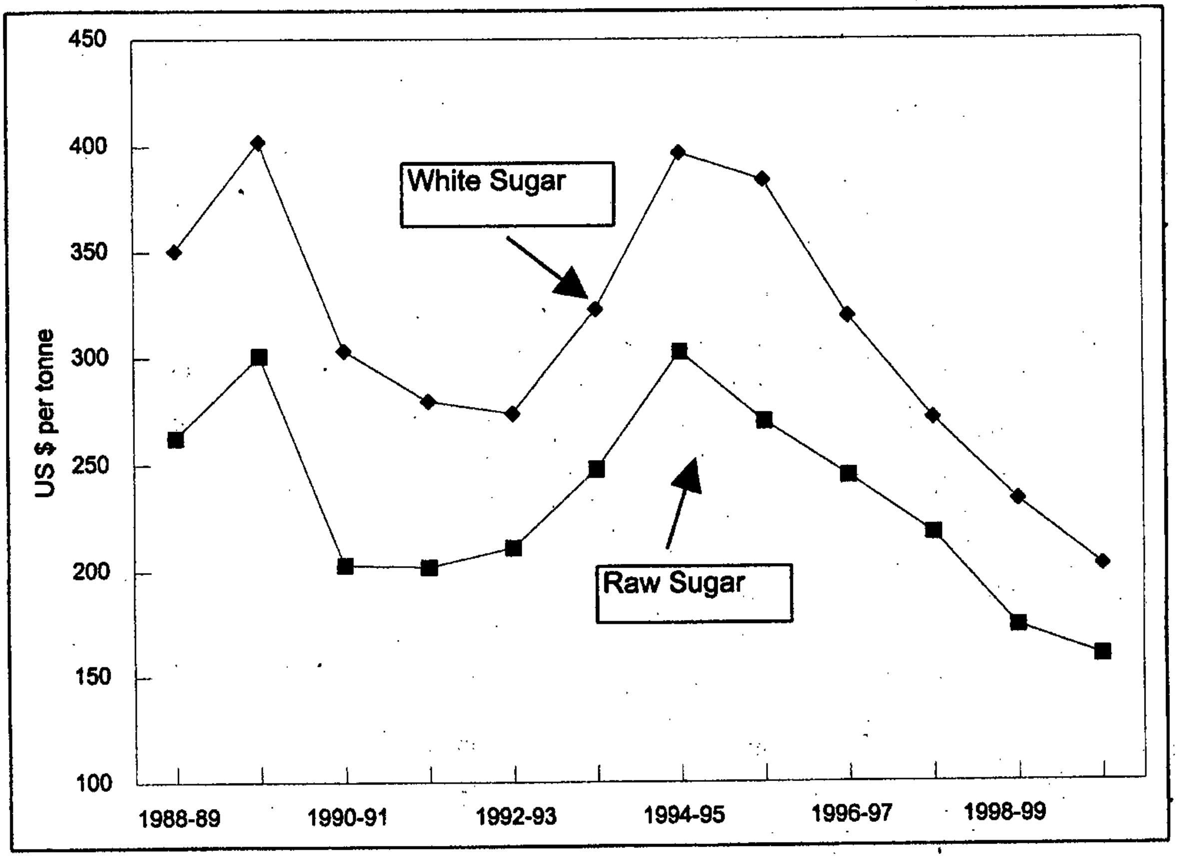

Fig - 6: INTERNATIONAL PRICES OF SUGAR:1988-89 TO 1999-00

per tonne in 1994-95 - the highest level during the period reviewed here. The prices have since been falling and in 1998-99 averaged at $ 146 per tonne. During 1999-00 the prices staged a recovery and averaged at US$ 159 per tonne. During October to December 2000, prices of raw sugar averaged at $ 237, $ 219 and $ 221 per tonne, respectively.

130. The prices of white sugar during the last 10 years have followed a pattern similar to that of raw sugar described above. Fob (London) prices averaging at $ 351 per tonne in 1988-89 rose to $ 402 in 1989-90, decreased to $ 303 in 1990-91. Following the downward trend in the next couple of years price of white sugar fell to $ 274 in 1992-93. In the next two years, however, prices bounced back and averaged at $ 397 per tonne in 1994-95. Again trending downward, prices averaged at $ 216 per tonne in 1998-99. During 1999-00, prices plunged further, averaging at $ 202 per tonne. During October 2000 prices of white sugar however rose to $ 259 per tonne but declined to US$ 241 in December.

131. The differential between the average annual prices of raw and white sugar, during the last 10 years has ranged between $ 54 in 1997-98 and $ 114 per tonne in 1995-96. During the 3 months of 2000-2001-sugar year, the differential (in their monthly average price) ranged between $ 20 to 24 per tonne. Due to low production and higher consumption forecast, end year stocks are expected to decline and this situation would result in higher prices of raw and white sugar in the year 2001.

8.9 Import and Export Parity Prices:

132. 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 trade. Since Pakistan has been importer in some years and exporter in the others, both the import and export parity prices of sugarcane have been estimated for analysing support price policy options for the next crop season. In past, import and export parity prices had been calculated on the basis of

actual average c&f import and fob export prices. But these prices did not reflect our true opportunity cost or exports competitiveness because of the following reasons:

i) Average export prices of sugar are not exclusively of commercial sugar.

ii) Import prices are affected by the dumping practices of the sugar exporting countries such as India.

iii) Incentives provided by the government to the exporters also distort the situation.

133. In view of these limitations, financial and economic import parity prices have been calculated on the basis of fob (London) prices. Calculations of export parity price are based on economic analysis only because there is no duty or surcharge on the export of sugar. For calculating the financial parity prices, inter-bank exchange rate while for economic parity prices, open market exchange rate has been used.

8.9.1 Import Parity Prices:

8.9.1.1 Economic import parity prices:

- **During 1995-96 to 1999-00**

134. The fob (London) prices of white sugar during 1995-96 to 1999-00 averaged at US $ 279 per tonne. Adding the freight charge @ US $ 30 per tonne, the c&f Karachi price of sugar comes to US $ 309. At the existing open market exchange rate of one US $ = 62.00 Pak rupees, the import price works out to Rs 19,158 per tonne. Adding the marine insurance, L/C opening charges @ 0.5% on c&f cost, transport charges @ Rs 1,350 per tonne and other port incidentals as detailed in Annex XVI, the landed cost of imported sugar at Lahore, adopted as mid point for major consumption centres, would be Rs 22,133. At the ratio of 66:34 between the cost of cane and its processing, the mill-gate economic prices of sugarcane calculate to Rs 49.69 per 40 kgs for Punjab and NWFP, and Rs 50.85 for Sindh, respectively. Details may be seen in Annex-XVI while a summary is presented in Table-18:

- **During 2000-01 (Oct -Dec)**

135. The average fob (London) prices of white sugar during 2000-01 averaged at US $ 248 per tonne. Adding the freight charges @ US $ 30 per tonne, the c&f Karachi price comes to US $ 278. At the existing market exchange rate of one US $ = 62.00 Pak rupees, the import price works out to Rs 17,236 per tonne. Accounting for the import incidentals and following the procedure outlined earlier, the import parity prices of sugarcane have been analysed in Annex-XVI. The mill-gate economic prices of sugarcane come to Rs 45.16 per 40 kgs for Punjab and NWFP, and Rs 46.22 for Sindh, (Table-18).

8.9.1.2 Financial import parity prices:

- **During 1995-96 to 1999-00**

136. The fob (London) prices of sugar during 1995-96 to 1999-00 averaged at US $ 279 per tonne. Adding the freight charge of US $ 30 per tonne, the c&f Karachi price of sugar comes to US $ 309. At the existing inter-bank exchange rate of one US $ = 59.00 Pak rupees, the import price works out to Rs 18,231 per tonne. Accounting for the financial incidentals i.e. custom duties @ 15% of import value, sales tax @ 15% of import value + custom duties, income tax @ 6% of Duty Paid Value (DPV) at import stage and 3.5% at sale stage (landed cost) and adding the marine insurance, and L/C opening charges @ 0.5% of c&f cost, transport charges @ Rs 1,350 per tonne and other port incidentals as detailed in Annex XVII, the landed costs of imported sugar at Lahore, would be Rs 29,841 per tonne. Accounting for 15% sales tax on local sugar production, ex-mill cost of sugar calculates to Rs 25,365 per tonne. At the ratio of 66:34 between the cost of cane and its processing, the mill-gate financial prices of sugarcane calculate to Rs 56.94 per 40 kgs for Punjab and NWFP, and Rs 58.28 for Sindh,. Details may be seen in Annex-XVII, while a summary is presented in Table-18.

- **During 2000-01 (Oct –Dec)**

137. The average fob (London) prices of white sugar 2000-01 (Oct-Dec) averaged at US $ 248 per tonne. Adding the freight charges of US $ 30 per tonne, the c&f Karachi price

comes to US $ 278. At the existing inter-bank exchange rate of one US $ = 59.00 Pak rupees, the import price works out to Rs 16,402 per tonne. Accounting for the financial incidentals and duties and following the procedure outlined in the above paragraph, the import parity prices of sugarcane come to Rs 51.68 per 40 kgs for Punjab and NWFP, and Rs 52.89 for Sindh (Annex-XVII). A summary of the import parity prices as worked above is given in Table-18.

Table-18: Economic and Financial Import 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 price	Financial price	Economic price	Financial price
	US$/tonne	-------------------- Rs per 40 kgs --------------			
1. During 1995-96 to 1999-00	279	49.69	56.94	50.85	58.28
During 2000-01 (Oct-Dec)	248	45.16	51.68	46.22	52.89

Source: Annexes XVI to XVII.

8.9.2 Export Parity Prices (Economic)

- **During 1995-96 to 1999-00**

138. The average fob (London) prices of white sugar during 1995-96 to 1999-00 have averaged at US $ 279. Assuming the quality of London sugar at par with Pakistani white sugar this price can be adopted for calculating export parity prices of sugar and sugarcane in Pakistan. Using the current open market exchange rate of one US $ = 62.00 Pak Rupees, the average export price in Pakistani currency works out to Rs 17,298. After accounting for various incidentals involved in exports of sugar right from the mill-gate to export point @ Rs 1,279 per tonne viz. the transport charge, transit insurance, special packing, clearing and forwarding, loading and unloading, port charges, wharfage, handling and stevedoring

charges etc, the ex-mill economic price of white sugar (without export duties, subsidies, local taxes and sales tax) comes to Rs 13,616 per tonne. Distributing this amount between the sugarcane and its processing in the ratio of 66:34 as their respective shares, the mill-gate prices of sugarcane should work out to Rs 30.55 per 40 kgs in the Punjab and NWFP and Rs 31.29 in Sindh. Details of these calculations and assumptions used in the analysis are given in Annex-XVIII, while a summary of the results is given in Table- 19.

- **During 2000-01 (Oct – Dec)**

139. During 2000-01, the fob (London) prices of sugar averaged at US $ 248 per tonne equivalent to Rs 15376. Accounting for export incidentals as discussed above, the ex-mill economic price of sugar is estimated at Rs 11982 per tonne. Using the ratio of 66:34 to work out the respective shares of sugarcane and its processing into white sugar, the mill-gate economic price of sugarcane works back to Rs 27.00 per 40 kgs for Punjab and NWFP and Rs 27.53 per 40 kgs for Sindh. Details can be seen in Annex-XVIII and summary in Table-19.

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

Period	Base price	Mill-gate prices of sugarcane	
		Punjab and NWFP	Sindh
	US$/tonne	---- Rs per 40 kgs ----	
1. During 1995-96 to 1999-00	279	30.55	31.29
2. During 2000-01 (Oct-Dec)	248	26.90	27.53

Source: Annex XVIII.

9. The Support Price

140. During the last two years production of cane has decreased from 55.2 million tonnes in 1998-99 to 42.5 million tonnes in 2000-01. This decline has posed a serious problem of supply of raw material to the industry, causing decline in production of sugar and rise in its prices as well as imports. The country had to import about 397 thousand tonnes of sugar during 1999-00 involving huge amount of foreign exchange. The severe water stress and drought condition experienced in 2000-01 further lowered the production of sugarcane. As a result, the situation of supply of cane and in turn sugar production from 2000-01 crop has further worsened . Local availability of sugar in 2000-01, including opening stocks of 507 thousand tonnes, and likely production of 2.1 to 2.4 million tonnes have been estimated to range between 2.6 to 2.9 million tonnes. Against this total consumption requirements of the country for 2000-01 have been estimated at 3.1 million tonnes. To keep the end year stocks at the last years' level of 507 thousand tonnes so as to keep the prices in check, the country shall need to import about 0.7 to one million tonnes of sugar during the current year. Reports indicate that 317000 tonnes have already been imported during first three months of the current sugar year i,.e. during October to December, 2000.

141. For formulating price policy proposals for the 2001-02 sugarcane crop a comprehensive analysis of various domestic and international factors has been undertaken. Emerging policy options are summarized in table-20.

Table-20: Price Policy Options for Sugarcane, 2001-02 Crop

Basis	Mill gate price of sugarcane		
	Punjab	**NWFP**	**Sindh**
	Rupees per 40 kgs		
1. Cost of production of sugarcane (Annexes-IV to VI):			
i) With normal yield	37.30	36.26	35.29
ii) With adjusted yield	38.21	-	36.70
2. If real value of support price were to be equated with the 1990-91 level	35.93	35.93	37.11
3. Domestic parity prices worked back from:			
i) Average wholesale price of "Gur" during October-December, 2000 (Annex-IX)	54.40	60.17* 62.87**	-
ii) Average wholesale price of sugar during 2000-01 crushing season (Annex-X)	48.62	48.62	49.76
4. Export parity prices (Economic) as worked back from the average fob (London) sugar price(Annex-XVIII):			
i) During 1995-96 to 1999-2000	30.55	30.55	31.29
ii) During 2000-01	26.90	26.90	27.53
5. Import parity prices (Economic) as worked back from the average fob (London) sugar price (Annex-XVI):			
i) During 1995-96 to 1999-00	49.69	49.69	50.85
ii) During 2000-01	45.16	45.16	46.22
6. Import parity prices (Financial) as worked back from the average fob (London) price (Annex-XVII):			
i) During 1995-96 to 1999-00	56.94	56.94	58.28
ii) During 2000-01	51.68	51.68	52.89

* with license fee

** without license fee

142. The mill gate prices of sugarcane as worked back from the average wholesale prices of gur during 2000-01 crushing season (October - December) come to Rs. 54.40 per 40 kgs in the Punjab, and Rs. 60.17 in the NWFP, (without license fee) and Rs. 62.87 (with license fee).

