

**COMPETITION ASSESSMENT STUDY ON THE
SUGAR SECTOR IN PAKISTAN**

**COMPETITION COMMISSION OF PAKISTAN
ISLAMABAD**

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Preamble

Sugar is an essential commodity in the consumption basket of all segments of society. Its production and distribution constitutes one of the major sectors of Pakistan's economy with significant backward and forward linkages. It is therefore desirable to assess competition issues in the sector with reference to its structural features, i.e. a chronic lack of efficiency in the sugar mills, a variety of impediments to technological upgrading and a lack of competitiveness when compared to sugar sectors in other developing countries. There is, too, on the face of it, evidence of a history of collective decision-making by the mill-owners through PSMA (Pakistan Sugar Mills Association).

The development of the sugar sector of Pakistan reveals many twists and turns from the very beginning in 1948 to its present position in 2010. The current problems are the outcome of a combination of economic and political factors and a policy of interventions that have been primarily driven by short term *ad hoc* considerations. The impact of these factors has reinforced each other over the years and effectively removed any impetus for competitive innovation and self-sustained growth in the sector. The owners of mills have never seriously addressed the inefficiency that exists in the sector when measured against regional and international benchmarks.

One hypothesis for the existing state of affairs is that the sugar industry has not felt impelled to establish a dynamic, competitive structure conducive to improving productive and commercial efficiency (via the production and sale of by-products together with refined sugar) and has hence failed to respond to the challenges/opportunities emanating for Pakistan in the regional and international markets. Despite being the fourth or fifth largest country in terms of the area devoted to sugarcane cultivation, favourable agro-climatic conditions and a supportive irrigation system, Pakistan, far from being a regular exporter, has actually had to import sugar from time to time. In the process, significant economic injuries have been inflicted on both sugarcane growers and end-consumers. This report is an attempt to understand the nature of the problems facing the sugar industry from a competition perspective, the role of official policy interventions and to offer solutions in that regard. The long term objective is to have a viable sugar industry in the country capable of looking after itself.

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CHAPTER I

Historical Background

Sugar, an essential consumption item, is a major carbohydrate derived mainly from sugarcane and to a smaller extent from sugar beet. There are three main sugars: sucrose, fructose and glucose. Sucrose is in fact a combination of fructose and glucose and the body quickly breaks it down into these separate substances. Sugar is separated from cane and beet for commercial use through a process called 'refining'. The sugar manufacturing process consists of technically simple steps of extracting and boiling the juice till it crystallizes as raw sugar after removing the liquid from the syrup. Raw sugar is washed and filtered to remove non-sugar ingredients and colour. This sugar is crystallized, dried and packaged as refined sugar. For beet sugar, the sugar beet is washed, sliced and soaked in hot water to separate juice from the beet fibre. The sugar-laden juice is then purified, filtered, concentrated and dried in a series of steps similar to cane sugar processing.

Pakistan's sugar industry has so far achieved limited success in creating a competitive environment whereby it can aim at achieving higher levels of technical and price efficiencies through by-product development and economies of scale. With low levels of land productivity of sugarcane and sucrose contents and outdated technology, its financial viability rests almost entirely on ensuring low prices of cane supplies but these, too, are not determined on a competitive basis. Currently, the cost of sugarcane in the total cost of sugar production accounts for over 80 percent¹, which demonstrates an excessively high share of sugarcane - often with low sucrose content - in the final price of sugar. It is noteworthy, too, that the sugar mills comprising the industry (over 80 in number) show considerable variation in terms of obtaining cane yield levels and value addition. This indicates the latent potential of the industry as well perhaps its excessive expansion over the years that has manifested itself in camouflaging high levels of inefficiency in the sector as a whole.

The relatively long value chain - from the purchase of sugarcane from the growers to the sale of refined sugar to retail consumers - should create opportunities for the forces of competition to operate at different points. Whether these opportunities are exploited in the spirit of competition or subsumed within a schema of collective decision-making and thus make itself open to the disadvantages of anti-competitive practices are choices that PSMA appears to have made in favour of the latter outcome (see Box in Chapter 5). The result is that the members of PSMA are hardly free agents operating in the industry on the basis of contestability. PSMA has instead sought to create an industry structure in which all participants can thrive regardless of their levels of efficiency.

In this context, this study aims at identifying the causes that have hampered the sugar industry to move towards a more competitive structure and environment in which individual players are incentivised to innovate and produce the many by-products that sugar refiners do across the world. By competitive is meant a structure that all or most sugar producers in the country operate at a level of efficiency that matches the best. Such an environment is essential for the achievement and continuation of comparative advantage in the industry in the long term, both domestically and internationally. The aim is to have a commercially viable sugar sector capable of standing on its own feet and meeting the challenges of domestic and international competition.

¹ Based on PSMA Annual Report, 2008. See Table 2(pp. 17)

The first chapter of this report highlights the historical background. The second chapter presents the current state of the sector. The third chapter discusses the prevalent production and trade practices in the sector and the resulting competition issues. Chapter four discusses the prospects of diversification in the industry and chapter five provides a set of conclusions and recommendations in a small to medium-term development framework in order to improve competition in this important industry.

1.1 Trends in Cane Cultivation

The history of cane cultivation in Pakistan reveals a tradition of an open pan industry which was common in Punjab and Khyber Pakhtunkhwa (old NWFP). The first centrifugal sugar mill was established at Rahwali, Punjab in 1936. At the time of independence in 1947, Pakistan (then West Pakistan) had two sugar mills which produced 9,510 tons of sugar in 1948.

The number of sugar mills steadily increased over time. By 2007/08, a total of 79 sugar mills constituted the sugar industry of Pakistan. The cultivation of cane took place on 1.24 million hectares (constituting 5.3 percent of the total cropped area) and produced 63.89 million tons of sugarcane implying an average yield of 51.5 tons per hectare (Table 1).

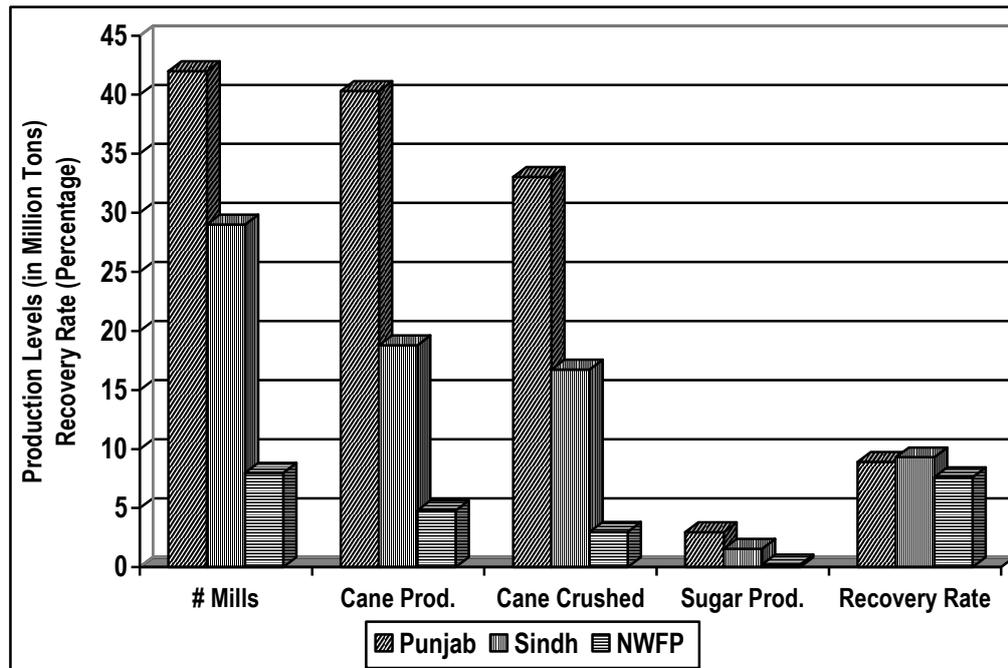
Table 1
Sugar Industry Data

(Units as specified)

Province	# Mills	Cane Production (Million Tons)	Cane Crushed (Million Tons)	Sugar Production (Million Tons)	Recovery Rate %
Punjab	42	40.31	33.06	2.95	8.92
Sindh	29	18.79	16.73	1.56	9.32
KP (NWFP)	8	04.79	2.98	0.23	7.62
Total	79	63.89	52.77	4.74	8.98

Source: Government of Pakistan, MINFAL, Agricultural Statistics (2007/08).

Chart 1



Of the total cane produced, 52.77 million tons were crushed by the sugar mills to produce 4.74 million tons of refined sugar. However, the proportion of total cane crushed by mills varied across the provinces based on the level of demand as well as the relative prices of refined sugar to the products of the traditional open pan industry (namely gur and khandsari).