143. Ex-factory price of sugar during 2000-01 crushing season, so far, has averaged at Rs. 26000 per tonne. Based on this, average cane price at mill gate works back to Rs. 48.62 for Punjab and NWFP, and Rs. 49.76 per 40 kgs for Sindh. However, sugar and gur prices are abnormally high during the current year and during a normal production year may not prevail at these levels. Therefore, above mentioned domestic parity prices of sugarcane can not be adopted for recommending support prices of sugarcane for a normal crop year. .

144. Based on the average fob (London) prices of sugar, 1995-96 to 1999-00 and 2000-01, the economic and financial import parity prices of sugarcane have been worked back. The economic prices calculate to Rs. 49.69 per 40 kgs for Punjab and NWFP and Rs. 50.85 per 40 kgs for Sindh when based on average prices for 1996-00, and to Rs. 45.16 for Punjab and NWFP and Rs. 46.22 for Sindh when based on prices of 2000-01. The corresponding financial prices of sugarcane work out to Rs. 56.94 per 40 kgs for Punjab and NWFP and Rs. 58.28 for Sindh, and Rs. 51.68 and Rs. 52.89 respectively.

145. During the decade ending 1999-00, Pakistan exported sugar in some years. Although, the situation during the last two years has reversed but still to determine the competitiveness of Pakistan in export of sugar, prices of sugarcane at mill gate have been worked back on the basis of average fob (London) sugar prices for the two periods i.e. average for 1995-96 to 1999-2000 and for 2000-01. The mill gate economic prices of sugarcane worked back from the average prices of sugar for the two periods come to Rs. 30.55 per 40 kgs for Punjab and NWFP and Rs. 31.29 per 40 kgs for Sindh and to Rs. 26.90 and 27.53, respectively.

146. During the decade ending December, 2000, sugar prices of white sugar have fluctuated widely going up as high as US $ 402 per tonne in 1989-90 and declining to as low as US $ 202 per tonne in 1999-2000. Therefore, worked back import/export parity prices of cane reflect a wide range. Hence it may not be advisable to entirely rely on these widely ranging/varying prices for sustainable production of sugarcane/sugar in the country. However, this does not imply that our sugarcane and sugar production policy

should not be totally incompatible with global situation. The price level should be kept at a level where in case of excess production our domestic prices should allow for economical exports maintaining adequate incentives to the growers and industry to keep production in line with the domestic requirements.

147. The mill gate costs of production of sugarcane for 2001-02 crop have been estimated at Rs. 37.30-38.21, Rs. 36.26, Rs. 35.29-36.70, per 40 kgs in the Punjab, NWFP and Sindh respectively reflecting 2.4 to 4.0 per cent increase over those of previous year's. The increases in the cost estimates of sugarcane are primarily due to increases in the custom hire rates of various cultural operations, prices of seed, chemical fertilizers, supplementary irrigation and land rentals. The increases in custom hire rates of tractor for cultivation practices and cost of supplementary irrigation of tubewell occurred due to frequent changes in POL prices. The cost of seed has increased due to short supply of cane. Land rentals have also gone up.

148. The foregoing analysis suggests the need for increasing the support price of sugarcane. However, in view of the short supply of water, it is not advisable to build high profitability of sugarcane vis-à-vis other crops merely on the basis high prices which will expand its area at the cost of other crops. Horizontal expansion in sugarcane area is not sustainable in the long run, particularly when the export parity/profitability is low. This will also disturb cropping patterns and adversely affect the production of other crops like cotton and wheat which the country can hardly afford for reasons of comparative advantage and food security considerations. On the other hand, the nation has invested tremendous resources in the sugar industry which needs assured supply of raw material for cost effective operations.

149. The above discussion suggests that production of both sugarcane and sugar be enhanced by improving the efficiency of sugarcane production and its processing. This can be achieved through the cultivation of high yielding and high sucrose cane varieties, using recommended agronomic practices as discussed else where in this Report. This would, however, require the fixation of support price at a level which provides sufficient

incentive for sugarcane farming and encourage investments in the adoption of recommended practices and technology.

150. In view of the above, the following support prices of sugarcane at mill gate for the 2001-02 crop are suggested.

Province	**Support Price for**	
	2000-01 crop	**2001-02 crop**
	Rupees per 40 kgs at mill gate	
Punjab and NWFP	Rs. 35.00	Rs. 42.00
Sindh and Balochistan	Rs. 36.00	Rs. 43.00

151. The recommended prices would provide a margin of about 12 per cent over the weighted average cost of production to help raise production of sugarcane to assure adequate supply of raw material to the sugar industry. The recommended prices are substantially below the worked back import parity prices of sugarcane but higher than those of export parity prices. The proposed prices would provide incentive to the growers for increasing production and reduce dependence on imports as well as trade deficit. It may not be out of place to mention here that the above recommended prices are meant to provide floor to the market in years of bumper crop. The effective implementation of support price in such years can ensure stability in production. However, to realise the full impact of increased price incentive, it is important to develop co-ordination and friendly relations between growers and millers based on mutual trust. The mills having good relations with growers have performed better even in the worst years of cane supply both in terms of tonnage of cane crushed and sugar recovery. The implementation of suggestions given in this regard in the relevant sections of this Report can greatly help to resolve the problems faced by sugar industry.

10. MARKETING OF SUGARCANE, 2000-2001 CROP

152. In order to study the marketing of sugarcane in the country, APCom conducted a mini survey during the 1st fortnight of January 2001 in the main cane producing areas of Punjab, Sindh and NWFP. On the basis of survey results and the discussions in the meeting of Standing Committee on Sugarcane held at Hyderabad on 13-1-2001, the main marketing issues of sugarcane crop are detailed below.

10.1. Sugarcane Supply to Mills

153. As a result of short cane crop in the country cane supply to the mills has been adversely affected. In Punjab, the supply of sugarcane to mills is such that they are running at 40-60 per cent of capacity. The most common varieties supplied to mills are CO-1148, BL-4, CP-26, CP-43-33, CP-72-2086, CP-77-400 and CP-233-889. About 25-50 per cent cane supply to mills is of CO-1148 (Indian variety). The sugar mills generally started crushing in the third week of November and may close by the end of February. Some mills have already closed due to the shortage of sugarcane. In Sindh mills started crushing cane during 1st week of November, 2000 and supply of cane to sugarmills was much less than their normal crushing capacity. The mills remained closed by about a fortnight or so due to non-availability of cane, as the growers demanded higher prices. However, with the consensus between the mills management and farmers, the mills restarted and agreed to pay higher prices.

154. In the NWFP, sugarmills compete with cane crushers for the supply of cane. In the past cane crushers did not have to pay any tax, therefore, they had an edge over the sugarmills to pay higher prices to the growers. During the current season even, they attracted the growers by paying higher prices upto Rs 60 per 40 kgs. However, very recently, the NWFP government has imposed license fee on the cane crushers at the following rates.

Farmers' Cane Crushers

- **6-12 Horse Power Cane Crushers**

License fee	=	Rs 10 thousand
Renewal fee	=	Rs 7 thousand/season

- Above 12 Horse Power Cane Crushers

License fee	=	Rs 15 thousand
Renewal fee	=	Rs 12 thousand/season

Commercial Cane Crushers

License fee	=	Rs 30 thousand
Renewal fee	=	Rs 27 thousand/season

155. The gur making industry in NWFP is popular and liked by growers due to the following reasons:

1. Gur making is more profitable than supply of cane to the sugar mills as the 'Gur' prices are attractive ranging between Rs 800-1040 per 40 kgs.
2. Procedure of cane supply to the mills is more complicated than supplying to the cane crushers.
3. Every truck/trolly driver charges Rs 300 to 400 per trip from the growers over and above the transportation charges deducted by the mills.

156. Due to the above reasons, the supply of cane to the mills is short and mills have to be shut down for 3-4 days during every week.

10.2 Quantity Specific Contracts

157. To ensure regular supplies of cane to sugar mills, the quantity specific contacts between mills and growers before the sowing of crop or on-set of crushing season can be helpful in facilitating the smooth supply of cane to the mills. The contract should also specify the month/week of delivery as well as prices to be paid for fresh, ratoon,

September planted and each variety. The provincial government should provide legal cover to contract system for its success.

10.3. Underweighments and Deductions

158. Underweighments and deductions of cane supplied by growers is very common on the part of sugar mills. The mills management contend that deductions from sale proceeds is on account of high trash contents, binding material and poor quality of cane. Though these deductions vary from mill to mill, but during the current season mostly ranged upto 2 per cent of the cane weight. In the past, however, when the supply was abundant, the deductions were reported as high as 20 per cent of the total weight. Underweighment at mill gate and purchase centers had also become a routine phenomenon. The middlemen operating in the sugarcane marketing field in the country side are very notorious in this respect. Weigh-bridges installed for the purpose have also been found defective in many cases and thereby do not record the correct weight reading. The under weighment in the past has been 25-40 maunds per truck load and 20-25 maunds per trolley load. However, due to shortage of cane the phenomenon was least observed during the current season.

10.4 Emergence of Middlemen and purchases from distant areas

159. During the last few years middlemen have emerged in sugarcane marketing as well. Their role in cane marketing is much exploitative. These middlemen purchase cane from the country side through the centres established by them. No doubt, the middlemen make prompt payment to the growers, but pay less price by Rs 5-8 per 40 kgs than paid at the mill gates. The mills also purchase cane from the much distant areas paying higher price in terms of transport subsidy to the growers. This is an important element of high cost of sugar manufacturing. This subsidy goes as high as Rs 8-10 per 40 kgs of cane by awarding LP (loading point) benefit to the distant sugarcane growers. This also encourages cross transportation of cane over long distances. Moreover, cross transportation causes wear and tear of the roads network, thus, making huge loss to the economy. It is therefore, necessary that mills should try to purchase cane from the near

by areas and discourage cross transportations. Further, there is a need to minimize the role of middlemen in cane marketing.

10.5. Sugarcane prices

160. The support prices of sugarcane for 2000-2001 crop year remained unchanged and were maintained at the last years' (1997-98 to 1999-2000) level of Rs 35 per 40 kgs for Punjab and NWFP and Rs 36 for Sindh and Balochistan. In Punjab sugar mills have their procurement centres, whereas in other provinces, especially in Sindh sector/circle offices are working just for better contacts and payment facilities to the growers. The prices received by farmers differ from province to province. In Punjab it varied from Rs 35 to 48 at the procurement centres and Rs 38 to 50 per 40 kgs at the mill gate. The sugarmills in Punjab during the middle of crushing season created a cartel and decided not to pay higher prices for cane. As a result of which cane supply to mills was interrupted and mills remained closed for sometime.

161. In Sindh mill gate prices were as high as Rs 58 per 40 kgs. As regards NWFP, the growers have received upto Rs 45 per 40 kgs at the mill gate. However, cane crushers paid upto Rs 60 per 40 kgs. The transport subsidy paid by some of the sugarmills in Sindh and Punjab was as high as Rs 8 to 10 per 40 kgs.

10.6 Fluctuations in sugar and sugarcane production

162. There have been wide fluctuations in sugarcane and sugar production during the last few years and thus prices remained unstable. The sugarcane production attaining the highest level of 55 million tonnes in 1998-99 dropped to 43 million tonnes in 2000-01. Similarly, sugar production declined from 3.5 million tonnes in 1998-99 to 2.4 million tonnes in 1999-00. This created instability in the sugar market as well as problem for the growers, sugar industry and the consumers. The surplus sugar production caused lower cane prices for the growers, whereas short production compelled the sugar mills to run under capacity, pay high prices of cane to the growers resulting in higher cost of

production of sugar. The lower production of sugarcane and sugar has been reported as a result of sugarmills' cane procurement policies detrimental to the interest of the growers. Thus, the situation needs to be corrected to save the national capital already invested in sugar industry. For the future development of sugar/sugarcane sector it is essential that;

1. Mills should appreciate the role of growers in providing raw material while growers need to give due credit to the industry in providing a market for their produce.
2. It is in the interest of the industry to help the growers stabilize sugarcane production in line with the domestic requirements and promote their well being. For this, emphasis needs to be on mutual trust, confidence and respect.
3. The cost of sugar production in the country may be lowered by improving the cane yield and quality. Through research and development efforts industry can play an important role in this context.

11. PAYMENT OF QUALITY PRICES FOR SUGARCANE

163. The payment of sugarcane price at present is related to its weight without the consideration of quality. The growers supplying cane of high sucrose contents are not encouraged by paying the premium price. But, at the end of crushing season quality premium is paid on collective basis, though varying from province to province. In case growers are paid higher price than the support price, payment of this quality premium becomes irrelevant however, APCom has been recommending appropriate measures in the past. The important ones are described below:

11.1 Payment According to Individual Consignments

164. The 'flat rate system' of payments for cane price was adopted by all the cane producing countries in the beginning. In this system payments are made on the basis of weight, regardless of cane quality. But gradually many countries shifted to the system where quality is also considered alongwith weight for cane payments. For this purpose

random sampling of all the cane consignments is carried out and the sucrose contents are determined for calculation of cane price to be paid to the growers. This system has improved the efficiency of cane industry both at the farm and sugar mills level.

165. As the manual sampling of all consignments was not possible, due to the laborious and time consuming nature of work, so the Cabinet on the recommendations of APCom approved the installation of core samplers in the sugar mills. To start with core samplers were to be installed at the three public sector mills, namely Kamalia (now privatized), Thatta and Khazana. Only Thatta sugarmills could succeed in installing the core sampler, but the system of payments based on sucrose recovery could not be developed and implemented, as farmers were happy over the premium price but unwilling to accept the discount price in case of low sucrose levels. Some private sugar mills, like Sindh Abadgar and Shakargang also tried the payments on the basis of sucrose contents, but could succeed only partially. The system of payments on quality basis could succeed only, if all the sugarmills follow this system as under present circumstances it is not possible for a mill in isolation to link cane price with quality.