The sucrose content (reflecting the quality of cane produced, process of transportation to mills, technology employed in producing sugar and the length of the crushing season) was on average 8.98 percent, with significant variations across provinces (Table 1). In 2008/09, a total of 82 mills were nominally in existence with six mills out of production.

Whereas the acreage under cane and the number of sugar mills increased substantially in the country as compared to the base period of 1948, the levels of cane yield per unit of land and the recovery rates have shown no ostensible improvement over time.

Table 2
Sugarcane Yield Levels across Provinces (2002-08)

Province	2007-08	2006-07	2005-06	2004-05	2003-04	2002-03
Punjab	48.7	52.7	46.3	51.3	48.0	45.1
Sindh	60.9	58.4	61.4	43.5	56.2	53.4
KP (NWFP)	45.7	45.6	45.0	45.3	45.3	48.1
Total	51.5	53.2	49.2	48.9	49.7	47.3

(Tons per hectare)

Source: Government of Pakistan, MINFAL, Agricultural Statistics (2007/08).

Chart 2

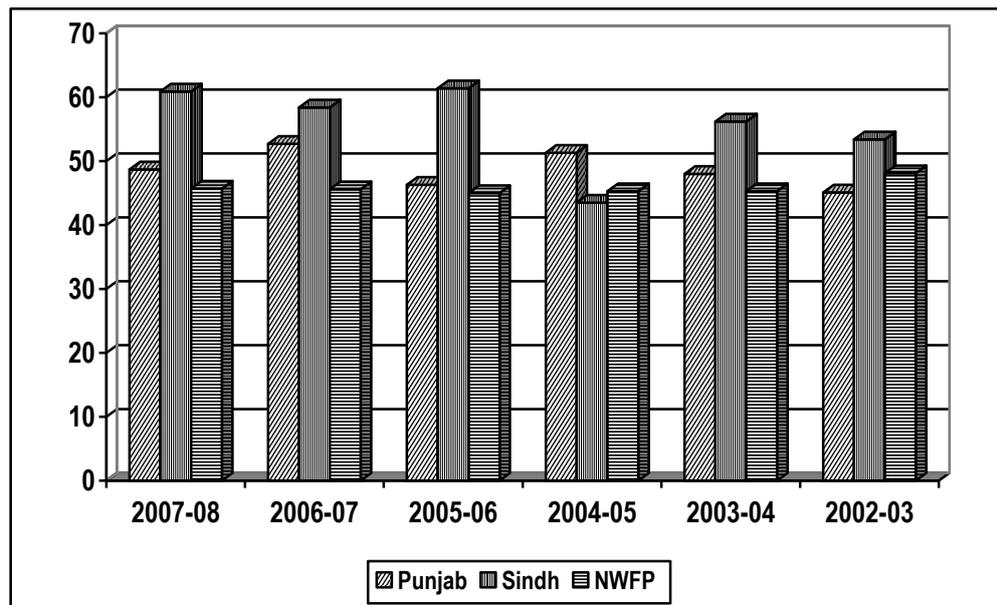


Table 2 shows yield levels of cane across provinces since 2002/03. It reflects a declining trend in yields across provinces over time. However, Sindh seems to have a significant lead over other provinces (with the exception of 2004/05). A basic reason for Sindh's higher yield level is the fact that a large proportion of mills in Sindh are located in the southern part of the province which has higher humidity levels due to the region's proximity to the sea – the single largest factor attributable to higher yield levels.

Another important aspect relates to increase in cane cultivation and establishment of new mills in the country, thereby extending it to areas which may not be suited for cane cultivation – a persistent practice causing excessive cultivation of cane. It implies that climatic factors have been largely ignored as a result of which the industry's expansion has continued in areas which were not the most efficient for cane cultivation.

Increase in acreage of cane cultivation and expansion of the sugar industry without giving due consideration to low yield levels and sucrose content was carried out to improve profitability of cane relative to other competing crops. The control over cane prices by the government and politicization of the sugar mills licensing process with a simultaneous neglect of financial and regulatory controls aggravated an already adverse situation. This tendency accentuated over time and caused serious levels of economic injury to the industry. It denied efficiency gains to the industry which could have been realized in the presence of healthy domestic and international competition.

1.2 Growth of Sugar Industry

The number of sugar mills in the country increased from only two in 1948 to six by 1960. This reflected passive growth and was confined to Punjab and KP (NWFP) only. During the period 1961-1970 the number increased rapidly to 20 mills. This was a period when cane cultivation was incentivized in Sindh through establishment of sugar mills. The size of the industry further increased to 34 by 1980. During the

1980s it added 26 new units increasing the total to 60 mills. Since the 1990s, however, the process of expansion has slowed down and the industry had added 19 new units by 2007/08.

The expansion of the sugar industry over this period is not only characterized by an increase in the number of sugar mills but also by substantial enhancement in the per mill crushing capacity, i.e. from 2,000 TCD (tons crushed per day) to over 4,000 and 6,000 TCD. Keeping in view both these factors, the average production of refined sugar per mills increased from 4.75 tons in 1947/48 to 60.00 tons in 2007/08 (Table 2A).

Table 2A
Relationship between Numbers of Sugar Mills & Sugar Production

(in '000' tons)

Year	# Sugar Mills	Sugar Production	Sugar Production / Mills
1947/1948	02	9.5	4.75
1959/1960	06	82.8	13.80
1969/1970	20	599.9	30.00
1979/1980	34	586.0	17.23
1989/1990	60	1,857.0	30.95
1999/2000	67	3,542.0	52.86
2007/2008	79	4,740.0	60.00
2008/2009	82	3,189.0	38.89

Sources: 1. Economic Survey of Pakistan, Government of Pakistan.
2. 25 Years of Pakistan in Statistics, Government of Pakistan.
3. PSMA, Mill-Wise Final Statement for 2008/09.

However, the above picture does not fully explain the efficiency of the sugar mills. The recent average capacity utilization rates of the industry range from 60 to 70 percent. These low utilization rates reflect insufficient supply of cane and/or excessive crushing capacity that the industry has created over time.

1.3 International Comparative Picture

Table 3 shows a comparative picture of average yield levels of sugarcane across major cane producing countries. It reveals that Pakistan's average yield level was 49.2 and 53.2 tons per hectare during 2006 and 2007 respectively. These yield levels were substantially lower in relation to comparator countries, except Cuba. This, in part, reflects significant levels of inefficiency in the production of cane in Pakistan. The increased cost of sugarcane production was counterbalanced by excessively high prices of cane fixed by the government annually. As a result, the cost of sugar production increased substantially over time. Currently, sugarcane accounts for over 80 percent of the total cost of sugar production.²

² PSMA Annual Report 2008, op. cit.

Table 3
International Yield Levels of Sugarcane

(Tons per Hectare)

Year	World	Brazil	China	Egypt	Cuba	India	Thailand	Pakistan
2007	70.8	76.6	86.1	119.6	27.7	72.6	63.7	53.2
2006	69.7	74.4	82.6	118.6	27.8	66.9	49.4	49.2

Source: Government of Pakistan, MINFAL, Agricultural Statistics (2007/08).

Chart 3

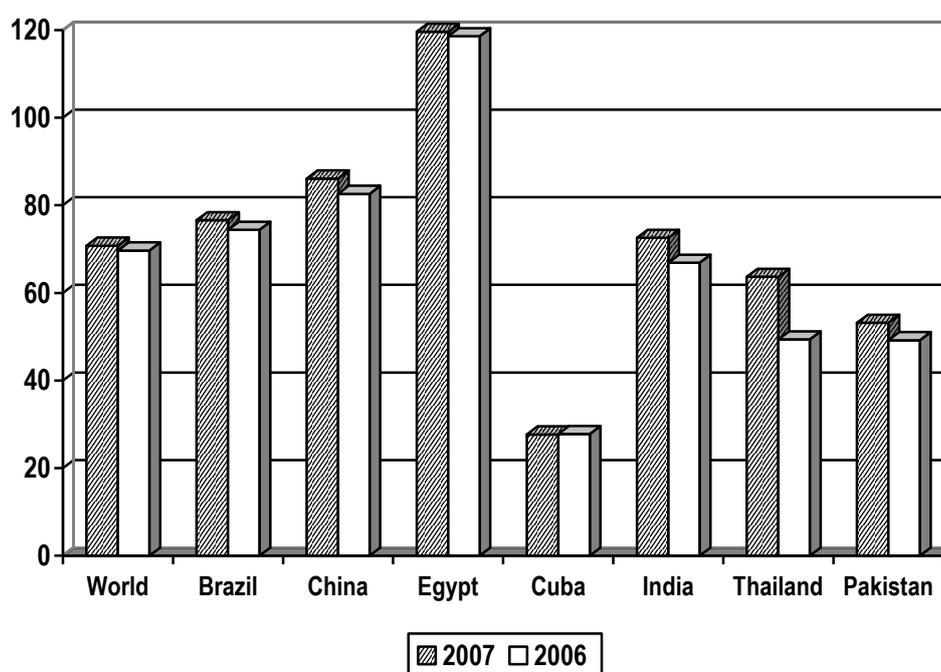


Table 4 provides information on the top five countries in the world during the period (2005-2007) in terms of average cane acreage, total production and yield levels. Only in the case of acreage, Pakistan ranked fifth in the world during 2005 and 2006 and fourth in 2007.

Table 4
Top Five Countries in Terms of Area, Production & Yield of Sugarcane

Rank	Area			Production			Yield		
	2005	2006	2007	2005	2006	2007	2005	2006	2007
1	Brazil	Brazil	Brazil	Brazil	Brazil	Brazil	Egypt	Egypt	Egypt
2	India	India	India	India	India	India	Columbia	Columbia	Columbia
3	China	China	China	China	China	China	Australia	Australia	China
4	Thailand	Thailand	Pakistan	Mexico	Mexico	Thailand	Guatemala	Guatemala	Australia
5	Pakistan	Pakistan	Thailand	Thailand	Thailand	Pakistan	Argentina	Mexico	Guatemala

Source: Derived from Government of Pakistan, MINFAL, Agricultural Statistics (2007/08).

This rather impressive position was lost in the rankings made in the context of total production where Pakistan could only maintain fifth position in 2007. However, it could not enter the top five ranking countries in terms of average yield levels.

Table 5 displays a ranking of seven major Asian countries in sugarcane yield levels during the period 2005-07. This ranking is in the context of 17 major sugar producing countries which account for over 85 percent of world sugar production. With the exception of China, the rest of the South and South-East Asian countries rank quite low in terms of sugarcane productivity. It is evident that Pakistan ranks lower even in the regional context.

Table 5
Ranking of South Asian / South-East Asian Countries in Terms of Sugarcane Yield Levels across 17 Major Sugar Producers in the World

Country	2005	2006	2007
1. China	12 th	4 th	3 rd
2. India	11 th	11 th	10 th
3. Indonesia	7 th	8 th	10 th
4. Pakistan	16 th	16 th	15 th
5. Thailand	15 th	15 th	14 th
6. Vietnam	14 th	14 th	15 th

Source: Derived from Government of Pakistan, MINFAL, Agricultural Statistics (2007/08).

1.4 Relative Performance of the Sugar Mills

Sugar mills in Pakistan vary significantly from each other across different performance indicators including the following:

i) *Crushing Capacity*

The capacity indicator of crushing cane i.e. TCD (tons per day) varies significantly ranging from a low of 1500 to over 8,000.

ii) *Plant Technology*

Internationally, the technology in producing sugar from cane has developed considerably over time. The newly established mills use the latest technologies and some old ones have also acquired new technologies (though on a limited scale).

iii) *Diversification*

Of the total 80-plus sugar mills currently operating in the country, only a few have opted for diversification in the range of products and that, too, on a limited scale. A full scale diversification in the product mix of sugar mills in Pakistan could create the basis for producing a large number of products in the

downstream industries. The process has yet to start.³ Only a handful of mills (4 or 5) have established distilleries to create value addition from molasses.

iv) Sucrose Content

The annual statements prepared by the Pakistan Sugar Mills Association (PSMA) show significant variations in the overall recovery rates achieved by mills annually. For example, during the year 2008/09, the variation in the recovery rates across provinces were as follows:

Punjab Province:	7.5 to 11.25 percent
Sindh Province:	7.9 to 11.30 percent
KP (NWFP):	7.9 to 9.71 percent

Whereas these variations are attributable to the quality of cane, timings of harvest and shipment to mills and the technology used for conversion into sugar, they also indicate the degree to which mills and farmers interact with each other.

A major inefficiency in cane pricing policy is the exclusive use of weight for price determination. Although a key determinant in the cost and efficiency structure of a sugar mill, sucrose content is not incorporated into the pricing of sugar cane. On occasion, the sugar mills in Sindh have paid premium payments based on sucrose contents (over and above the cane price) to all growers. This represents a classic case of an adverse selection problem, where each supplier is provided additional benefits on the basis of the overall recovery rate achieved by all the mills in a given season. Such a practice sets perverse incentives for growers to plant better quality sugar cane which produces higher sucrose content. On the contrary, growers of inferior quality sugar cane can free ride on their more efficient counterparts. In the long run, this causes a gradual decline in the overall recovery rates achieved by mills.

v) Sugarcane Yield Levels

Although, the old system of allocating each mill a zone from where sugarcane was supplied has been discontinued and mills compete with each other in procuring cane, it remains an undeniable fact that certain geographical locations in Pakistan are less suited to sugarcane cultivation than others. By ignoring this fact and permitting new mills to be established in relatively unsuitable areas/regions, excessive and inefficient cane cultivation has been promoted in the country.

In addition, within the more suited areas/regions there are significant variations in the yield levels of sugarcane. These differences are attributable to low investment capacity of farmers (particularly small farmers) as well as lack of dissemination of technical knowledge to farmers by the mills and research institutions to improve cane yield levels. In certain suitable regions, the variability in yield levels across farms ranges from 20 tons per hectare to as high as 150 tons per hectare.

³ Details on such achievable potential have been provided in the subsequent sections of this Report.

Since the average yield level in Pakistan is less than 70 percent of that achieved by major sugar producers in the world (reference Table 3), it is apparent that sugar production in Pakistan is costlier than other competitors. Currently, as mentioned earlier, sugarcane cost alone accounts for over 80 percent of total cost of sugar production (inclusive of taxes) in Pakistan.

In light of the above, a lot needs to be done in improving productivity of sugarcane and sugar production in Pakistan. It also reveals that the future expansion of the industry needs to be based on a rationalized pricing mechanism. Since the land allocation to sugarcane accords Pakistan a status of fourth or fifth largest country in the world, the same needs to be maintained in the total production of cane. This will help in minimising Pakistan's sugar import bill in the years ahead taking 'good' and 'bad' years together. Further efficiency improvements at the sugar mills can create a potential for exports, especially through greater diversification of the sector's products.

1.5 Sugar Trade Balance

The world sugar trade scenario indicates 11 countries as net exporters of sugar during the next 10 years and 18 major net importers.⁴ A growth of over 38 percent in the world sugar trade is forecast by the year 2018/19. Whereas this expected growth forecasts may provide opportunities for some countries to reap benefits through trade, some may keep increasing their sugar imports on account of economic inefficiency. According to the forecast, Pakistan would not only remain a net importing country during the next decade but its import requirements may increase to 1.48 million tons. These estimates have been prepared under the following assumptions:

1. Sugarcane acreage will increase from 1.077 million hectares in 2009/10 to 1.147 million hectares in 2018/19.
2. Sugarcane yield level will increase from 53 to 56 tons per hectare
3. Recovery rate from sugarcane will remain unchanged at around 8.5 percent.
4. On the domestic consumption side, the estimates show a growth of 26.6 percent during the period 2009/10 and 2018/19.

Despite the possibility of upward or downward estimation bias in these estimates, it is apparent that by maintaining the status quo of the sugar industry, the country will have to import a significantly higher volume of sugar in the next 10 years in order to meet demand.

The resulting impact on employment and foreign exchange resources would be significant unless drastic and unconventional measures are taken to reverse the situation. Therefore, in order to effectively manage production and consumption levels, the country will have to spend over \$ 1.0 billion on sugar imports by 2018/19 (based on the current world price of refined sugar).

⁴ FAO Outlook on World Sugar Prices, Production and Consumption (2007).

Other estimates⁵, though somewhat different, portray a bleak scenario for Pakistan's sugar sector. All point in the same direction i.e., due to internal inefficiencies in the production of cane and sugar, and rapidly increasing sugar consumption at home, Pakistan will have to rely increasingly on imported sugar to meet its requirements. The implications of such imports on an already deteriorating trade deficit and local unemployment could strain an ailing economy.

⁵ USDA, Foreign Agricultural Service, "Sugar: World Production Supply and Distribution" May 2009; and USDA, Foreign Agricultural Service, GAIN Report (No.PK-9005), "Pakistan Sugar Annual 2009", April 2009.