166. For the purpose of enhancing per acre production of sugar, it is very essential that Pakistan should move from the present system of cane price to the quality payments. In this respect APCom had made the following suggestions in its support price policy reports for 1998-99 and 1999-2000 crops, but have not been implemented properly. "Government needs to sponsor a project to locally manufacture sampling device and constitute a committee of experts, millers, technologists and farmers to work out a feasible system for payment of sugarcane price by the mills to growers on the basis of sucrose contents of individual consignments".

167. Therefore, the recommendation is reiterated to be implemented during 2001-02 crop year.

11.2 Payment of Quality Premium on Collective Basis

168. The support prices of sugarcane in different provinces are fixed by government on the basis of average recovery of sugar in that province (8.7 per cent in Sindh, Balochistan and 8.5 per cent in the Punjab and NWFP). If a sugar mills' overall recovery is higher than the base level recovery, that mill is supposed to share with the farmers, the extra revenue earned by the mill due to higher recovery. So, while announcing the support prices, government also announces every year the rate of quality premium on sugarcane. The Economic Coordination Committee of the Cabinet in its meeting held on 16-6-1998, while fixing the support prices of sugarcane for 1998-99 also announced the payment of quality premium @ paisas 50 per 40 kgs, on each 0.1 per cent additional sugar recovery over the respective provincial base levels. Since support prices for 1998-99, 1999-2000 and 2000-2001 crops remained at the 1997-98 level, so there was no change in quality premium calculations. Therefore, for the quality premium of 2000-2001 crop status-quo was maintained.

12. IMPROVING PRODUCTIVITY AND MARKETING OF SUGARCANE

12.1 Improving Productivity

169. The raw material requirement of large sugar industry consisting 77 operating units has mostly been met in the past through expanding acreage under sugarcane. During the last two years industry has faced severe shortage of cane supply due to sudden fall in its acreage as well as reduction in yield due to drought and short supply of water. In the current water stress situation, the scenario of meeting industry's requirement through horizontal expansion in sugarcane is neither possible nor advisable. Also the crop is facing competition for land and water from other competing crops like cotton, rice, wheat etc. Thus, increasing per hectare/acre yield of sugarcane is the only option to meet the requirements of the industry. On the basis of available research findings vast scope for the improvement in yield of cane and its sucrose contents exists in the country. Pakistan does not compare favourably on both these counts with other sugarcane

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producing countries. Ranked according to efficiency, Pakistan is the last among 15 countries in the productivity of sugar per acre. Australia recovers 5000 kgs of sugar from an acre as against 1700 kgs in Pakistan. Keeping in view the potential of existing sugarcane varieties realized at the research stations and at the farms of progressive growers APCom in its support price policy for sugarcane 2000-2001 crop, emphasized on increasing unit production and for that purpose suggested various measures. The development on these issues is however, lacking. The present section re-emphasises the importance of various issues alongwith the latest developments on each, if any, and future course of action required to be taken to improve the situation.

12.1.1. Sugarcane Breeding

170. Plant breeding in general and sugarcane in particular is an important aspect of research and varietal development to improve productivity. However, development of high yielding varieties of sugarcane in Pakistan is constrained due to poor infrastructure for the local production of sugarcane fuzz and or its irregular supply from abroad. The development of needed facilities can help accelerate this programme. The local production of fuzz inter alia would require the development of such facilities and logistics which help to maintain desired photoperiod, temperature and humidity levels required for induction of flowering in cane varieties, increasing their viability, development and pollination as well as their synchronization with desired parents. The development and maintenance of infrastructure needed to provide for desired phtoperiod, temperature and humidity levels require huge financial resources.The nature of the breeding research entailing such kind of activities indicates that production of sugarcane fuzz at home is a long-term process/programme facing many administrative and financial barriers. However, as short term measure till such time, the country is able to produce fuzz locally, our cane breeding programmes should be coordinated with the breeding stations abroad for regular flow of sugarcane fuzz from desired parents alongwith the provision of land and needed resources for its testing in the country. It may be mentioned that one to ten Lac seedlings reportedly are required to be developed from sugarcane fuzz to select one variety of sugarcane.

171. At the moment sugarcane breeding at a limited scale is being undertaken by Federal Sugarcane Research Institute Thatta and Provincial Research Institutes of Faisalabad and Mardan because these research stations do not have sufficient land and financial budgets for initiating long-term breeding programmes. Also there are no arrangements for the regular supply of fuzz of desired material from abroad. To supplement the existing budget for sugarcane research provincial governments have already been directed by ECC of the Cabinet in its meeting held on 14-07-2000 to set aside 15 per cent of sugarcane cess fund and allocate it to sugarcane research and development. However, the provincial governments have not yet notified the procedure for the utilization and release of cess fund alongwith its availability and allocation to different areas, disciplines etc and the agencies responsible for scrutinizing, processing and according approval of the schemes/projects to be financed from the cess fund allocation. The provincial governments be asked to take a decision in this regard expeditiously.

12.1.2 Improved Seed

172. Improved seed is the primary determinant of productivity.The seed used from commercial crop is a major source of infection of various sugarcane diseases. However, the seed treatment can help to provide coverage against some diseases. It has been observed that most of the farmers either due to ignorance about new varieties or due to non-availability of their seed in their surroundings use the seed from the commercial crop of old and discarded varieties which is generally infested. The reduction in the price of one of such varieties i.e. CO.1148 as done during 1999-00 crushing season is not a solution to wipe out this variety as there is no ready supply of seed of desired varieties due to non-existence of formal source for the supply of certified seed of sugarcane to growers.

173. The researchers, in spite of facing financial constraints, have developed many high yielding varieties for early, mid and late season crushing (detail in Annex-XIX)

which if adopted can help immediate increase in the cane yield by 20-25 per cent provided their disease free seed is made available and used. During the zoning system some of the sugar mills used to arrange the supply of improved seed of the available cane varieties either from their own farms maintained specifically for the purpose or from the farms of progressive growers. After de-zoning this programmes has been abandoned by mills and growers started sowing of their own farm produced seed. Although, there is no institutional arrangement for producing and distributing quality seed of sugarcane, yet in the Punjab the situation improved in favour of high yielding varieties in 1998-99 and 1999-2000 when more area was brought under approved varieties of sugarcane as a result of campaign launched by agriculture department through information media for the purpose. However, still more than 50 per cent of total area in Punjab is reportedly sown with unapproved Indian cane variety CO-1148 (Annex-XX) which over time had become susceptible to various cane diseases. The most promising varieties of sugarcane both in terms of cane yield as well as sucrose content are CP-72-2086, CP-77-400, CP-43-33, BF-162, and BL-4. All these varieties are early maturing and their average sucrose content in the season respectively is reported at 10.30, 10.35, 10.28, 10.05 and 10.06 per cent. But unfortunately all these five varieties have hardly occupied 20 per cent of the total cane acreage. Against this CO-1148 is a late variety and its average sucrose content is estimated around 8.84 per cent. Thus a considerable increase in the yield of sugar per unit area is possible by replacing area under CO-1148 with any of the above named varieties.

174. The present cane payment system do not encourage the cultivation of high sucrose varieties nor there exist any regular development programme for educating growers to adopt improved seed of recommended and approved varieties. In order to encourage adoption of high sucrose varieties, following measures are suggested:

i) The sugar industry should provide incentive to the growers for growing cane of high sucrose varieties in the form of quality premium.

ii) The responsibility of production, multiplication and distribution of certified seed of sugarcane be assigned to the sugar mills, as they are the sole beneficiaries of increased production of sugarcane and sugar. For this purpose sugar mills should establish their Cane Development Centres either individually or collectively. These centres in collaboration with the progressive growers and sugarcane researchers should undertake the multiplication and distribution of certified cane seed.

iii) The sugarmills should provide the facilities of hot water treatment of cane sets to the growers alongwith technical guidance for using the technique.

iv) The Cane Development Centres of the sugar mills should also function as regular institution for extending technical advisory services to sugarcane growers in co-operation with the provincial agricultural research and extension departments.

12.1.3 Balanced Use of Fertilizer

175. The use of chemical fertilizers on sugarcane has increased considerably in the past but their use in imbalanced form has been identified as the most prominent reason for the low productivity of crop. According to a survey report on Punjab province only four per cent cane growers have adopted balanced use of nitrogenous, phosphatic and potassium fertilizers while 73 per cent used both nitrogenous and phosphatic fertilizer but not in proper mix. The remaining 23 per cent growers used only nitrogenous fertilizers and that too in nominal quantity. This practice has not only constrained per hectare yield of sugarcane but has also affected sugar contents/recovery.

176. This has been proved by the experiments that use of potassic fertilizers increases sugar recovery and provide resistance against drought and some sugarcane diseases. Phosphatic fertilizers help nourishing of roots and strengthening of plants. It is estimated that on an average 1000 maunds of cane from an acre remove 72 kgs N, 36 kgs P and 136 kgs K. Considering the efficiency of applied fertilizer nearly double the quantity of these fertilizer nutrients needs to be applied. The fertilizer use statistics further reveal that application of potash to sugarcane is less than 3 kgs per acre implying that if fertilizer dose is improved towards balanced level, productivity of sugarcane and sugar may be enhanced to the level being achieved by the progressive growers.

177. Although research on fertilizer use in the country is much ahead of other research areas, yet growers are not being benefitted by the recommendations/conclusions that researchers have prescribed/drawn. Timely availability of required fertilizers, provision of technical guidance regarding proper mix of various brands of fertilizers, determining optimum nutrient requirement based on soil analysis and management of scarce water resources are seen the most lacking factors affecting the efficiency of applied fertilizer. Therefore, provincial governments should launch campaigns to educate the growers about the importance of the use of balanced doses of various fertilizers besides providing soil analysis facilities and arranging availability of all types of fertilizers at the proper time of their application.

12.1.4 Use of press mud/organic matter

178. Intensive and continuous cropping has depleted the organic matter and humus content of most of the soils, adversely affecting the crop response to the doses of chemical fertilizers. Press mud, a waste of sugar industry, is a good source of organic matter and also contains 2 per cent N, 4 per cent P_2O_5, 1 per cent K_2O and other micro nutrients such as zinc, iron, manganese etc. But unfortunately this nutrient-rich by-product is being used mainly as fuel. The APCom in its earlier policy reports had highlighted the wasteful use of press mud and recommended that sugar mills should discourage burning of press mud as fuel and promote its' use as organic matter/manure. APCom further suggested that sugar mills should supply press mud to the cane growers free of cost instead of selling for non-farm uses. Some of the mills reportedly have started supplying it free of cost while some others are charging price. The supply of press mud free of cost may cause some financial loss to the mills but in the long run, the mills will be compensated for this loss in terms of increased supply of sugarcane of improved quality.

12.1.5 Biological control of sugarcane pests

179. Sugarcane crop suffers heavy losses due to the attack of borers. These losses are 10-35 per cent loss in yield and 0.25 to 1.25 per cent in sucrose recovery. The recommended chemical control measures also kill predators and natural enemies of other sugarcane pests. Moreover, severe attack of borers particularly in advanced stage of crop growth cannot be controlled through ground spray.Alternatively granular pesticides do offer the solution but these are very costly and also not effective in controlling stem, top and Gurdaspur borers. Some traditional measures like burning of trash are also applied but this practice destroys the eggs and larvae of some useful pests. Thus practice of "Spray and Kill" and burning of trash needs to be replaced by Integrated Pest Management (IPM) technology mainly rooted in biological control of pests and diseases.

180. The toxic effects of chemicals used for controlling sugarcane pests on human health have also induced the crop scientists/research institutes to evolve some alternate technology. The concept of biological control is based on the fact that each weed or insect pest has a complement of parasites, predators and diseases that are part of that pest's co-evolved natural checks and balances. When a plant or insect is freed from these checks and allowed to move to new areas without its natural enemies, the new arrival enjoys a competitive advantage over already existing plant and insect species. This advantage often allows the new comer to increase its population levels. The biological control workers seek to reduce this advantage by travelling to the pest's place of origin, collecting its former parasites and predators and then introducing them into the pest's new home. Recently various species of trichograma have been identified for control of certain sugarcane pests and some other crops.

181. The identification of species of trichograma and other parasites/predators for controlling sugarcane pest is a laudable achievement of research. For exploiting the real gains from this developmental finding artificial rearing of parasites/predators of sugarcane pests at commercial scale and their adoption by the growers are needed. The public sector institutions do not have sufficient resources for this task. Therefore, sugar

mills, who will be the main beneficiaries of increased production of better quality sugarcane should play their due role in this direction. Some sugar mills have already established their system of rearing predators and distributing to the growers at nominal prices. It has been reported that in the areas of those sugar mills which distributed the cards containing eggs of artificially reared parasites/predators pest attack has been reduced. This practice should be adopted by other sugar mills also. The government should encourage the PSMA to propagate the adoption of the technique as well as ensure establishment of progrmme of artificial rearing of predators by sugar mills individually or jointly in different regions for their distribution amongst sugarcane growers of the area.

12.1.6 Bio fertilizer for sugarcane

182. Increasing cost of chemical fertilizers and their toxic effects on human health have led to identification/search of alternative sources of plant nutrients especially for nitrogen. Bio fertilizers embodying a process of fixing atmospheric nitrogen are the rich source of nitrogen. Nitrogen gas (N_2) makes up 79 per cent of the earth's atmosphere. But before plant can use this molecular nitrogen for the synthesis of aminoacids and proteins, it must be converted to combined or fixed nitrogen compounds. Plants do not have this ability. Making atmospheric nitrogen available to food chain is restricted to certain prokaryotes (cellular organisms without a distinct nucleus), such as bacteria and cyanobacetria (blue green algae) which contain enzyme called nitgrogenase. This nitrogenase catalyzes the reduction of gaseous nitrogen (N_2) to ammonia (NH_3). Some bacteria fix nitrogen in free living state and others only when living in a symbiotic relationship with a plant.

183. Legumes such as soyabeans, peas, and alfalfa are well known plants which enter into nitrogen fixing symbioses when root are infected by specific bacteria called rhizobia. Some plants that are non legumes also enter into nitrogen fixing relationship and contribute significant quantities of fixed nitrogen to their environments. One example is a small water fern Azolla which is used as a source of nitrogen in the cultivation of rice. For sugarcane crop specific nitrogen fixing bacteria Acetobacter diazototropicus has

been identified by Dr. Johanna Dobriener, a microbiologist from Brazil. This bacteria when applied to sugarcane fixes about 150 kgs of nitrogen per hectare as empirically proved at Tamil Nadu, India.

184. Keeping in view the importance of Acetobacter diazototropicus, as nitrogen fixing bacteria, the APCom has earlier suggested that PARC and provincial soil bacteriologists should undertake the isolation of this strain of bacteria to develop and supply inoculum to sugarcane research institutes for testing its efficiency as nitrogen fixing in sugarcane cultivation. In the absence of any development in this regard, it is suggested that both Federal and provincial research institutes should join hands for achieving the objective.

12.1.7. Sugarcane Development by Improving Agronomic Practices

185. Sugarcane is a high water delta crop and its cultivation involves intensive resource use. Therefore, horizontal expansion in the cane cultivation is not feasible because of the scarcity of water. However, the industry which has expanded during the recent years needs adequate supply of raw material from domestic production as the same cannot be imported. More than 50 million tonnes of cane is required for the industry to run the existing sugar mills for 150 to 160 days. Adding to it cane required for gur making and allowance for seed and chewing, total requirement may exceed 70 million tonnes. Against this country produced 46.33 million tonnes in 1999-00 and the production estimates for 2000-01 crop are 42.53 million tonnes implying that supplies are short by about 40 per cent.

186. The implications of inadequate cane production are the high prices of sugar and cut throat competition among the sugar mills resulting into huge expenditures made by these mills on the purchase of cane from distant areas at higher cost both in the form of price and transport charges. Until there is a breakthrough in the production, the situation may not improve. Therefore, the only feasible solution to the problems faced by the sugar industry in the supply of raw material is the productivity improvement perceived through

initiating the cane development progrmmes both in private as well as in public sectors. The amount spent on transport subsidy in procuring cane from distant areas if directed towards development of cane in the area can greatly help to ease the supply of cane without any additional burden to sugar consumers.

187. The productivity can be increased by increasing the use levels of various inputs/sources of growth and improving the efficiencies of their use. These inputs/sources mainly include; timely sowing of crop by using quality seed of improved varieties at recommended rates, timely irrigation, balanced use of chemical fertilizers and adoption of improved cultural practices. It has been observed during various field visits that the use level of various inputs and cultural practices are much below their recommended levels. There is a general agreement that each of the above factors if applied properly can enhance the productivity by atleast ten per cent per annum. In addition to this if proper attention is given to weed control and plant protection each can increase the productivity of sugarcane on average by 5 per cent. Keeping the acreage constant and applying all these improved factors at least on 20 per cent of the cane average in a year may help to increase the average yield by 10 per cent a year. Thus raising the national yield from the present level of 45.9 tonnes per hectare to 73.9 tonnes per hectare in 5 years. This would enable the country to meet its cane requirement in the next 5 years. Both the sugar industry and provincial agriculture extension departments should accept the challenge of developing sugarcane crop by encouraging the adoption of recommended technoogy as there is no alternative to save the industry from collapse. The sugar mills should strengthen their development staff and organize development programmes either individually or collectively by area/region or on province level.

12.2 IMPROVING MARKETING

188. Sugarcane, is one of the main cash crops of Pakistan. But during the last few years farmers had faced many marketing problems in its disposal. As a result of which farmers started switching to other competing crops. In order to improve sugarcane marketing APCom had recommended a number of non-price measures in its previous

years support price policy reports, but due to one or the other reason, these measures have not been implemented properly. Therefore, these measures have been reviewed and reiterated below for implementation during the 2001-2002 crop.

12.2.1 Use of Sugarcane Cess Fund

189. The sugarcane cess is deducted by the sugar mills from the sale proceeds of growers, and an equal amount is deposited by the concerned sugar mills in the fund, maintained by the Provincial Governments. The sugarcane cess rates differ from province to province. The Punjab government had reduced the cess rate to paisas 80 per 40 kgs of cane, which is still about 50 per cent higher than the rates applicable in NWFP and Sindh. This fund is to be utilized for the development of roads and other such infrastructure in the respective mill area and also for the agriculture research purposes. The ECC of the Cabinet in its meeting held on 14-7-2000 while deciding about the support prices, also directed that the provincial governments should earmark 15% of sugarcane cess fund for research and development of sugarcane crop.

190. In order to improve the utilization of cess fund and to further refine its functioning, the following recommendations of APCom need to be implemented properly.

1. In order to remove discrimination among provinces, uniform policy for levy of sugarcane cess in all the provinces be adopted.

2. The procedure should be notified for the utilization and release of cess fund alongwith availability and allocation to different areas, disciplines and the agencies responsible for scrutinizing, processing and according approval of the schemes/projects to be financed from cess fund collections.

12.2.2 Support Price for Sugar

191. As sugarcane is the raw material for sugar, so any increase in sugarcane price ultimately leads to increase in the price of sugar. In some years, when the sugar price did

not increase in line with sugarcane prices, the sugar mills (support price implementing agencies) faced difficulties in implementing the support price programmes. Consequently the growers had been facing the problems in the form of uneconomic prices of sugarcane received by them. Moreover, the payments of sale proceeds remained held up for a much longer time. Farmers had raised their voice at various fora to correct the situation. The Pakistan Sugar Mills Association is of the view that they are unable to improve the affairs until a support price of sugar is also fixed in line with the price of raw material and other related costs involved. In this respect, APCom in its support price policy for sugarcane 2000-2001 crop recommended that the minimum ex-mill price of sugar should also be fixed keeping in view the cost of cane, processing cost of sugar, recoveries of by-products and equity of the sugar mills. This price was proposed to be worked out by the Ministry of Industries. This proposal of working out the minimum ex-mill price of sugar by Ministry of Industries was approved by ECC in its meeting held on 14-07-2000. This decision, however has not been implemented. Its implementation during 2001-2002 crop season is suggested.

12.2.3 Amendment in Sugar Factories Control Act, 1950

192. For implementing support prices of crops, other than sugarcane, implementing agencies are appointed for under-taking procurement operations when the market prices fall below the support prices. In case of sugarcane the implementing agencies are the sugar mills as provided in the Sugar Factories Control Act, 1950. But this Act has become obsolete in the wake of changes occurred in the sugar industry after de-zoning. Amendments in this Act are needed to provide for the promotion of contract system between growers and mill-owners, removal of provision regarding prohibition of 'Gur' making, removal of provisions relating to zoning, enhancement of penalties, etc. Thus, it is recommended that amendments in the Sugar Factories Control Act, 1950 may be expedited, which is already taken up by MINFAL.

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ANNEX-I

AREA,YIELD AND PRODUCTION OF SUGARCANE: 1990-1991 TO 2000-2001

YEARS	PUNJAB	SINDH	NWFP	BALOCH.	PAKISTAN
AREA			*000 HECTARES*		
1990-91	525.6	253.1	104.6	0.5	883.8
1991-92	536.2	255.3	104.0	0.6	896.1
1992-93	536.1	248.0	99.9	0.6	884.6
1993-94	596.2	265.8	100.3	0.5	962.8
1994-95	656.7	249.7	102.1	0.5	1009.0
1995-96	605.6	254.4	102.5	0.6	963.1
1996-97	604.2	251.2	108.4	0.7	964.5
1997-98	685.3	261.6	108.6	0.7	1056.2
1998-99	780.3	270.8	103.3	0.7	1155.1
1999-2000	672.1	230.6	106.3	0.8	1009.8
2000-2001	580.9	238.8	105.8	0.7	926.2
YIELD			*TONNES PER HECTARE*		
1990-91	37.4	46.7	43.2	47.2	40.7
1991-92	37.3	55.8	43.9	47.8	43.4
1992-93	37.4	54.7	44.3	48.2	43.0
1993-94	41.1	58.0	44.6	50.2	46.1
1994-95	43.0	57.3	44.7	55.8	46.7
1995-96	44.4	54.0	44.7	49.2	47.0
1996-97	39.7	52.2	44.7	51.4	43.5
1997-98	46.9	61.2	45.6	53.6	50.3
1998-99	42.8	63.0	45.7	54.4	47.8
1999-2000	40.3	62.0	46.3	54.3	45.9
2000-2001	43.3	52.2	46.3	51.9	45.9
PRODUCTION			*000 TONNES*		
1990-91	19633.4	11815.6	4516.1	23.6	35988.7
1991-92	20026.8	14240.5	4568.9	28.7	38864.9
1992-93	20044.8	13556.8	4428.4	28.9	38058.9
1993-94	24510.8	15421.0	4470.1	25.1	44427.0
1994-95	28268.0	14310.3	4562.2	27.9	47168.4
1995-96	26880.0	13737.2	4583.0	29.5	45229.7
1996-97	24010.2	13110.6	4841.6	36.0	41998.4
1997-98	32110.6	15999.6	4956.5	37.5	53104.2
1998-99	33382.8	17050.7	4719.5	38.1	55191.1
1999-2000	27081.3	14290.8	4917.1	43.4	46332.6
2000-2001	25133.0	12466.2	4897.2	36.3	42532.7

Sources:
1. From 1990-91 to 1998-99: Agricultural Statistics of Pakistan 1998-99, MINFAL,Islamabad.
2. For 1999-2000: Final estimates provided by MINFAL, Islamabad.
3. For 2000-2001: Second estimates provided by respective Provincial Agriculture Departments.

ANNEX-II

DISTRICT-WISE AREA AND PRODUCTION OF SUGARCANE: AVERAGE OF 1997-98 TO 1999-00

Area = 000 hectares
Production = 000 tonnes

S.No.	Districts	Area	Percent	Production	Percent	S.No.	Districts	Area	Percent	Production	Percent
	PUNJAB						**NWFP**				
1	Faisalabad	116.37	10.84	5580.30	10.83	1	Charsada	33.03	3.08	1752.50	3.40
2	Jhang	84.67	7.89	3444.57	6.68	2	Mardan	28.63	2.67	1215.00	2.36
3	Sargodha	75.43	7.03	3145.07	6.10	3	Peshawar	13.03	1.21	666.60	1.29
4	Kasur	53.53	4.99	2478.00	4.81	4	D.I.Khan	8.43	0.79	325.90	0.63
5	T.T.Singh	43.40	4.04	2150.37	4.17	5	Nowshera	5.87	0.55	283.90	0.55
6	Okara	31.03	2.89	1560.30	3.03	6	Malakand	4.90	0.46	190.67	0.37
7	Bahawalnagar	34.40	3.20	1414.77	2.74	7	Swabi	4.33	0.40	179.17	0.35
8	R.Y.Khan	33.10	3.08	1337.17	2.59	8	Bannu	2.73	0.25	111.37	0.22
9	M.B.Din	34.00	3.17	1304.73	2.53	9	Mohmand Agenc	2.23	0.21	60.07	0.12
10	Bhakkar	24.37	2.27	1006.87	1.95	10	Lakki	0.43	0.04	16.70	0.03
11	Sheikhupura	25.50	2.37	973.93	1.89	11	Khyber Agency	0.60	0.06	15.53	0.03
12	Sahiwal	17.57	1.64	766.73	1.49	12	Tank	0.53	0.05	12.77	0.02
13	Vehari	15.83	1.47	743.03	1.44	13	Kohat	0.30	0.03	9.63	0.02
14	Layyah	18.57	1.73	718.73	1.39	14	Bunner	0.37	0.03	9.03	0.02
15	Pakpatan	15.33	1.43	643.83	1.25	15	Haripur	0.10	0.01	3.20	0.01
16	M.Garh	16.30	1.52	578.73	1.12	16	Dir	0.10	0.01	2.63	0.01
17	Bahawalpur	10.80	1.01	496.13	0.96	17	F.R. Bannu	0.10	0.01	2.50	0.00
18	Khushab	9.10	0.85	362.80	0.70	18	Bajour "	0.10	0.01	2.23	0.00
19	Khanewal	9.03	0.84	362.50	0.70	19	N/Waziristan	0.03	0.00	1.80	0.00
20	Hafizabad	8.80	0.82	347.67	0.67	20	F.R.D.I.Khan	0.10	0.01	1.73	0.00
21	Mianwali	5.37	0.50	221.93	0.43	21	F.R.Peshawar	0.03	0.00	0.63	0.00
22	Narowal	5.53	0.52	211.23	0.41	22	F.R.Kohat	0.03	0.00	0.50	0.00
23	Multan	4.23	0.39	187.10	0.36	23	Manshera	0.03	0.00	0.17	0.00
24	Gujrat	4.53	0.42	176.07	0.35	24	Shanglapar	0.00	0.00	0.13	0.00
25	Gujranwala	4.47	0.42	176.27	0.34						
26	Sialkot	2.63	0.25	121.57	0.24						
27	D.G.Khan	2.03	0.19	89.90	0.17						
28	Rajanpur	2.13	0.20	83.47	0.16						
29	Lodhran	2.07	0.19	79.30	0.15						
30	Lahore	1.97	0.18	78.10	0.15						
31	Jhelum	0.30	0.03	10.23	0.02						
32	Attock	0.17	0.02	5.83	0.01						
	Sub-total	712.57	66.37	30858.23	59.87		*Sub-total*	106.07	9.88	4864.37	9.44
	SINDH						**Balochistan**				
1	Hyderabad	64.90	6.04	4296.03	8.33	1	Lasbela	0.30	0.03	17.00	0.03
2	Badin	51.17	4.77	3255.60	6.32	2	Sibi	0.27	0.02	12.07	0.02
3	Thatta	26.40	2.46	1575.93	3.06	3	Nasirabad	0.13	0.01	7.70	0.01
4	N.Feroze	23.07	2.15	1444.00	2.80	4	Jafarabad	0.03	0.00	1.97	0.00
5	Nawab shah	21.73	2.02	1388.00	2.69	5	Bolan	0.00	0.00	0.93	0.00
6	Mirpurkhas	15.33	1.43	892.60	1.73						
7	Sanghar	11.03	1.03	710.07	1.38						
8	Khairpur	11.90	1.11	695.00	1.35						
9	Umer Kot	10.57	0.98	588.87	1.14						
10	Ghotki	7.17	0.67	373.97	0.73						
11	Dadu	5.30	0.49	261.70	0.51						
12	Sukkur	4.33	0.40	240.47	0.47						
13	Larkana	1.07	0.10	47.37	0.09						
14	Shikarpur	0.27	0.02	9.33	0.02						
15	Jacobabad	0.10	0.01	1.43	0.00						
	Sub-total	254.33	23.69	15780.37	30.62		*Sub-total*	0.73	0.07	39.67	0.08
							Total (PAKISTAN)	1073.70	100.00	51542.63	100.00

Note:

1. Data have been arranged in descending order of production.
2. Percentage share calculated on the basis of country total.
3. Districts in which sugarcane is not grown or for which the data are not available, are excluded.