CHAPTER 2

Current State of Sugar Sector of Pakistan

2.1 Political Economy of the Sector

As mentioned in the preceding chapter (Table 2A), growth in the sugar industry in Pakistan started in the late 1960s. Before that only a handful of sugar mills were operating in the country. Largely ignoring the economic aspect, the use of political patronage for acquiring sugar mill licenses has been prevalent since the 1960's. As a result, for many individuals who were granted licenses to establish sugar mills, the licenses effectively became a tradable commodity for them.

The role of politics is still central - from the sanctioning of a sugar mill to its day-to-day financing and operations. Of the 80 mills, more than half are owned by members of parliament and/or their extended families. They represent a wide political spectrum, ranging from the treasury as well the opposition benches potentially creating serious conflicts of interest in policy decisions. The organization of the sugar industry in Pakistan serves as a stark example depicting the extent to which markets and public policy are routinely captured by inter-connected interests⁶. In this process PSMA has provided a useful platform for facilitating collective decision-making in the sector.

The political leverage has many undesirable side-effects. It clearly inhibits competition and hence restricts the emergence of the required entrepreneurial drive that is essential for the development of any sector. As a consequence, the industry continues to employ relatively old technologies, adopts extremely low levels of value addition, especially through the vigorous manufacture of by-products – a standard practice in sugar-making the world over - and appears to have all the traits of a quasi-rent seeking industry. There is strong evidence that the industry as a whole primarily works on the basis of standardized recurrent costs and incomes which *exclusively* focus on producing refined sugar by crushing local cane production and processing imported raw sugar. During the past 60 years, the industry has consistently followed a path that has avoided the costs of technological innovation and value addition. As a result, capital investments have tended to become irretrievable sunk costs and over the long run the industry may be categorized as driven not by competition but by economic rent-seeking. Unless the right incentives can be put in place to encourage modernization and diversification the industry is likely to remain stuck in this perverse *status quo*.

The structure and contents of official sugar policies announced as part of annual trade policies primarily focus on *fixing* prices (on an indicative basis) of cane as well as of refined sugar from time to time, largely ignoring the potential gains of a competitive environment. A variety of provincial and national laws exist in the country that affect the sugar industry, with varying levels of operational effectiveness. All of them serve, however, to perpetuate anti-competition practices on the part of mill-owners. There is a widely held view that operating under a competitive environment, mills would be

⁶ “Sugar and Political Power” – a note by Dr. Adeel Malik, University of Oxford (September 2009).

forced to compete with each other on the basis of their *individual* technical and productive efficiency as is the case in other developing countries. In addition to the production of sugar, value addition would be brought about by innovation and an optimal use of by-products leading to the eventual development of downstream industries. The fact that neither individual mill-owners nor PSMA have felt it necessary to look at by-products as a means of improving the economics of sugar refining suggests that the latter has been sufficiently profitable for them.

2.2 Current Levels of Production

This section provides information on levels of productivity of the sugar industry during 2008/09. It primarily focuses on variations in the recovery rates of sugar and molasses, length of the crushing season and size of sugar mills and their correlation. Out of the 80-odd sugar mills operating during 2008/09, eight sugar mills were sampled for analysis. Four mills each, with the highest and lowest sucrose contents were selected. The purpose of this categorization was to observe other attributes of these extreme level cases i.e., recovery rate of molasses, length of the crushing season as well as the actual time of its occurrence. The rationale behind this analysis is to highlight the fact that production of molasses is as important for the economy as the level of refined sugar production. Furthermore, it reveals whether sugar and molasses are substitutes or compliments.

The production level of molasses is being emphasized in the context of two major aspects related to the development of Pakistan's sugar industry. First, to ascertain the degree to which the current levels of molasses production depend upon the technical effectiveness of the management of the mills; and second, to analyze the opportunities that direct and indirect products of the sugar mills proffer. This becomes important in the context of the extensive use of by-products, especially molasses by rival sugar producing countries.

Data on the levels of cane crushed and production of sugar and molasses across all sugar mills in Pakistan during 2007/08 and 2008/09 published by PSMA reveal the following:

i) Sugar Recovery

The recovery rates (i.e., sugar as a percentage of cane crushed) show significant variations across mills in each province, as explained below:

Punjab :	from 7.50 percent to 11.25 percent
Sindh :	from 7.88 percent to 11.30 percent
KP (NWFP):	from 7.88 percent to 9.71 percent

It follows from the above that the level of sucrose contents vary equally across the provinces, particularly in Punjab and Sindh, implying potential efficiency gains.

The data also shows an overall recovery of 9.45 percent in 2008/09 as compared to 8.98 percent in 2007/08 i.e., an overall growth of 5.2 percent during the period.

ii) Molasses Recovery

There seems to be an inverse relationship between sugar and molasses production levels (based on 2007/08 and 2008/09 PSMA data). It implies that the benefits attributable to molasses need to be measured in detail to ascertain the relative share in costs and benefits of individual mills. The inverse relationship needs to be studied further in order to investigate the presence of cartel-like behaviour by sugar mills to reduce volumes and create shortages. Such shortages can be used to justify a higher sugar price and simultaneous benefit through increased molasses production can be realized. Sugar production levels may be used as instruments by the mills to affect the domestic sugar price in the wake of hikes in international sugar prices. On the contrary, the differences may, in fact, be attributable primarily to the limited technical management capacity of individual mills.

iii) Length of Crushing Season

The length of the crushing season (including stoppages due to various reasons) also varies significantly across mills. PSMA data reveal the following length of crushing season across provinces:

Punjab : from 50 to 122 days
Sindh : from 60 to 139 days
KP (NWFP): from 59 to 106 days

These variations depict both scenarios. Some mills may be operating at low levels due to their inability to procure cane in the required quantity. On the other hand, some mills may be crushing for excessively long periods, which appear to be economically unfeasible for the sector (though it might be feasible for the mills in the context of their financial return). Under both scenarios, these variations depict economic inefficiencies which need to be checked. A shorter crushing season may also be related to poor mills-farmers relationship.

The crushing season of each mill also depends on its policy with regard to expected cane supplies and/or pre-determined sugar production levels. A delayed crushing season may also affect farmers' cropping patterns, particularly cotton growers who need to sow cotton in the month of March.

iv) Size of the Sugar Mills

Bigger sized sugar mills may also enjoy complimentary benefits of economies of scale. It appears from the data that the rate of sugar recovery is proportional to the amount of cane crushed. However, further analysis based on the amount of cane crushed per day by individual mills during the season shows that a higher sugar recovery is associated with the size of the mill.

In light of (i) to (iv) above it appears that all the four factors namely sugar recovery, molasses recovery, length of the crushing season and the size of the mill crushing capacity play important roles in determining the performance of the mills. For the year 2008/09, the PSMA data show how extreme variations in sugar recovery rates are associated with other factors as explained in Table 1.

The comparative statistics, based on sugar recovery rates of the four highest and the four lowest performing sugar mills show that:

- i) The four high performing mills, on average managed to achieve 43 percent higher recovery rates than the average for the four low performing mills.
- ii) In contrast, the four mills with the highest sugar recovery rates, on average, achieved only 84 percent of the average recovery rate of molasses achieved by the lowest sugar recovery mills. It implies an inverse relationship between the recovery rates of sugar and molasses.

Table 1
Extreme Cases of Sugar Recovery and Associated Factors

Extreme Sugar Recovery Rates	Associated Factors			
	Molasses Recovery Rate (%)	Length of the Crushing Season (# years)	Total Level of Cane Crushed ("000" tons)	Level of Crushing Per Day Per Mill ("000" tons)
i) Highest Recovery Cases:				
11.30% (Ghotki, Sindh)	4.02	94 (1 Dec–4 Mar)	553	5.88
11.25% (United, Punjab)	4.02	103 (23 Nov–5 Mar)	596	5.78
11.15% (JDW, Punjab)	4.16	107 (24 Nov–9 Mar)	1,488	13.91
10.70% (Dewan, Sindh)	4.80	72 (19 Dec–5 Mar)	141	1.96
Weighted Av. of Higher Recovery Cases 11.2%	4.13	94	695	6.88
i) Lowest Recovery Cases:				
7.88% (Ansari, Sindh)	4.93	112 (28 Nov–19 Mar)	491	4.39
7.88% (Chashma, NWFP)	4.65	101 (7 Dec–2 Mar)	370	3.66
7.81% (Baba Farid, Punjab)	4.98	93 (27 Nov–27 Mar)	219	2.36
7.50% (G. Summandri, Punjab)	5.50	93 (26 Nov–28 Feb)	124	1.33
Weighted Av. of Lowest Recovery Cases 7.83%	4.91	100	301	2.93

Source: Derived from PSMA Data: 2008/09.