Source:

Ministry of Food, Agriculture and Livestock, Islamabad.

ANNEX-III

LOCATION OF SUGARMILLS, CRUSHING CAPACITY AND DATE OF COMMENCEMENT OF OPERATION IN 2000-2001, BY PROVINCE.

S.No	SUGARMILLS	LOCATION AND DISTRICT	YEAR OF INSTAL-LATION	CRUSHING CAPACITY (Tonnes/Day)	DATE OF START 2000-01
	PUNJAB				
1	Layyah	Layyah Sugarmills, Layyah	1963	3000	20-11-2000
2	Kohinoor	Jauharabad, Khushab	1955	2700	23-11-2000
3	Crescent	New Lahore Road, Nishatabad, Faisalabad	1960-61	1500	14-11-2000
4	Hamza	Jetha Bhutta, 43 Khanpur, Rahim Yar Khan	1963-64	3000	15-11-2000
5	Fecto	Darya Khan Bhakkar	1966-67	5000	24-11-2000
6	Noon	Bhalwal, District, Sargodha	1966	2500	15-11-2000
7	Adam	Chak No.4/ Ford, Tehsil, Chishtian, B/nagar	1967-68	3500	01-11-2000
8	Shahtaj	Mandi Bahauddin	1968	8000	22-11-2000
9	Hussain	Lahore Road, Jaranwala, Faisalabad	1968	4500	12-11-2000
10	United	Bakhshabad, Sadiqabad, R.Y. Khan.	1971	3000	Not operating
11	Fauji	Sangla Hill, Sheikhupura	1972	3800	11-11-2000
12	Shakarganj	Toba Tek Singh Road, Jhang	1974	8000	30-10-2000
13	G.Samundri	Chak 226, Tehsil Samundri, GoJra Samundri Road, Faisalabad.	1977-78	2500	15-11-2000
14	Pasrur	Pasrur, Sialkot	1977-78	1500	Not operating
15	Pattoki	Pattoki, Kasur	1978-79	3000	15-11-2000
16	Kamalia	Kamalia, Toba Tek Singh	1980	4000	16-11-2000
17	Baba Farid	Gojra-Faisalabad Road, Okara	1980	3000	20-11-2000
18	Ittefaq	P.O. Box No.125, Sahiwal	1982-83	4000	15-11-2000
19	Ashraf	P/O Ashrafabad, Bahawalpur	1982	4000	16-11-2000
20	Punjab	Chak 84/15-L,Mian Channu,P.O.Box 66,Khanewal	1986	3000	16-11-2000
21	Phalia	Karmanwala, Mano Chok, Phalia, Gujrat	1988	5000	20-11-2000
22	Brothers	2-KM Chunian, Kasur	1989	6500	17-11-2000
23	Chishtia	Silanwali, Distt, Sargodha	1989-90	2000	15-11-2000
24	Ramzan	Chiniot, Jhang	1991-92	8000	18-11-2000
25	Tandlianwala	Chak No. 542/G-B Kangwani, Samundri, Faisalabad.	1992	6000	03-11-2000
26	Hasib Waqas	Mirajabad, Nankana Sahib, Sheikhupura	1992	6000	19-11-2000
27	Chaudhry	14-KM Pensara Road, Gojra, T.T.Singh	1992	6000	15-11-2000
28	National	Village Jan Muhammad Wala Near Talib Wala Pattan Bhalwal,Sargodha	1992	5000	15-11-2000
29	Pharianwali	Lalian, Jhang	1992	4000	15-11-2000
30	Indus	Kot Bahadur, Rajanpur	1992	4000	15-11-2000
31	Fatima	G.T. Road Near Railway Crossing Sinwan, Tehsil Kot Abdu, Muzaffargarh	1992	4000	20-11-2000
32	Chanar	Chak 407 GB, Tandlianwala, Samundri, Distt: Faisalabad.	1992	4000	03-11-2000
33	Shekhoo	Anwarabad Patti NAICH,Near Sanwan, Kotaddu, Muzaffargargh.	1993	6000	10-11-2000
34	JDW	Mauza Sharin, Jamal Din Wali, Rahim Yar Khan	1993	4000	28-10-2000
35	Qand garh	Chak No. 66 RB, Shah Kot Chak Jumra Road, P.O. Box 922, Faisalabad	1994	4000	Not operating
36	Yousaf	Mirajabad, Shahpur, Distt, Sargodha	1995	6500	21-11-2000
37	Abdullah	17 KM Chunia, Hujra Road, Depalpur, Okara	1996	6500	20-11-2000
38	Kashmir	6 KM Shore Kot City to Cantt.	1997	6000	15-11-2000
39	Mian Muhammad	Azad Kashmir.	1998	2000	Not Commis-sionned
		Total crushing capacity in the Punjab		169000	

Sindh

1	Fauji	Tando Muhammad Khan, Hyderabad	1960	4000	03-11-2000
2	Habib	P.O.Box No. 25, Nawabshah	1962	7500	04-11-2000
3	Mirpurkhas	Umar Kot Road, P.O.Sugarmills, Mirpurkhas	1964	4000	03-11-2000
4	Mehran	Tando Adam Road, Tando Allah Yar, Hyderabad	1965	7000	02-11-2000
5	Sawany	Ahmadnagar P.O.Talhar, Tand Bago Road, Badin	1965	6000	17-11-2000
6	Al-Noor	Noorpur Jahania, Moro Nawabshah	1970-71	8000	01-11-2000
7	Fauji (Khoski)	Khoski, Badin	1971	4500	05-10-2000
8	Larkana	Naudero, Larkana	1974-75	1500	Not Ooerating
9	Consolidated	Kot Diji, Ranipur, Khairpur	1976-77	3000	03-11-2000
10	Dadu	P.O. Piarogoth, Dadu	1977-78	2800	Not Ooerating
11	Thatta	Deh Bijora, Thatta - Sujawal Road, Thatta	1979	2800	Not Ooerating
12	Shahmurad	Jhok Sharif, Mirpur Bathoro, Thatta	1980-81	8000	03-11-2000
13	Faran	Tando Ibrahim, Sheikh Bhirkio, Hyderabad	1983	7500	03-11-2000
14	Army Welfare	Badin, Badin	1983	4000	03-11-2000
15	Pangrio	Deh Rajouri-2, Tando Bago, Badin	1984-85	3500	03-11-2000
16	Sindh Abadgar's	Deenpur, Tando Muhammad Khan, Hyderabad	1985	4500	03-11-2000
17	Dewan	Jianiabad, Budho Talpur, Sujawal, Thatta	1987	9000	01-11-2000
18	Al-Asif	Asifabad, Village Jararkot, P.O. Gharo, Taluka Ghorabari, Thatta.	1987	4000	01-11-2000
19	Sanghar	13 Km, Sindhri-Sanghar Road P.O.Box No.2, Sanghar	1988	4500	31-10-2000
20	Matiari	Nasarpur Road, Deh Pannu, Matiari, Hyderabad	1989-90	4000	27-10-2000
21	Sakrand	Deh Tharo Unar, Qazi Ahmed, Sakrand, Nawabshah	1990	6000	10-11-2000
22	Ansari	Deh Jagsiyani,Tando Mohd Khan, Hyderabad	1991	6500	07-11-2000
23	Kiran	Noman Goth, Dubar Road, Taluka Rohri Sukkur	1992-93	8000	Not Ooerating
24	Khairpur	Naroo Dhoro Taluka, Kot Digi District Khairpur	1992-93	4000	03-11-2000
25	Al-Abbas	Mirwah Gorchani, Mirpurkhas	1992-93	4000	03-11-2000
26	Mirza	Deh Charo, Tapo Lowori Sharif, Kudhan Badin	1992-93	4000	08-11-2000
27	Larr	Deh Kinjhir Takyja Sujawa , Thatta	1995	4000	03-11-2000
28	Seri	Seri Deh Noral Jagir.		6000	03-11-2000
29	Tharparkar	Tharparkar		4000	Not Ooerating
30	Digri	Digri		4000	03-11-2000
31	Bachani	Tando Allahyar, Distt. Hyderabad.		4000	Not Commissionned
32	Thar	Tharparkar			Not Commissionned
		Total crushing capacity in Sindh		154600	

NWFP

1	Frontier	Takht-i-Bhai, Mardan	1938	3500	16-11-2000
2	Premier	Mardan, Mardan	1949-50	1500	14-11-2000
3	Saleem(Chashma)	Charsada, Charsada	1956-57	4700	
4	Bannu	Serai-Naurang, Bannu	1965	1500	N.A
5	Khazana	P.O. Box No.88, Charsada Road, Peshawar	1976	5300	
6	Chasma	University Road, Dera Ismail Khan	1991	3000	
		Total crushing capacity in the NWFP		19700	
		Total crushing capacity in Pakistan		343300	

Notes: 1. C stands for cane crushing capacity.
2. B Stands for beet crushing capacity

Source: PSMA, Islamabad.

ANNEX-IV

AVERAGE FARMERS' COST OF PRODUCTION OF SUGARCANE IN THE PUNJAB: 2000-01 AND 2001-02 CROPS

Sr. No.	Operations / Inputs	Average No. of oprs/ units/ acre	2000 - 01 crop Cost per unit	2000 - 01 crop Cost per acre	2001 - 02 crop Cost per unit	2001 - 02 crop Cost per acre	Increase in 2001-02 over 2000-01
1	2	3	4	5=3*4	6	7=3*6	8=7-5
				---------Rupees---------			
1.	Land preparation:						
	1.1 Deep ploughing	0.314	325.00	102.05	380.00	119.32	17.27
	1.2 Rotavator	0.209	360.00	75.24	420.00	87.78	12.54
	1.3 Ploughing	7.470	120.00	896.40	140.00	1045.80	149.40
	1.4 Planking	3.744	60.00	224.64	70.00	262.08	37.44
	1.5 Levelling	0.306	160.00	48.96	185.00	56.61	7.65
2.	Seed bed preparation/Sowing oprs:						
	2.1 Ploughing/Furrow making	1.151	120.00	87.02	140.00	101.52	14.50
	2.2 Planking	0.467	60.00	17.65	70.00	20.59	2.94
	2.3 Trench making (m.days)	0.266	90.00	15.08	90.00	15.08	0.00
	2.4 Bund making (m.days)	0.452	90.00	25.63	90.00	25.63	0.00
3.	Seed and Sowing:						
	3.1 40 kg units	0.598	40.00	15.07	50.00	18.84	3.77
	3.2 Marlas	10.175	200.00	1282.05	250.00	1602.56	320.51
	3.3 Harvesting & stripping (m.days)	1.951	90.00	110.62	90.00	110.62	0.00
	3.4 Transport	-	-	62.00	-	100.00	38.00
	3.5 Making of sets (m.days)	2.697	90.00	152.92	90.00	152.92	0.00
	3.6 Sowing of sets (m.days)	3.089	90.00	175.15	90.00	175.15	0.00
	3.7 Contract sowing	0.168	-	110.00	-	110.00	0.00
4.	Interculture and Earthing up:						
	4.1 Manual/binding of plants	0.995	353.00	351.24	353.00	351.24	0.00
	4.2 Bullock/tractor	1.719	120.00	206.28	140.00	240.66	34.38
5.	Plant Protection:						
	5.1 Weedicides	0.124	215.00	26.66	215.00	26.66	0.00
	5.2 Pesticides/insecticides	0.306	193.00	59.06	193.00	59.06	0.00
6.	Irrigation:						
	6.1 Canal	7.590	-	161.05	-	177.16	16.11
	6.2 Scarp tubewell	0.697	-	10.37	-	16.00	5.63
	6.3 Private tubewell	2.837	152.00	431.22	228.00	646.84	215.61
	6.4 Mixed	3.160	36.00	113.76	54.00	170.64	56.88
7.	Labour for irrigation and water course cleaning (m.days)	5.143	90.00	462.87	90.00	462.87	0.00
8.	Farm Yard Manure:						
	8.1 Material	-	-	400.00	-	455.00	55.00
	8.2 Transport & application	-	-	246.00	-	345.00	99.00
9.	Fertilizers: (bags)						
	9.1 DAP	1.170	650.00	760.50	720.00	842.40	81.90
	9.2 Urea	1.604	340.00	545.36	400.00	641.60	96.24
	9.3 Nitrophos	0.259	460.00	119.14	475.00	123.03	3.89
	9.4 SSP	0.087	250.00	21.75	260.00	22.62	0.87
	9.5 CAN	0.004	230.00	0.92	260.00	1.04	0.12
	9.6 AS	0.006	280.00	1.68	303.00	1.82	0.14
	9.7 SOP	0.205	540.00	110.70	686.00	140.63	29.93
	9.8 NPK	0.011	600.00	6.60	665.00	7.32	0.72
	9.9 Gypsum	0.038	35.00	1.33	40.00	1.52	0.19
10.	Fert. transport and application	3.384	17.00	57.53	20.00	67.68	10.15
11.	Mark up @ 14.0 % per annum for 12 months on item 1 to 10 minus 6(1&2)	-	-	1025.23	-	1205.70	180.47
12.	Land rent for 13 months	-	-	3000.00	4000.00	4333.33	1333.33
13.	Land revenue including local rate, chaukidara, etc.	-	-	5.00	-	-	-5.00
14.	Management charges for 13 months	-	-	400.00	-	423.00	23.00
15.	Harvesting & stripping (40 kg units)	515.520	3.75	1604.56	4.00	1711.53	106.97
16.	Expected escalation in cost of selected items	-	-	501.00	-	226.00	-275.00
17.	Total cost (items 1 to 16)	-	-	14030.28	-	16704.82	2674.55
18.	Yield (40 kg units)	-	-	515.52	-	515.52	0.00
19.	Cost per 40 kgs at farm level:						
	19.1 Including land rent	-	-	27.22	-	32.40	5.18
	19.2 excluding land rent	-	-	21.40	-	24.00	2.60
20.	Marketing expenses: (Rs/40 kgs)						
	20.1 Transport, etc.	-	-	3.53	-	4.50	0.97
	20.2 Development cess	-	-	0.40	-	0.40	0.00
21.	Cost per 40 kgs at millgate:						
	21.1 Including land rent	-	-	31.15	-	37.30	6.16
	21.2 excluding land rent	-	-	25.33	-	28.90	3.57

ANNEX-V

AVERAGE FARMERS' COST OF PRODUCTION OF SUGARCANE IN SINDH: 2000-01 AND 2001-02 CROPS

Sr. No.	Operations / inputs	Average No. of oprs/ units/ acre	2000 - 01 crop Cost per unit	2000 - 01 crop Cost per acre	2001 - 02 crop Cost per unit	2001 - 02 crop Cost per acre	Increase in 2001-02 over 2000-01
1	2	3	4	5=3*4	6	7=3*6	8=7-5
				---------Rupees---------			
1.	Land preparation :						
	1.1 Deep ploughing	0.445	330.00	146.85	370.00	164.65	17.80
	1.2 Ploughing	5.642	180.00	1015.56	200.00	1128.40	112.84
	1.3 Planking	1.132	90.00	101.88	100.00	113.20	11.32
	1.4 Levelling	0.981	180.00	176.58	200.00	196.20	19.62
2.	Seed bed preparation/Sowing oprs:						
	2.1 Ploughing/Furrow making	0.906	180.00	127.20	200.00	141.34	14.13
	2.2 Planking	0.186	90.00	13.06	100.00	14.51	1.45
	2.3 Trench making (m.days)	2.088	90.00	146.58	90.00	146.58	0.00
	2.4 Bund making (m.days)	0.421	90.00	29.55	90.00	29.55	0.00
3.	Seed and Sowing:						
	3.1 40 kg units	64.010	42.00	2098.97	55.00	2748.03	649.06
	3.2 Ghuntas	0.522	1024.00	416.93	1340.00	545.59	128.66
	3.3 Harvesting & stripping (m.days)	1.932	90.00	135.63	90.00	135.63	0.00
	3.4 Transportation	-	-	120.00	-	190.00	70.00
	3.5 Making of sets (m.days)	2.027	90.00	142.30	90.00	142.30	0.00
	3.6 Sowing of sets (m.days)	1.327	90.00	93.16	90.00	93.16	0.00
	3.7 Contract sowing	0.618	-	175.00	-	175.00	0.00
4.	Interculture and Earthing up:						
	4.1 Manual	1.771	340.00	602.14	340.00	602.14	0.00
	4.2 Bullock/tractor	0.941	185.00	174.09	200.00	188.20	14.12
5.	Plant Protection :						
	5.1 Pesticides/Insecticides	0.480	204.00	97.92	204.00	97.92	0.00
	5.2 Rondenticides	0.247	44.00	10.87	44.00	10.87	0.00
6.	Irrigation (canal)	19.149	-	181.87	-	181.87	0.00
7.	Labour for irrigation and water course cleaning (m.days)	4.857	90.00	437.13	90.00	437.13	0.00
8.	Farm Yard Manure:						
	8.1 Material		-	600.00	-	685.00	85.00
	8.2 Transport & application	-	-	236.00	-	330.00	94.00
9.	Fertilizers: (bags)						
	9.1 DAP	1.481	650.00	962.65	720.00	1066.32	103.67
	9.2 Urea	3.014	340.00	1024.76	400.00	1205.60	180.84
	9.3 Nitrophos	0.069	460.00	31.74	475.00	32.78	1.04
	9.4 SSP	0.004	250.00	1.00	260.00	1.04	0.04
	9.5 SOP	0.054	540.00	29.16	686.00	37.04	7.88
10.	Fert. transport and application	4.622	17.00	78.57	20.00	92.44	13.87
11.	Mark up @ 14.0 % per annum for 12 months on item 1 to 10 minus 6	-	-	1291.26	-	1504.80	213.55
12.	Land rent for 16 months	-	-	1900.00	2000.00	2666.67	766.67
13.	Land revenue including local rate, Pachotra, etc.	-	-	5.00	-	-	-5.00
14.	Management charges for 16 months	-	-	493.00	-	520.00	27.00
15.	Harvesting & stripping (40 kg units)	592.580	3.75	2022.18	4.00	2156.99	134.81
16.	Expected escalation in the cost of selected items	-	-	522.00	-	231.00	-291.00
17.	Total cost (items 1 to 16)	-	-	15638.57	-	18009.94	2371.36
18.	Yield (40 kg units)	-	-	$\boxed{592.58}$	-	$\boxed{592.58}$	0.00
19.	Cost per 40 kgs at farm level:						
	19.1 including land rent	-	-	26.39	-	30.39	4.00
	19.2 excluding land rent	-	-	23.18	-	25.89	2.71
20.	Marketing expenses: (Rs/40 kgs)						
	20.1 Transport, etc.	-	-	3.53	-	4.50	0.97
	20.2 Development cess	-	-	0.32	-	0.32	0.00
	20.3 Drainage cess	-	-	0.08	-	0.08	0.00
21.	Cost per 40 kgs at mill-gate:						
	21.1 Including land rent	-	-	30.32	-	35.29	4.97
	21.2 excluding land rent	-	-	27.11	-	30.79	3.68

ANNEX-VI

AVERAGE FARMERS' COST OF PRODUCTION OF SUGARCANE IN THE NWFP : 2000-01 AND 2001-02 CROPS

Sr. No.	Operations / Inputs	Average No. of oprs/ units/ acre	2000 - 01 crop		2001 - 02 crop		Increase in 2001-02 over 2000-01
			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 Rotavator	0.488	360.00	175.68	385.00	187.88	12.20
	1.2 Ploughing	2.953	150.00	442.95	160.00	472.48	29.53
	1.3 Planking	1.345	75.00	100.88	80.00	107.60	6.72
	1.4 Levelling	0.190	150.00	28.50	160.00	30.40	1.90
2.	Seed bed preparation/Sowing oprs:						
	2.1 Ploughing/Furrow making	0.962	150.00	101.01	160.00	107.74	6.73
	2.2 Bund making (m.days)	0.453	85.00	26.95	85.00	26.95	0.00
3.	Seed and Sowing:						
	3.1 40 kg units	76.401	44.00	2353.15	55.00	2941.44	588.29
	3.2 Harvesting & stripping (m.days)	0.530	85.00	31.54	85.00	31.54	0.00
	3.3 Transport	-	-	100.00	-	160.00	60.00
	3.4 Making of sets (m.days)	2.757	85.00	164.04	85.00	164.04	0.00
	3.5 Sowing of sets (m.days)	3.525	85.00	209.74	85.00	209.74	0.00
	3.6 Contract sowing	0.043	-	70.00	-	70.00	0.00
4.	Interculture and Earthing up :						
	4.1 Manual/binding of plants	1.654	390.00	645.06	390.00	645.06	0.00
	4.2 Bullock/tractor	1.653	135.00	223.16	160.00	264.48	41.33
5.	Plant Protection:						
	5.1 Rodenticides/Against boars	0.000	14.00	0.05	14.00	0.05	0.00
	5.2 Pesticides/insecticides	0.269	185.00	49.77	185.00	49.77	0.00
	5.3 Weedicides	0.018	296.00	5.33	296.00	5.33	0.00
6.	Irrigation:						
	6.1 Canal	11.594	-	399.20	-	399.20	0.00
	6.2 Scarp Tubewell	0.491	-	17.00	-	19.00	2.00
	6.3 Private tubewell	1.713	165.00	282.65	181.00	310.05	27.41
	6.4 Mixed	1.26	100.00	126.00	109.00	137.34	11.34
7.	Labour for irrigation and water course cleaning (m.days)	6.976	85.00	592.96	85.00	592.96	0.00
8.	Farm Yard Manure:						
	8.1 Material	-	-	630.00	-	720.00	90.00
	8.2 Transport & application	-	-	330.00	-	460.00	130.00
9.	Fertilizers: (bags)						
	9.1 DAP	0.552	650.00	358.80	720.00	397.44	38.64
	9.2 Urea	1.818	340.00	618.12	400.00	727.20	109.08
	9.3 Nitrophos	0.328	460.00	150.88	475.00	155.80	4.92
	9.4 SSP	0.162	250.00	40.50	260.00	42.12	1.62
	9.5 CAN	0.402	230.00	92.46	260.00	104.52	12.06
	9.6 AS	0.012	280.00	3.36	303.00	3.64	0.28
10.	Fert. transport and application	3.274	17.00	55.66	20.00	65.48	9.82
11.	Mark up @ 14.0 % per annum for 12 months on item 1 to 10 minus 6(1 and 2)	-	-	1121.28	-	1286.75	165.46
12.	Land rent for 15 months	-	-	3200.00	4000.00	5000.00	1800.00
13.	Land revenue including local rate, chaukidara, etc.	-	-	5.00	-	-	-5.00
14.	Management charges for 15 months	-	-	462.00	-	487.00	25.00
15.	Harvesting & stripping (40 kg units)	515.610	3.75	96.68	4.00	103.12	6.45
16.	Expected escalation in cost of selected items	-	-	357.00	-	164.00	-193.00
17.	Total cost (items 1 to 16)	-	-	13667.34	-	16650.11	2982.77
18.	Yield (40 kg units)	-	-	515.61	-	515.61	0.00
19.	Cost per 40 kgs at farm level:						
	19.1 including land rent	-	-	26.51	-	32.29	5.78
	19.2 excluding land rent	-	-	20.30	-	22.59	2.29
20.	Marketing expenses: (Rs/40 kgs)						
	20.1 Transport, etc.	-	-	2.70	-	3.70	1.00
	20.2 Development cess	-	-	0.27	-	0.27	0.00
21.	Cost per 40 kgs at millgate:						
	21.1 including land rent	-	-	29.48	-	36.26	6.78
	21.2 excluding land rent	-	-	23.27	-	26.56	3.29

Notes for Annexes-IV to VI.

1. The physical input-output parameters for estimating cost of production for sugarcane 2001-02 crop have been adopted from the Support Price Policy for Sugarcane , 2000-01 Crop (APCom Series No. 185).

2. Seed and related costs (items 2 and 3) for the fresh planted crop were estimated @ 63, 78, and 70 per cent for the Punjab, Sindh and NWFP respectively in view of the incidence of ratooning observed during the survey.

3. The prices of farm inputs, chemical fertilizers and custom hire rates of farm operations involved in the sugarcane cultivation have been updated in view of the prevailing market rates as collected through the mini field survey conducted during January, 2001 in the major sugarcane growing regions of the Punjab, Sindh and NWFP, discussions in the meeting of the Standing Committee on sugarcane, held on 13th January, 2001.

4. The canal water rates have been revised in view of the water rates received from the respective Provincial Governments,

5. The cost of supplementary irrigation has been revised in view of rises in the prices of diesel @ about 59 per cent from January, 2000 to January, 2001. The cost of electric tube-wells remained constant because the G. S. T. @ 15 per cent effective from January, 2000 is adjusted through reduction of additional surcharge to make the electric bill neutral. Based on the ratios of electric and diesel tube-wells i.e. 15:85 in the Punjab and 84:16 in the NWFP as reported in the Agricultural Statistics of Pakistan, 1998-99, the weighted average increase in energy charges has been estimated as 50 per cent in the Punjab and 10 per cent in the NWFP.

6. The rising trend in the prices of pesticides/weedicides has been arrested on account of the availability of new generic and low cost pesticides/weedicides as obtained from the Dy. Director, Plant protection Department, Karachi. Accordingly, the cost of pesticides/weedicides has been kept on last year level.

7. The transportation costs have been increased in light of rises in the prices of diesel.

8. The management charges for a manager looking after a 25-acre farm and devoting one-fourth of his time to the managerial activities have been worked at Rs 3250 per month in view of the latest salary package for a Field Assistant at the 10th stages in BPS-6, including allowances inter alia, 25 per cent increase in the budget 1999-00, ad-hoc relief of Rs. 100 per month announced in December, 1999 and interim relief of Rs 2000 once a year announced in the budget, 2000-01.

9. In view of the 1990-91 crop survey, about 17, 9 and 95 per cent of the acreage under sugarcane was harvested in lieu of sugarcane tops in the Punjab, Sindh and the NWFP, respectively. The expenditure on account of harvesting and stripping has been adjusted accordingly.

10. The likely escalation during 2001-02 crop year in the cost of operations like interculture, plant protection, supplementary irrigation, urea fertilizer, harvesting/stripping and marketing has been estimated as 4.4 per cent in the Punjab, 3.7 per cent in Sindh and 4.6 per cent in the NWFP on the basis of weighted average annual increase in their costs for the last 4 years.

11. Land rent is the major item of cost of production. It contributes about 15 to 30 per cent in the COP of sugarcane in the Punjab, Sindh and NWFP. There is no precise measure for updating the land rentals. However, keeping in view the observations obtained during the field survey and discussion made with knowledgeable growers in the meeting of APCom's Standing Committee, land rentals have been enhanced accordingly.