- iii) The sugar mills with the highest sugar recovery rates had, on average, crushed 695,000 tons of sugarcane during the season which is 131 percent higher than the crushing done by sugar mills with the lowest sugar recovery rates.

2.3 Causes of Recent Sugar Crises in Pakistan

The process of sugar production in Pakistan has historically followed a cycle of three or four years, i.e. a 'bad' year followed by two or three good years. Production levels generally show a decline after which they mostly rebound, either as a result of favourable weather conditions alone or a combination of favourable weather and higher sugarcane prices offered to growers, if only on an indicative basis. During years when the domestic production exceeds demand, surplus stock is carried forward. In the event of the international market price of sugar exceeding the domestic price, some surplus is also exported. At times, small quantities of sugar are exported despite a low international price because stocks to be carried forward are

large enough to create liquidity constraints for the mills as well as a shortage of space for stocks.

However, due to a weak policy framework, sugar has sometimes been imported as well as exported during the same year. This reflects unwise decisions taken to export notional surpluses. Similarly, sugar is imported expecting a shortage at home either due to reduced supplies of cane and/or late start of the crushing season. In this regard, the likelihood of misjudgments is substantial but there is an economic cost involved in terms of skewed incentives for mill-owners for the next crushing season. A resort to collective action to pre-empt such dangers on a collective basis is therefore understandable.

A closer view of the levels of domestic production and consumption and international trade of sugar in Pakistan during the last 16 years shows that in most years, level of stocks carried forward were rather low i.e., less than 20 percent of the consumption level (with the exception of one or two years when they exceeded 30 percent). In contrast, globally, stock levels of 40 to 50 percent of consumption are maintained. Since a strategic food management system is currently not in place in Pakistan, inappropriate decisions have been taken with regard to the sugar trade (both in terms of quantities to be exported/imported and their timings) and the management of stocks at home. Shortage of sugar and its higher price for consumers is not related to low levels of production. Rather, untimely and inadequate quantity of sugar reserves through imports and carried forward stocks seem to be the real cause of apparent shortages. Inter-temporal shortages in a given year which cause upward shifts in consumer prices are in fact a reflection of untimely decisions on the import (or export) of sugar and the lack of a well-organized distribution system.

According to the Annual Report of the Pakistan Sugar Mills Association (PSMA) of 2008, the total availability of sugar remained above the domestic consumption requirements in the country during the period 1992/93 to 2007/09. Total availability, however, does not provide evidence that each year the stocks were managed on a timely basis to prevent a price hike of sugar.

From 1991/92 to 2007/08, the retail price of sugar showed a range of Rs 11.26 to Rs 32.40 per kilogram. However, in the year 2009, the country witnessed a major sugar crisis. In late 2009 and early 2010 sugar virtually disappeared from the market and caused significant social unrest. Given the severity of the situation, the Government of Pakistan and the Supreme Court of Pakistan took a serious view of the issue. The Government of Punjab took administrative measures through raids on hidden sugar stocks at sugar mills as well as warehouses. These raids were probably counter-productive in their effectiveness. Through a High Court order, the retail price of sugar was fixed at Rs 40 per kilogram.

Sugar is a homogeneous commodity with a low elasticity of demand. It is impossible for a government, especially in a developing country setting, to ensure that subsidies, targeted through price-fixing, actually reach the poorest sections of society. A black market inevitably develops and thrives in such a situation. Apart from the scarce quantity sold through state-owned utility stores, sugar prices remained stubbornly unchanged. In fact, such subsidies end up creating windfall profits for middlemen, rather than achieving their intended purpose of providing relief to the poor.

Reasons for Shortages of Sugar

A number of factors are attributed by different stakeholders towards the recent sugar shortages and the sharp hike in its price. These include the following:

i) Absence of a strategic food management system

The independent views based on the information about: i) the level of sugar stocks carried over from the surpluses of 2007/08; ii) reduced output of 3.2 million tones of sugar during 2008/09; and iii) the extra- ordinary hike in the price level to \$ 638 per ton of refined sugar in the international market, suggest that had sufficient stocks through import been made on a timely basis by the government (through the Trading Corporation of Pakistan) substantial savings of foreign exchange would have been realized while ensuring a smooth supply of the commodity. In the earlier period, the international market price of refined sugar was much lower than the price of \$ 638 per ton which the government paid eventually. A timely decision by the government in this regard would also have averted the sugar crises witnessed recently.

Another major decision that did not prove to be correct, was the export of 260,680 tons of sugar from the surplus stock of 2007/08 at Rs 22 per kilogram. In comparison, the landed cost of sugar imported in 2008/09 was over Rs 60 kilogram. Such blunders are natural outcomes of a failure to establish a strategic food management system in the country. In the absence of such a system, a recurrence of such mistakes in future is quite likely.

ii) Role of Sugar Mills and Traders

In addition to (i) above, a close assessment of the cost of sugar production at present demonstrates that sugar could be provided to consumers at Rs 40 per kilogram (see Table 2). For the year 2008/09, the government fixed a price of Rs 82 per 40 kilograms of sugarcane. However, the shortage of sugarcane during the year led to excessive prices charged by the growers. If we assume, for the sake of analysis, an average price of Rs 100 instead of Rs 82 per 40 kilograms of sugarcane paid by the mills to the growers (suppliers) and add all other costs including excise duty, sales tax and appropriate marketing margins, the consumer price should not exceed Rs 40 per kilogram. Given this scenario and the fact that sufficient surplus stock of sugar was carried forward from 2007/08 and was available with sugar mills and traders, it is surprising that these stocks of sugar were not brought to the market.

Whereas the domestic cost of production of sugar was well under Rs 40 per kilogram, the landed cost of imported refined sugar was over Rs 60 per kilogram. Although this difference may be attributed to a hike in sugar prices in the international market, massive sugar shortages witnessed across the country hint at some degree of manipulation and distortion of market forces. Whether the manipulation can be described as *defensive* (in the guise of collective decision-making), or a more blatant resort to cartelization remains to be seen.

As part of CCP's investigation report, information collected from the inspection of PSMA premises seems to suggest that this body, rather than solely being a representative forum of sugar producers, *prima facie* appeared to be acting as an institution for collective business decision-making. Evidence suggests the presence of collective stances in the purchase of sugarcane (mostly done by geographically defining boundaries), as well as in the production and sale of refined sugar. The information obtained from PSMA depicts collective efforts to control output and prices, as well as lobbying with the Trade Corporation of Pakistan in the matter of the quantity of sugar to be imported.

Such practices clearly distort the market. The victim of such market distortions are the ordinary consumers, who end up either paying exorbitant prices for sugar or, on certain occasions, are not able even to purchase the commodity at all. The need to check collective decision-making by producers to manipulate or rig the market, is therefore self-evident.

Table 2
Cost Structure of Sugar Production in Pakistan (2008-09)

1.	Cane Price (Rs.40/Kg.)	Rs.100
2.	Cane Price (Rs.100/Kg.)	Rs.250
3.	Recovery Rate	9 Percent
4.	Sugar Produced from 100 Kg. of Cane	9 Kg.
5.	<u>Cost of sugar / Kg.</u>	
	i) Sugarcane Cost	Rs.27.8
	ii) Conversion Cost	Rs.5.0
	iii) Excise Duty & Sales Tax	Rs.2.6
6.	Ex-Mill Price	Rs./Kg. 35.4
7.	Marketing Margin including marketing, storage, wholesale profit, etc.	Rs./Kg. 4.0
8.	Consumer Price	Rs./Kg. 39.4

Source : PSMA Annual Report 2008

Note: Results of sensitivity analysis on the above cost structure have been discussed in detail in the following chapter.