ANNEX-VII

ECONOMICS OF FERTILIZER USE ON SUGARCANE IN PAKISTAN AT THE 2000-2001 SUPPORT PRICE

S.No	Item	Cane Nutrient Ratio			
		50:1	70:1	90:1	110:1
		-----------Kgs-----------			
1.	Yield increase due to use of additional 10 nutrient kgs of fertilizers per acre	500.00	700.00	900.00	1100.00
		-----------Rupees-----------			
2.	Direct cost of 10 kgs of NPK fertilizer at the weighted average price of Rs.18.71 i.e. Rs. 14.78, 22.48 and 22.80 per nutrient kgs of N, P and K respectively in the ratio of 2:1:1	187.10	187.10	187.10	187.10
3.	Indirect cost due to the application of 10 nutrient kgs of fertilizer	124.62	161.27	197.92	234.57
	3.1 Transportation and application charges of 20 kgs of fertilizer @ Rs. 17.00 per 50 kgs bag of fertilizer	6.80	6.80	6.80	6.80
	3.2 Harvesting, stripping, transport, development cess etc on the additional produce @ Rs. 7.33 per 40 kgs	91.63	128.28	164.93	201.58
	3.3 Mark up on direct cost of fertilizer for 12 months @ 14.00 per cent per annum.	26.19	26.19	26.19	26.19
4.	Total additional cost (item 2+3)	311.72	348.37	385.02	421.67
5.	Value of additional produce @ Rs. 35.33 per 40 kgs.	441.62	618.27	794.92	971.57
6.	Benefit cost ratio (item 5 divided by item 4)	1.42	1.77	2.06	2.30

Notes:
1. The prices of N, P and K are the average of nutrient prices of Urea, DAP and SOP used in the COP estimates of the Punjab, Sindh and the NWFP for 2000-2001 crop.
2. The rates of indirect cost items are the average of the rates used in the COP estimates of the Punjab, Sindh and the NWFP for 2000-2001.
3. Additional produce has been valued at the average support prices fixed for 2000-2001 crop of the Punjab, Sindh and NWFP.
4. The value of tops has not been included in the analysis due to non availability of data.

ECONOMICS OF SUGARCANE AND COMPETING CROPS AT PRICES REALIZED BY GROWERS: 2000-01 CROPS

Province/crops/ crop combinations	Crop duration	Water used	Gross cost	Cost of purchased inputs	Gross revenue	Gross margin	Net Income	Output-Input ratio	Revenue per Rupee of Purchased inputs	Revenue per Crop day	Revenue per Acre inch of water used
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. Suagarcane	394	44	13547	4485	21001	16516	7454	1.55	4.68	53.30	477.30
2. Cotton	240	22	11300	4777	15182	10406	3882	1.34	3.18	63.26	690.10
3. Basmati paddy	180	58	8330	4605	6700	2096	-1630	0.80	1.46	37.22	115.52
4. IRRI paddy	180	62	7255	4017	5848	1831	-1407	0.81	1.46	32.49	94.32
5. Wheat	180	17	8456	3595	8057	4462	-399	0.95	2.24	44.76	473.95
6. Sunflower (spring)	144	22	6918	2158	7665	5507	747	1.11	3.55	53.23	348.41
7. Cotton + wheat	420	39	19756	8372	23239	14868	3483	1.18	2.78	55.33	595.88
8. Cotton + sunflower	384	44	18218	6935	22847	15927	4629	1.25	3.29	59.50	519.25
9. Basmati paddy + wheat	360	75	16786	8200	14757	6558	-2029	0.88	1.80	40.99	196.76
10. Basmati paddy + sunflower	324	80	15248	6763	14365	7617	-882	0.94	2.12	44.34	179.56
11. IRRI paddy + wheat	360	79	15711	7612	13905	6293	-1806	0.89	1.83	38.63	176.02
12. IRRI paddy + sunflower	324	84	14164	6175	13513	7338	-636	0.95	2.19	41.71	160.87
Sindh											
1. Suagarcane	488	58	15048	5740	26925	21185	11877	1.79	4.69	55.17	464.22
2. Cotton	240	18	9450	3921	13389	9468	3939	1.42	3.41	55.79	743.85
3. IRRI paddy	180	56	6365	2942	5908	2965	-458	0.93	2.01	32.82	105.49
4. Wheat	180	15	7118	2883	7392	4509	274	1.04	2.56	41.07	492.83
5. Sunflower (Spring)	144	22	6918	2158	7665	5507	747	1.11	3.55	53.23	348.41
6. Cotton+Wheat	420	33	16581	6804	20781	13977	4200	1.25	3.05	49.48	629.73
7. Cotton + Sunflower	384	40	16368	6079	21054	14975	4700	1.29	3.46	54.83	526.36
8. IRRI+Wheat	360	71	13607	5825	13300	7474	-308	0.98	2.28	36.94	187.32
9. IRRI+Sunflower	324	78	13283	5100	13573	8472	192	1.02	2.66	41.89	174.01

Notes for the Annex-VIII

1. The economic analysis presented in the above exercise is based on the input-output prices of the crops raised during 2000-01 season.

2. The data regarding input-output parameters have been adopted from the APCom's support price policies for sugarcane, seed cotton, rice paddy, wheat and Non-traditional oilseeds, 2000-01 crops. To incorporate the escalations in input prices which occurred during the growing period of 2000-01 crops, some marginal revisions have been made as under:

   2.1 The cost of supplementary irrigation for sugarcane and seed cotton has been revised in view of 11 per cent increase in diesel prices during March 2000 and for wheat by 12.96 per cent effected in September 2000. The cost of electric tubewells remained constant because the G.S.T @ 15 per cent effective from January 2000 is adjusted through reduction in additional surcharge to make the electric bill neutral. The ratio of diesel and electric tubewels in the Punjab is 85 and 15 per cent and in Sindh 28 and 72 per cent. Based on these ratios, the expenses on supplementary irrigation have been revised by applying the weighted average increase in diesel prices at 9.35 per cent in the Punjab and 3.08 per cent in Sindh for seed cotton and at 9.35 per cent in Punjab for sugarcane while at 11.02 per cent for the Punjab and 3.63 per cent for Sindh for wheat.

   2.2 The cost of fertilizers has been revised in view of their prices prevailed at the time of their application for the respective crops during 2000-01 season.

   2.3 The value of kind payments has been revised in view of prices applicable during the post-harvest for the respective crops.

   2.4 The marketing expenses have been revised as applicable during the post-harvest for the respective crops.

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 Government is the major buyer of wheat during the post-harvest season. Accordingly, the bulk of the transactions of wheat take place at the support price. As the support price of wheat for 2000-01 has been maintained at Rs 300 per 40 kgs, the same has been adopted for the current analysis.

   4.2 The rice paddy is primarily transacted by the private sector in the open market. The wholesale market prices of rice paddy during the post-harvest (Nov-Dec 2000) in the main producing area markets have averaged at Rs 283 per 40 kgs for Basmati-385 and Rs 176 for IRRI in the Punjab as reported by the Directorate of Agriculture (E&M), Lahore. The same for Sindh has been reported at Rs 162 per 40 kgs of IRRI paddy in the APCom's field survey.

   4.3 The wholesale market price of seed cotton during the post-harvest months of September to December, 2000 in the Multan market has averaged at Rs 907 per 40 kgs in the Punjab as reported by the Directorate of Agriculture (E&M) Lahore. The same for Sindh in major producing area markets has been reported at Rs 883 by the PCCC, Karachi during September to December 2000.

   4.4 The 2000-01 sunflower crop is yet to be harvested. The market prices of this crop are not regularly reported by any agency. However, the average price in the open market was reported by the PODB and APCom's Standing Committee at Rs 525 per 40 kgs for the last crop, which has been adopted.

   4.5 The market prices of sugarcane are not available from any agency. However, the mill-gate prices in the major cane producing areas of Punjab were reported around Rs 45 per 40 kgs in view of the APCom field survey and information media. In Sindh, the price of sugarcane was hovering around Rs 50 per 40 kgs.

5. The prices for various commodities have been adjusted for the marketing expenses to make them effective at the farm level. In case of sugarcane, these expenses amount to Rs 4.90 per 40 kgs. The market expenses have been taken at Rs 12 per 40 kgs for rice paddy and seed cotton and Rs 14 per 40 kgs for wheat and oilseed crops.

6. Gross income = (Yield per acre <u>multiplied by</u> price of principal produce at farm gate) <u>plus</u> (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 <u>minus</u> cost of purchased inputs
9.	Net income	=	Gross income <u>minus</u> gross cost.
10.	Output-input ratio	=	Gross income <u>divided by</u> gross cost
11.	Revenue per rupee of purchased inputs cost	=	Gross income <u>divided by</u> cost of purchased inputs
12.	Revenue per crop day	=	Gross income <u>divided by</u> crop duration in days
13.	Revenue per acre-inch of water used	=	Gross income <u>divided by</u> irrigation water used in acre inches.

ANNEX -I X

MILL- GATE PRICES OF SUGARCANE WORKED BACK ON THE AVERAGE WHOLESALE PRICE OF GUR DURING 2000-01 CRUSHING SEASON (OCTOBER - DECEMBER)

S.No	Item	Unit	N.W.F.P		Punjab
			With licence fee	Without licence fee	
1	Gur produced from 400 kgs of cane at 10 % recovery	Kgs	40.00	40.00	40.00
2	Sale price of gur	Rs/40 kgs	812.00	812.00	725.00
3	Marketing cost of gur including transport, commission, etc.	Rs/40 kgs	48.00	48.00	30.00
4	Net price of gur at farm level (item 2 minus item 3)	Rs/40 kgs	764.00	764.00	695.00
5	Processing cost including cane crushing and labour used for gur making	Rs/40 kgs	159.00	159.00	170.00
6	Cost of chemicals.	Rs/40 kgs	16.00	16.00	30.00
7	Licence fee on cane crusher @ Rs 27000 per season assuming 10000x 40 kgs average cane crushing capacity	Rs/40 kgs	27.00	----	---
8	Net value of 400 kgs of cane used in making 40 kgs gur (item 4 minus 5 minus 6)	Rs/40 kgs	562.00	589.00	495.00
9	Value of 40 kgs of sugarcane	Rs/40 kgs	56.20	58.90	49.50
10	Marketing cost of cane, i.e., transport and development cess	Rs/40 kgs	3.97	3.97	4.90
11	Mill - gate price of cane (item 8 plus item 9)	Rs/40 kgs	60.17	62.87	54.40

Sources:
1. Based on the information collected during Agricultural Prices Commission's field survey, January, 2001.
2. For licence fee on cane crusher: Cane Commissioner, MINFAL, Islamabad.
3. For gur prices: Directorate of Agriculture (E&M), Punjab, Lahore.

ANNEX - X

MILL-GATE PRICES OF SUGARCANE WORKED BACK ON THE BASIS OF AVERAGE WHOLESALE MARKET PRICE OF SUGAR DURING 2000-01 CRUSHING SEASON (NOVEMBER - DECEMBER)

S.No	Item	Rupees per tonne	
1	Average wholesale market price of sugar (a)	26000	
2	Wholesale dealer margin @ 5 % on ex-mill price	1083	
3	Sales tax @ 15 per cent on ex-mill price	3250	
4	Ex-mill price of sugar (item 1 minus 2 minus 3)	21667	
		Punjab & N.W.F.P	Sindh
5	Processing cost of sugar (b)	7367	7367
6	Value of cane to produce one tonne of sugar (item 4 minus 5)	14300	14300
7	Provincial recovery (Percent)	8.50	8.70
8	Tonnes of cane required to produce one tonne of sugar (100 divided by item 7)	11.76	11.49
9	Mill - gate price of sugarcane (Rupees per tonne) (item 6 divided by item 8)	1215.50	1244.10
10	Mill - gate price of sugarcane (Rs per 40 kgs)	48.62	49.76

Note:
a) Average price of Hyderabad and Faisalabad markets during current crushing seaso (November to December, 2000).

b) Ratio between costs of cane and its processing into sugar has been estimated at 66:34 from publication "Cost of Production of Sugar" jointly prepared in 1996 by Agricultural Prices Commission and Business & Consultancy Services.

Sources:
1. For wholesale price of sugar: ALMA, Karachi.

2. For sales tax: Central Board of Revenue (CBR), Islamabad

ANNEX - XI

PER CAPITA AVAILABILITY (CONSUMPTION) OF SUGAR: 1990-91 TO 1999-00 (October - September)

S.No.	Item	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00
		000 tonnes									
1	Opening stocks as on 1st October	263	201	218	224	309	265	104	245	513	697
2	Production	1932	2326	2394	2922	3001	2470	2393	3555	3542	2426
3	Imports	323	155	80	8	4	166	604	11	4	419
4	Exports	----	----	----	139	328	29	----	477	648	22
5	Closing stocks as on 30 September	201	218	224	309	265	104	245	513	697	507
6	Net availability (item 1+2+3-4-5)	2317	2464	2468	2706	2721	2768	2856	2821	2714	3013
		Million									
7	Population on first April (a)	116.87	118.39	121.06	124.04	127.00	130.04	132.96	136.19	139.07	142.34
		Kgs per annum									
8	Per capita availability (consumption)	19.83	20.81	20.39	21.82	21.43	21.29	21.48	20.71	19.52	21.17
9	Average per capita availability										
	i) Average					20.84					
	ii) Forecast for 2000-01					21.40					

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 Imports and Exports: Federal Bureau of Statistics, Karachi.
3. For Population of Pakistan: Economic Survey, 1999-00 & Planning Division, Islamabad.
4. For Population of AJ&K and Northern Areas: Population Census Organization, Islamabad.
5. For Population of Afghan refugees: Kasmir Affairs and Northern Areas and States and Frontier Regions Division, Government of Pakistan, Islamabad.

ANNEX-XII

RELATIONSHIP BETWEEN SUGAR AND SUGARCANE PRODUCTION DURING 1989-90 TO 1999-00 AND ESTIMATE OF SUGAR AND CANE PRODUCTION DURING 2000-01

Year	Cane production	Sugar production	Additional sugar production per 100 tonnes of additiona cane production
	Thousand tonnes		**Tonnes**
1989-90	35494	1860	7.76
1990-91	35989	1909	7.80
1991-92	34204	2297	7.65
1992-93	38059	2375	7.98
1993-94	44427	2920	8.49
1994-95	47168	2983	8.69
1995-96	45230	2450	8.55
1996-97	41998	2379	8.30
1997-98	53104	3549	9.12
1998-99	55191	3531	9.26
1999-00	46697	2415	8.66
2000-01 (Estimated)	42540	2496	7.90

1. Sugar production $= 0.000285\ (\text{cane production})^{1.3454}$

   or $= \text{antilog}\ 0.001478 + 1.3454\ (\text{cane production})$

2. Add. sugar production $= 001989\ (\text{add. cane production})^{0.3454}$

   or Add. sugar production = 0.001989 + 0.3454 (additional cane production)

3. Correlation between sugar production and sugarcane production = 0.86
4. Coefficient of determination = 0.74

Note: The coefficients in equations 1 and 2 have been estimated through Ordinary Least Square Method from the data given above on production of sugar and sugarcane.