An associated adverse effect of such practices has traversed down to sugarcane growers and the traders. Growers, on numerous occasions refuse to supply sugarcane to mills at the prices indicated by the government. Their plea is simple: if sugar mills can make extraordinary profits, the growers should also be given a fair share. Such a tendency is bound to increase the

cost of sugarcane in the total cost of sugar which is already close of 80 percent. If not controlled, this is likely to create a perpetual adverse impact on the efficiency of sugar production in Pakistan. The current crushing season has already started experiencing this effect. Based on reports in newspapers, growers are currently selling sugarcane to mills at Rs 130 to 140 per 40 kilograms compared to a price of Rs 102 per 40 kilogram set by the government. The impact of this on the price of sugar for 2009/10 would thus be adverse.

iii) Wholesalers and Retailers Views

As mentioned earlier, sugar was not available at Rs 40 per kilogram despite rulings from the High and Supreme courts. Rather, sugar was sold at Rs 60 per kilogram or more in retail shops and at a somewhat lower rate in the government utility stores. The issue was raised with wholesalers and retailers to find out the causes of non-adherence to a mutually agreed price fixation closer to the Rs 40 per kilogram level. It was revealed that the decision of the Supreme Court dated October 30, 2009 to fix the sugar price at Rs.40 per kilogram was relevant to the level of sugar stocks which were sufficient only for one month. As a result, the decision could only be enforced till November 30, 2009. According to some news reports, the trading community had to face additional hardships in the shape of different kinds of checks and raids in carrying sugar stocks released under the court's ruling. This increased the transaction costs of the wholesalers and retailers and by the same token gave them the liberty to charge a higher price from consumers. In the process, the average sugar price went much above Rs 40 and reached Rs 60 per kilogram. This situation continued till November 30 after which all restrictions on price and mobility were relaxed. As a result, the retail price of sugar actually came down somewhat and tended to stabilize at around Rs 52 per kilogram in most cities and towns.⁷

The lessons of recent events and the manner in which they were sought to be dealt with indicate that undue physical restrictions, fixation of prices and restricted mobility are contrary to free and fair competition and increase transaction costs, which are ultimately passed on to the consumers. Therefore, the use of force, raids and other drastic administrative measures only aggravate the problem rather than providing a solution. In implementing the court's ruling, the process followed witnessed an excessive use of threats and harassment for sugar producers and middlemen.

⁷ Newspaper reports point out that after mid-November 2009 the open market price of sugar started rising again. This rise in sugar price is largely due to higher prices at which growers are selling sugarcane to mills. In the event the world price of refined (or raw) sugar drops below the domestic price, the government may decide to import sugar for building buffer stocks. This would hurt the interests of sugar mills who may not be in a position to pay growers for their supplies.

CHAPTER 3

Organization of the Sugar Industry and Impediments to Competition

This section of the report focuses on the economic issues confronting the sugar sector using mill-wise data for 2008/09. Major issues that hamper competitiveness and productivity levels are highlighted. Specifically, the following aspects that determine the industry's overall performance are discussed:

- Overall organization of production, trade and market structure
- Interrelationship between key variables impacting on sugar production
- Variability in performance across mills
- Economies of size and scale
- Impact of the duration of the crushing season
- Excessive cane cultivation and/or excessive expansion of industry
- Cost structure of sugar production
- Adverse selection problem in rewarding sucrose content

3.1 Organization of Production and Trade

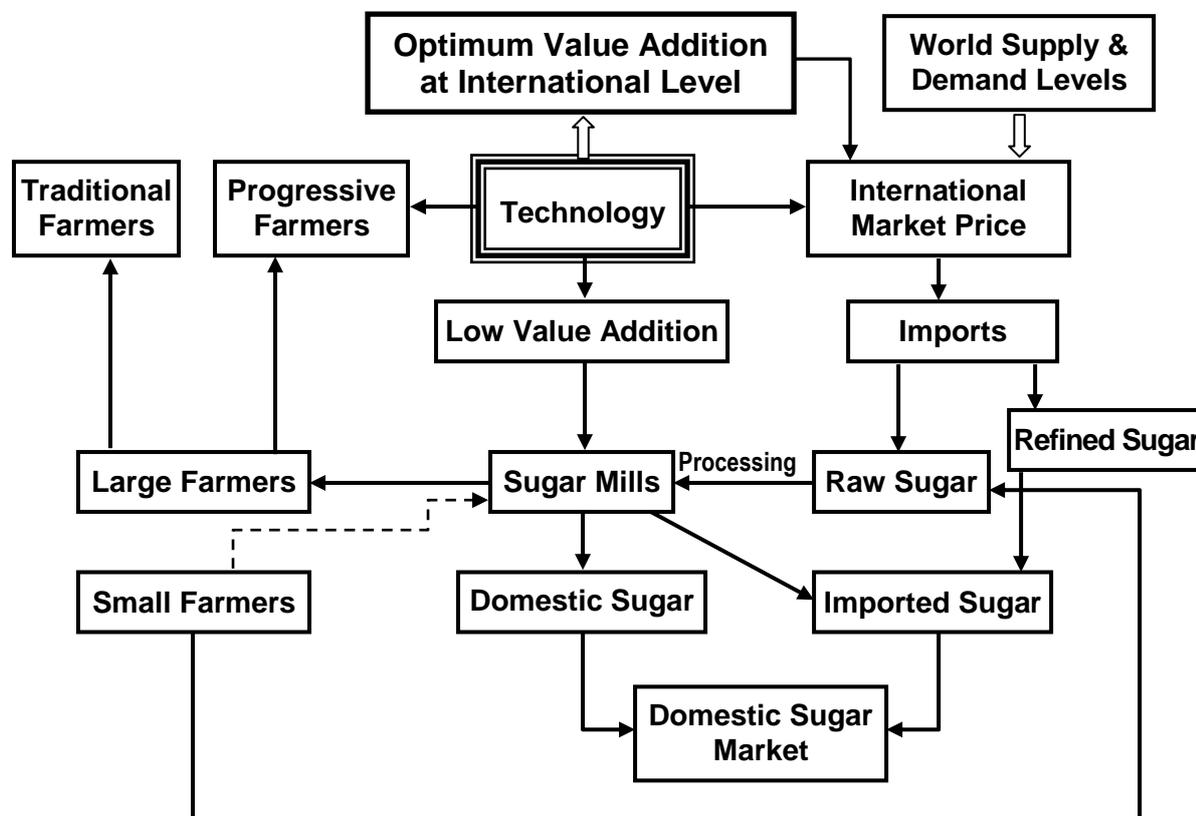
As discussed earlier, Pakistan has not yet achieved a stable pattern of sugar production for domestic consumption. The relative price structure of sugarcane and its competing crops, as well as the relative prices of sugar in Pakistan and neighboring countries determine the overall demand for sugar as well as sugarcane acreage. The relationship between growers and sugar mills, particularly with reference to the provision of credit and payment for sugarcane supplies also influences sugarcane acreage. As a matter of routine, sugar is imported to augment market supplies as well as to build stocks. Certain years have also witnessed the export of sugar. However, the rationale for export is based less on genuine surpluses than on the anticipation of a liquidity crisis for sugar mills in the wake of large, unsold stocks. Gaps in supplies have been bridged regularly through imports with low levels of sugar trade efficiency and with a somewhat cavalier disregard of their effects on mill-owners. Timing and quantity of exports and imports have not remained consistent either with domestic requirements or international market price variations. This simply reflects serious defects in the policies designed for the sugar industry.

A heavier focus on trade to stabilize the domestic market tends to overlook the potential of a boost in the production of sugarcane and the opportunities available through technical advancement in sugar production world-wide. The notion of technical innovation, which should have been heavily focused, has largely been ignored.

Currently, though the sugar industry has expanded rapidly, it still portrays a mix of traditional and non-traditional type of farmers using varying approaches towards the production of sugarcane. Similarly, sugar mills employ diverse production techniques and hence wide variations in efficiency levels are observed. Mills utilize varying levels of diversification through the utilization of by-products and production of derivatives. In this context, use of technology to improve production efficiencies at

the farm and mill levels is considered pivotal for the sugar industry's long term sustenance. Progress in this regard will also create the basis for achieving higher levels of trade-related efficiencies.

Chart 3.1
Flow Chart Highlighting Inter-linkages between Domestic and International Factors in Determining Sugar Supplies in Pakistan



Legends:

- ⇨ Strong Relationship / Impact
- One Way Relationship
- ↔ Two Ways Relationship
- ⇨⇨ Two Ways Weak Relationship

By attributing a central role to technology, Chart 3.1 exhibits relationships that currently exist in Pakistan in determining sugar supplies for the domestic market. Technology is shown as the engine of growth; optimum benefits are received internationally. However, in Pakistan the bulk of the technology that is used generates low value-addition.

The manner in which various factors are inter-related depicts the strength and direction of linkages. The sugar mills in the country, show low value addition and are predominantly traditional in their approach towards the production of sugar, its by-products and derivatives. In this process, mills depend on cane supplies from farms of

different sizes. The large farms seem to have better access and relationship with mills. A handful of large and progressive farmers attempt to use available technologies to improve farm-level efficiency by enhancing land productivity and sugarcane quality. Other large, but traditional farmers, who constitute a bigger proportion still employ primitive technology which exhibits low levels of land productivity.

Small farmers, who have limited access to mills, are the major suppliers of sugarcane. A significant proportion of small farmers (particularly in Punjab and PK-NWFP) also process sugarcane in open pan units to produce gur and other sweeteners which have bigger markets in the rural parts of the country and Afghanistan. These small farmers are often confronted with the issue of late payments for their sugarcane supplies to mills which affects their capacity to plan for the subsequent cropping season. Most small farmers face credit constraints from formal sources as well.

From the mid-1980s, zoning of sugar mills was introduced. All sugarcane growers in a particular zone were restricted to sell their cane supplies to a specific mill only. This competition-inhibiting practice has since been abolished. Over time, the rapid expansion in the number of sugar mills as well as enhancement in the crushing capacity led to the de-zoning of mills. Now each mill has to compete for the supply of cane. Newspaper reports suggest that farmers can charge up to 25 to 50 percent higher prices relative to cane prices fixed by provincial governments. Mills faced with excess capacity have an inelastic demand for sugarcane. Such mills end up paying higher prices for sugarcane. De-zoning was introduced largely in the context of excess capacity and not in the spirit of introducing fair competition among farmers in determining cane prices. In the process, prospects for technological progress were overlooked. A lack of technical support to farmers through public sector research organizations also contributed in pushing the farmers in the direction of technical inefficiency. The intent of the government to ignore efficiency parameters is evident from the fact that cane prices are still fixed each year, although such price fixation has been made largely ineffective by the cane growers. Had cane prices been linked to sucrose content along with weight, growers would have been encouraged to make farm level efficiency gains which would also have benefited the industry and society.

In addition to domestic supplies, refined and raw sugar is also imported regularly to augment the market stocks and stabilize consumption requirements. Raw sugar costs relatively less foreign exchange per unit of import and utilizes part of the idle capacity of mills. On the other hand, it can be used as an instrument by the mills to exploit farmers. Instead, a higher focus on technological innovation would improve cane yield levels and sucrose content which are quite low in Pakistan relative to rival sugar producing countries.

3.2 Marketing System

A number of factors reflect on the inefficiencies in the organization of production and marketing of the sugar industry. These factors jointly determine the competitive outlook of the industry, which is pivotal in attaining higher efficiencies in production and trade in the years ahead. At the beginning of the Report (in Chapter 1) it was posited that as a result of the cumulative interplay of three following factors, the industry appears as a quasi-rent seeking industry:

- i) The industry works with relatively old technologies;

- ii) A continuation of political leverage restricts the emergence of entrepreneurial urge towards innovation; and
- iii) Adoption of extremely low levels of value addition.

As a result, the prospects for future development through improvements in sugarcane yield levels and sucrose contents, optimal use of by-products and production of derivative products have been badly hurt.

With such deficiencies in the overall organization of production, the industry largely operates on the basis of meeting the recurrent cost of production and income exceeding outlays. In doing so it adopts approaches that tend to create major distortions in its system of production and marketing. It avoids necessary costs for research and development, machinery upgrades and improved management to improve returns from sugar and its by-products.

i) *Barriers to Entry*

In strictly legal terms, there is no barrier to obtaining a license for setting up a sugar mill in Pakistan. However, as per practice it requires an unwritten and informal approval from the political and social elite of the area where the mill is to be established. The political basis for award of licenses to sugar mills has a long history in Pakistan assisted by a generous policy requiring a debt-equity ratio of 70:30 percent in the industry.

A relatively weak and non-transparent approach followed by financial institutions in judging the feasibility of establishing sugar mills, particularly in areas which are technically not suited for sugarcane cultivation, has reduced the possibility of the longer term viability of sugar mills from the economic and social point of view. Furthermore, a weak and ineffective institutional framework in decision-making has not employed the active participation of civil society, research organizations and environmental agencies which could have averted the situation and carried out an unbiased cost-benefit assessment based on the principles of economics and natural resource management.

Patronage of the state in expanding the sugar industry on political rather than on commercial and economic grounds has further aggravated the situation thereby creating an information gap which allows borrowers to exploit it in their negotiations with the lenders. Specifically, this exploitation takes the form of over-invoicing to artificially inflate estimates of the setting-up costs of sugar mills. It is generally believed that as a result of this distortion, the debt-equity ratio of 70:30 effectively turns into a ratio of 90:10. The main escalations relate to the cost of land, plant and equipment. The government's policy response was negated by its own lack of accountability and transparency in the process. In most cases, an individual, or a group acquiring a license to establish a sugar mill invests only minimal equity in the venture.

This phenomenon is the basic flaw in government efforts at the development of an economically viable sugar sector. It has led to a considerable change (if not a reversal) in the investors' attitude, characterized by a virtual elimination of an entrepreneurial urge. Due to political patronage, which has over-

shadowed the economic and social dimensions of any business enterprise, it may be regarded as a form of collusion between entrepreneurs and politicians. The nexus has caused intense damage to the long term competitiveness of Pakistan's sugar industry

ii) *Fixation of Sugarcane Prices*

The sugar industry has followed practices which are against the norms of free market behaviour and competition. Until the mid-1980s, when the industry comprised 36 sugar mills, each mill had been allocated an agricultural zone to acquire sugarcane supplies. The growers in a zone were linked to a specific mill for selling sugarcane at prices determined by the respective provincial governments annually before the start of crushing season, a practice contrary to competition norms.

Whereas the fixation of cane prices itself is against the norms of a competitive environment, there was a further distortion in that cane supplies were priced on the basis of weight alone. A mechanism evolved, for premium payments to be made for aggregate sucrose content of a sugar mill exceeding a benchmark set by the provincial governments. It was exercised only in Sindh province. The mechanism was flawed since it was not based on individual supplies of cane. Rather, premium payments were made to all suppliers proportional to cane weight. Each supplier of cane, regardless of the sucrose level in his respective produce, was paid a premium on an equal footing. This typifies an adverse selection problem where efficiency is measured on aggregate performance rather than at an individual level. It sets perverse incentives for growers to improve cane quality. Eventually it also contributes towards inefficiency in the production of sugar. Although appropriate technology (Core Sampler) is readily available and extensively used in most countries, it is not utilized in Pakistan due to the lack of an entrepreneurial spirit on the part of the mill-owners.

After the mid-1980s, the industry expanded at a rapid pace. By the early 1990s it comprised of 62 sugar mills as compared to 36 in the early 1980's. At present, a total of 85 sugar mills constitute the sugar industry. The geographic fixation of a mill zone was abolished apparently to provide greater freedom to growers to fetch a fairer price for their produce. Some regard it a natural consequence of the higher density of sugar mills which made it impractical to demarcate a specific zone to each mill. The fixation of sugarcane prices by the government has however continued along with the policy of premium payments.

Fixation of prices favours sugar mills, whereas the farmers can receive a higher price for their cane supplies as an outcome of de-zoning. The government faces a complex situation. If it continues to fix sugarcane prices it would favour mills in stabilizing the cost of the production of sugar. On the contrary, if it allows competition among farmers and mills, (as an intended outcome of de-zoning) the price of cane may rise translating into a higher cost of sugar production.

Distortions are inherent based to the fact that sugarcane supplied is valued on the basis of weight only. Ideally, sucrose content needs to be included in the pricing mechanism. A fair method to determine sucrose levels shall convey appropriate signals to the farmer. Such an incentive shall ensure that mills receive a higher quality of sugarcane. A recent decision by the Supreme Court of Pakistan, based on the proposal by the Competition Commission of Pakistan that consideration be given to sucrose content in assessing a fair price for sugarcane appears to be an appropriate ruling from a competition standpoint. However, resolution of the issue of sugarcane price fixation alone may not significantly improve the overall performance of the sugar industry. A number of other policy issues need to be addressed (the following chapter focuses on this aspect in detail).

An inquiry report⁸, based on the study of various minutes of the meetings of PSMA and its various zonal committees and interviews of some of the office-bearers of the association, provides evidence that hint at some degree of collective decision-making on the part of sugar mills to fix sugarcane and refined sugar price levels. This assertion if analyzed in tandem with the earlier discussion on sugarcane price policy sheds light on the possibility of collusive behaviour by sugar producers in their efforts to fix prices of sugarcane. PSMA contends that it merely provides mill-owners with a forum to discuss the problems facing the sector and/or to make a collective representation to the government on policy issues. CCP's tentative judgment is that response is not the whole story and that PSMA has also played a role in facilitating price-fixing by its members.⁹

Whereas sugar mills appear, on the face of it, to be involved in practices that distort prices, some mills in their individual capacity purchase cane at prices higher than those fixed by provincial governments. Newspaper reports suggest that in Sindh, some mills started crushing after receiving supplies at Rs 130 to 140 as opposed to Rs 102 per 40 kg fixed by the government. Similarly in the preceding year (2007/08) reports suggest that sugarcane price was fixed at Rs 82 per 40 kg., while mills continued purchasing cane at Rs 120 or above.