ANNEX-XIII

MONTHLY AVERAGE WHOLESALE PRICES OF SUGAR IN MAJOR DOMESTIC MARKETS: 1999 AND 2000

Year/Month	Lahore	Faisalabad	Karachi	Hyderabad	Peshawar	Average
			Rupees per 100 kgs			
1999						
January	1868	1845	1743	1633	1825	1783
February	1818	1818	1793	1625	1813	1773
March	1803	1803	1718	1600	1763	1737
April	1873	1885	1805	1758	1873	1839
May	1925	1913	1910	1825	1873	1889
June	1935	1913	1910	1825	1968	1910
July	1930	1910	1910	1833	1953	1907
August	1958	1948	1878	1838	1975	1919
September	1960	1963	1935	1890	1988	1947
October	1985	1978	1973	1933	1993	1972
November	1915	1895	1945	1873	1915	1909
December	1803	1753	1673	1725	1768	1744
Average	**1898**	**1885**	**1849**	**1780**	**1892**	**1861**
2000						
January	1825	1825	1646	1728	1738	1752
February	1995	2008	1918	1905	1923	1950
March	2023	2053	1975	2003	2085	2028
April	2143	2133	2080	2083	2173	2122
May	2155	2170	2125	2093	2200	2149
June	2438	2425	2290	2285	2458	2379
July	2505	2493	2380	2350	2515	2449
August	2675	2638	2510	2490	2690	2601
September	2688	2645	2550	2520	2735	2628
October	2723	2695	2530	2615	2775	2668
November	2783	2768	2838	2743	2838	2794
December	2525	2555	2460	2403	2620	2513
Average	**2373**	**2367**	**2275**	**2268**	**2396**	**2336**

Source: **ALMA, Karachi.**

ANNEX-XIV

MONTHLY AVERAGE WHOLESALE PRICES OF SUGAR IN MAJOR DOMESTIC MARKETS: 1989-90 TO 2000-01
(October - September)

Year (October - September)	Lahore	Faisalabad	Karachi	Hyderabad	Peshawar	Average	Increase (+) decrease (-) in average price over previous year
	----------	----------	Rupees	per 100 kgs	----------	----------	**Percent**
1989-90	1073	1083	1035	1018	1088	1059	----
1990-91	1040	1043	1000	995	993	1014	-4.2
1991-92	1123	1125	1075	1078	1103	1101	8.5
1992-93	1198	1200	1143	1158	1200	1180	7.2
1993-94	1200	1185	1188	1173	1233	1196	1.4
1994-95	1355	1348	1333	1345	1368	1350	12.9
1995-96	1695	1705	1650	1625	1718	1679	24.4
1996-97	1988	2020	1975	1923	2110	2003	19.3
1997-98	1745	1713	1720	1643	1835	1731	-13.6
1998-99	1865	1861	1823	1726	1864	1828	5.6
1999-00	2179	2168	2089	2082	2183	2140	17.1
2000-01 *	2677	2673	2609	2587	2744	2658	24.2
			Average	**annual increase:**			**8.56**

Note: * Prices are upto December, 2000
Source: ALMA, Karachi.

ANNEX - XV

AVERAGE OF INTERNATIONAL DAILY PRICES OF SUGAR: 1988-89 TO 2000-2001 (OCTOBER - SEPTEMBER)

Month	Raw sugar ISA price fob & stowed Caribbean ports in bulk		White sugar fob and stowed London port		Difference Between white and raw sugar price	
Oct - Sept	Cents/ lb	$/ per tonne	Cents/ lb	$/ per tonne	Cents/ lb	$/ per tonne
1988-89	11.91	262.57	15.90	350.53	3.99	87.96
1989-90	13.65	300.93	18.24	402.12	4.59	101.19
1990-91	9.20	202.82	13.75	303.13	4.55	100.31
1991-92	9.16	201.94	12.68	279.54	3.52	77.60
1992-93	9.57	210.98	12.42	273.81	2.85	62.83
1993-94	11.24	247.80	14.63	322.53	3.39	74.73
1994-95	13.72	302.47	17.99	396.61	4.27	94.14
1995-96	12.25	270.06	17.41	383.82	5.16	113.76
1996-97	11.10	244.71	14.48	319.23	3.38	74.52
1997-98	9.89	218.03	12.33	271.83	2.44	53.80
1998-99	6.63	146.20	9.79	215.83	3.16	69.63
1999-2000	7.23	159.30	9.18	202.38	1.95	43.08
2000-2001	10.23	225.60	11.25	247.98	1.01	22.38
October	10.75	236.99	11.76	259.35	1.01	22.36
November	9.93	218.92	11.03	243.20	1.10	24.28
December	10.02	220.90	10.95	241.40	0.93	20.50

Source: **Internatioal Sugar Organization, London "Monthly Market Reports and Press Summaries"**

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

Item	1995-96 to 1999-00		2000-01 (Oct - Dec)	
	.... US $ per tonne			
1. Average fob (London) price	279.00		248.00	
2. Freight charges upto Karachi	30.00		30.00	
3. C & f cost at Karachi port	309.00		278.00	
	OR ... Rs per tonne (a)...			
	19158.00		17236.00	
4. Marine insurance (actual)	56.17		56.17	
5. Import value (items 3+4)	19214.17		17292.17	
6. L/C opening charges @ 0.5% of c&f cost	95.79		86.18	
7. Foreign Bank charges (actual)	1.00		1.00	
8. Mark up on retirement of documents by bank for 60 days @ 12% per annum of c&f cost	383.16		344.72	
9. Wharfage, handling and stevedoring charges	610.00		610.00	
10. Allowance for shortage and unforeseen expenses @ 1% of c&f cost	191.58		172.36	
11. Service charges of inspection @ 0.5% (cif) value	96.07		86.46	
12. Importer commission @ 1% of c&f cost	191.58		172.36	
13. Transport charges from Karachi to Lahore including loading/unloading	1350.00		1350.00	
14. Landed cost at Lahore (items 3 to 13)	22133.35		20115.25	
	Punjab & NWFP	Sindh	Punjab & NWFP	Sindh
15. Processing cost of sugar (b)	7525.34	7525.34	6839.19	6839.19
16. Value of cane to produce one tonne of sugar (item 14 minus item 15)	14608.01	14608.01	13276.07	13276.07
17. Provincial base recovery level (%)	8.50	8.70	8.50	8.70
18. Quantity of cane in tonnes required to produce one tonne of sugar (100 / item 17)	11.76	11.49	11.76	11.49
19. Price of one tonne of sugarcane (item 16 / item 18) (Rs per tonne)	1242.18	1271.37	1128.92	1155.45
20. Price of 40 kgs of cane (Rs per 40 Kgs)	49.69	50.85	45.16	46.22

Sources: i) For average c&f price: Federal Bureau of Statistics, Karachi.
ii) For incidentals and duties: Trading Corporation of Pakistan, Karachi.

Notes: (a) Exchange rate of one US $ = 62.00 Pak rupees.
(b) 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.

FINANCIAL IMPORT PARITY PRICES OF SUGARCANE AT MILL-GATE AS WORKED BACK ON THE BASIS OF AVERAGE FOB (LONDON) PRICE

Item	1995-96 to 1999-00		2000-01 (Oct - Dec)	
	.... US $ per tonne			
1. Average fob (London) price	279.00		248.00	
2. Freight charges upto Karachi	30.00		30.00	
3. C & f cost at Karachi port	309.00		278.00	
	OR ---------Rs per tonne----------			
	18231.00		16402.00	
4. Marine insurance (actual)	56.17		56.17	
5. Import value (items 3+4)	18287.17		16458.17	
6. Custom duty 15 % of import value	2743.08		2468.73	
7. Sales tax @ 15% of (Import value + Custom duty)	3154.54		2839.03	
8. Custom duty, Sales tax & Wharfage on empty bages	165.00		165.00	
9. Duty paid value (DPV)(items 5+6+7+8)	24349.78		21930.93	
10. Income tax @6% at import stage of DPV	1460.99		1315.86	
11. Income tax on empty bags(fixed)	40.00		40.00	
12. Income tax @3.5 at sale stage	1044.44		947.86	
13. L/C opening charges @ 0.5% of c&f cost	91.16		82.01	
14. Foreign Bank charges (actual)	1.00		1.00	
15. Mark up on retirement of documents by bank for 60 days @ 12% per annum of c&f cost	364.62		328.04	
16. Wharfage, handling and stevedoring charges	610.00		610.00	
17. Allowance for shortage and unforeseen expenses @ 1% of c&f cost	182.31		164.02	
18. Sindh Govt excise duty @ 0.3% of DPV	73.05		65.79	
19. Service charges of inspection @ 0.5% (cif) value	91.44		82.29	
20 Importer commission @ 1% of c&f cost	182.31		164.02	
21. Transport charges from Karachi to Lahore including loading/unloading	1350.00		1350.00	
22. Landed cost at Lahore (item 9+items 10 to 21)	29841.09		27081.82	
23. Sales tax @ 15% of landed cost at Lahore	4476.16		4062.27	
24. Cost of one tonne of imported sugar after deducting sale tax 15% of landed cost at Lahore	25364.92		23019.55	
	Punjab & NWFP	Sindh	Punjab & NWFP	Sindh
25. Processing cost of sugar (b)	8624.07	8624.07	7826.65	7826.65
26. Value of cane to produce one tonne of sugar (item 24 minus item 25)	16740.85	16740.85	15192.90	15192.90
27. Provincial base recovery level (%)	8.50	8.70	8.50	8.70
28. Quantity of cane in tonnes required to produce one tonne of sugar (100 / item 27)	11.76	11.49	11.76	11.49
29. Price of one tonne of sugarcane (item 26 / item 28) (Rs per tonne)	1423.54	1456.99	1291.91	1322.27
30. Price of 40 kgs of cane (Rs per 40 Kgs)	56.94	58.28	51.68	52.89

Sources: i) For average c&f price: Federal Bureau of Statistics, Karachi.
ii) For incidentals and duties: Trading Corporation of Pakistan, Karachi.

Notes: (a) Exchange rate of one US $ = 59.00 Pak rupees.
(b) 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 - XVIII

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

Item	1995-96 To 1999-200		2000-01 (Oct - Dec)	
	US $ per tonne			
1. Average fob (London) price of white sugar		279.00		248.00
	OR Rs. per tonne (a)			
2. Average fob Karachi price (assuming equivalent to fob London price)		17298.00		15376.00
3. Transport charges from Interior Sindh to port		750.00		750.00
4. Special packing		90.00		90.00
5. Inspection/ survey		40.00		40.00
6. Transit insurance		40.00		40.00
7. Loading and unloading		60.00		60.00
8. Clearing and forwarding charges		25.00		25.00
9. Wharfage, handling and stevedoring charges		180.00		180.00
10. Agents commission		44.00		44.00
11. Miscellaneous expenses		50.00		50.00
12. Ex- mill price of sugar (item 2 minus 3 to 11)		16019.00		14097.00
13. Sales tax @15% of ex-mill price		2402.85		2114.55
14. Price of one tonne sugar with out sale tax (item 12-item 13)		13616.15		11982.45
	Punjab & NWFP	Sindh	Punjab & NWFP	Sindh
15. Processing cost of sugar (b)	4629.49	4629.49	4074.03	4074.03
16. Value of cane to produce one tonne of sugar (item 14 minus item 15)	8986.66	8986.66	7908.42	7908.42
17. Provincial base recovery level (%)	8.50	8.70	8.50	8.70
18. Quantity of cane in tonnes required to produce one tonne of sugar (100 / item 27)	11.76	11.49	11.76	11.49
19. Price of one tonne of sugarcane (item 16 / item 18) (Rs per tonne)	763.87	782.13	672.48	688.29
20. Price of 40 kgs of cane (Rs per 40 Kgs)	30.55	31.29	26.90	27.53

Sources: (1) For average fob price: Market Report and Press Summary, ISO, London.
(2) For incidentials: PSMA, Sindh, Karachi.

Notes: (a) Buying exchange rate of one US $ = 62.00 Pak rupees.
(b) 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.

YIELD AND QUALITY PERFORMANCE OF SUGARCANE VARIETIES IN PUNJAB

Varieties	Cane Yield	Sugar Recovery %			Sugar Yield	Status
	Tonnes/ha	Nov.	March	Average	Tonnes/ha	
BL-4	85	9.10	10.7	10.06	8.55	Early
L-116	75	10.20	11.68	11.20	8.40	"
BF-162	90	8.56	10.95	10.05	9.04	"
CP 43-33	80	9.24	10.91	10.28	8.22	"
CP 72-2086	80	9.26	10.70	10.30	8.24	"
CP 77-400	80	9.45	10.98	10.35	8.28	"
SPSG-26	90	8.58	10.88	10.09	9.08	"
CoL-54	75	8.64	9.76	9.48	7.11	Mid
Triton	85	8.73	9.84	9.89	8.41	Mid
CO-975	75	8.11	9.55	9.18	6.88	Mid
L-118	83	6.86	9.16	8.28	7.70	Late
CO-1148	88	6.84	10.35	8.84	7.78	Late

Source: Proceedings of Workshop on Agriculture 1999, organized by Pakistan Society of Sugar Technologists, Karachi.

ANNEX-XX

VARIETY-WISE SUGARCANE AREA IN PUNJAB

(Percentage)

S.No.	Variety	1998-99	1999-2000
1.	CO-1148	64.50	50.02
2.	COL-54	4.40	7.16
3.	COL-29	1.70	3.12
4.	CO-975	6.40	11.94
5.	BL-4	3.10	3.45
6.	Triton	2.80	2.94
7.	BF-162	7.20	4.49
8.	SPSG-26	1.50	2.00
9.	L-118	2.20	0.23
10.	CP 77-400	1.50	4.00
11.	CP 72-2086	1.20	2.00
12.	CP 43-33	1.90	5.00
13.	Ponda	0.70	1.25
14.	Others	0.90	2.41

Source: Director, Sugarcane AARI, Faisalabad