If sugarcane prices do not stabilize within a reasonable range, the cost of sugar production and its price will inevitably rise. This will affect sugar mills and consumers adversely. Conversely, if the sugarcane price level is fixed and not based on the prevailing market situation, the farmers will be at loss. As a group, they may restrict supplies to mills and/or reduce cane acreage. The solution does not lie in replacing one group's collusive behavior with that of another. In either case, the market will not remain competitive, which is always an overall loss to society.

The solution would seem to lie in setting a *base price* for sugarcane in the context of a specified level of sucrose content. The proposed action is quite similar to existing practice and only differs on account of suggesting a *base price* rather than a *minimum price*. Simultaneously, there needs to be a clearly

⁸ Competition Commission of Pakistan, Inquiry Report on Collusive Practices in the Sugar Industry” by Shaista Bano Gilani and Syed Umair Javed, October 2009.

⁹ The matter is *sub judice*.

defined system of rewards and penalties. Farmers supplying cane with sucrose content higher than the benchmark should be paid an additional price as an incentive. Similarly, farmers supplying cane with lower sucrose level be penalized by paying a price less than the base price. Sugarcane price needs to depend on weight as well as sucrose contents, without any upper or lower limit. Relative to the current situation, the proposed scenario should be more conducive to competition norms. However, in doing so, the following aspects need to be ensured:

- a) Since sucrose content is measured within the premises of the mills, transparency needs to be ensured. The measurement mechanism should be understood by the farmer. The marketing margins and deductions also need to be transparent.
- b) Sucrose measurement should be at the level of the individual farm and not at the level of the entire crushing season. This will help distinguish between good supplies and bad supplies for an individual farmer as well.
- c) The mills may also provide other non-price incentives to growers.

With these corrective measures, the current imperfections in the sugarcane market can be reduced. The industry can be made to function on the basis of fairer competition, incentivizing farmers to grow better quality cane, as well as sugar mills to acquire higher quality of cane supplies with higher sucrose content.

In this regard, the advantages and disadvantages of zoning are finely balanced. On the one side zoning is anti-competition; on the other, it encourages mills and farmers to look at each others needs and constraints and develop ways of dealing with the issues confronting them. By not advocating the reintroduction of zoning in this context, the reasoning is that a more competitive environment should emerge which will ensure transparency in transactions, easy entry and exit for farmers as well as sugar mills and greater efficiency in sugar production. A cane producer will be independent in selling his output to any mill, given the quality of his product. Similarly, a sugar producer will be independent in purchasing cane from any grower in any quantity based on its quality and price.

iii) Inter-relationship among Key Variables Impacting on Sugar Production

With regard to sugar production, certain key variables remain the subject of discussion such as levels of cane crushed, total sugar produced, sucrose content, length of the crushing season and working capacity of mills in crushing cane.

Using PSMA data for 2008/09, the variability of these factors, their correlation and economies of scale are analysed in this Section. Table 3.1 shows the range and average levels of these variables. It depicts significant variation across sugar mills during 2008/09. The level of total cane crushed and sugar production show that these vary by a factor of 40 to 60 in the industry, implying significant variations in the capacity of sugar mills in the country.

Table 3.1
Descriptive Statistics on Level of Crushing, Sugar Production,
Length of Crushing season in Pakistan (2008/09)

	N	Minimum	Maximum	Mean	Standard Deviation
Cane Crushed “000” tone	76	36	1665	408.6	284.79
Total Production “000” tons	76	3.0	170.3	38.7	29.61
Season (Total # Days)	76	50	139	101.7	16.96
Average Recovery Rate (%)	76	7.5	11.3	0.093	0.009
Average Cane Crush/Day/Mills	76	0.71	15.42	3.89	2.54

Source: Derived from PSMA Data for 2008/09.

Note: No. of mills is less than the total of 80 mills due to incomplete data.

The length of the crushing season is associated with less variability. The length of the crushing season has been reduced in the country due to a variety of factors including rapid increase in capacity, failure to introduce early and late varieties of cane and competition for land for various other crops. The recovery rates, which have recently exhibited greater variability in the upward direction, show some mills achieving 11 percent recovery. Whereas a higher recovery rate is beneficial to all stakeholders, the low levels of 7 or 8 percent still point towards inappropriate and inefficient decisions of excessive cultivation of cane and extension in the number of sugar mills. A high variability in the level of average cane crushed per day per mill is not particularly surprising.

Table 3.2 highlights the degree of correlation among these variables which are all statistically significant except the relationship between the length of the crushing season and recovery rates. As indicated earlier, a shorter crushing season is associated with higher sucrose content i.e., when cane is crushed in the peak season, the recovery rates improve. Since durations of the crushing season have been reduced in relation to the past, the variability in sucrose levels has also been reduced but the biological relationship between the two factors diminishes as they come closer to periods of higher recovery.

Table 3.2
Correlation Coefficients among Specific Variables

	Crushed	Production	Season	Average Recovery Rate	Average Cane Crush
Cane Crushed	1				
Total Production “000” tones	0.990** (0.000)	1			
Season (Total # Days)	0.247** (0.000)	0.392** (0.000)	1		
Average Recovery Rate (%)	0.345** (0.002)	0.444** (0.000)	0.089 (0.446)	1	
Average Cane Crushed/Day/Mills	0.986** (0.000)	0.981** (0.000)	0.297** (0.009)	0.360** (0.001)	1

Source: Derived from PSMA Data for 2008/09.

Table 3.3 shows the relationship between the length of the crushing season and average level of crushing for each category of sugar mills. It tends to suggest the crushing season of 90 to 120 days as optimal in improving the average crushing per day by individual mills.

Table 3.3
Average Level of Cane Crushed per Day per Mill
by Total Cane Crushed and Crushing Season

(‘000 tons of cane per day per mill)

Cane Crushed in thousand tones	Crushing Season	Mean	N
Up to 500	Up to 60 days	2.2765	3
	60 to 90 days	1.6653	10
	90 to 120 days	3.2668	39
	Higher than 120 days	2.2686	5
	Total	2.8462	57
500 to 750	90 to 120 days	5.7397	11
	Higher than 120 days	5.0500	2
	Total	5.6336	13
Higher than 750	90 to 120 days	10.0548	6
	Total	10.0548	6
Total	Up to 60 days	2.2765	3
	60 to 90 days	1.6653	10
	90 to 120 days	4.4799	56
	Higher than 120 days	3.0633	7
	Total	3.8921	76

Source: Derived from PSMA Data for 2008/09.

Table 3.4 shows the relationship between the length of the crushing season and recovery rates for different categories of mill capacity. The data suggests only weak presence of economies of scale, as recovery rates increase only marginally as size increases.

Table 3.4
Average Recovery Rate by Cane Crushed and Crushing Season

(Percentage)

Cane Crushed in thousand tones	Crushing Season	Recovery Rate (%)	N
Up to 500	Up to 60 days	8.74	3
	60 to 90 days	9.43	10
	90 to 120 days	9.01	39
	Higher than 120 days	9.20	5
	Total	9.09	57
500 to 750	90 to 120 days	9.78	11
	Higher than 120 days	9.43	2
	Total	9.72	13

Higher than 750	90 to 120 days	9.95	6
	Total	9.95	6
Total	Up to 60 days	8.74	3
	60 to 90 days	9.43	10
	90 to 120 days	9.26	56
	Higher than 120 days	9.26	7
	Total	9.26	76

Source: Derived from PSMA Data for 2008/09.

iv) **Excessive Cultivation of Sugarcane**

The earlier Section has shed light on the possibility of excessive expansion of the sugar industry, especially in the context of a stabilize level of sugarcane cultivation. This Section extends the discussion further by carrying out a district level analysis of cane yield levels, size of cultivation and number of sugar mills for each province. Tables 3.5 to 3.7 provide a provincial coverage of the issue.

Table 3.5
District Level Production Status of Sugar Industry in Sindh Province (2008/09)

District	# Sugar Mills (in operation) (No.)	Av. Recovery Rate (Sucrose Contents) 2008-09 (%)	District Level Total Cane Area 2008-09 (‘000’ Hectares)	Crushing per Day per Mill (Tons)	Av. Sugarcane Yield (Av. of 2006-08) (Tons/Hectare)
1. Badin	5	9.25	59.8	2422	63.4
2. Ghotki	1	10.55	8.4	5879	58.3
3. Hyderabad*	7	9.11	77.4	3601	63.0
4. Khairpur	2	8.50	24.6	2350	54.7
5. Larkana	1	8.80	0.6	1288	51.4
6. Mirpurkhas**	5	9.88	25.8	2960	54.1
7. Nawabshah	3	9.25	26.7	5527	60.0
8. Sanghar	1	9.50	13.9	4523	57.6
9. Thatta	4	9.20	41.0	3463	65.6
Total	29	9.33	308.8	3358	61.4

Source: Computed from:

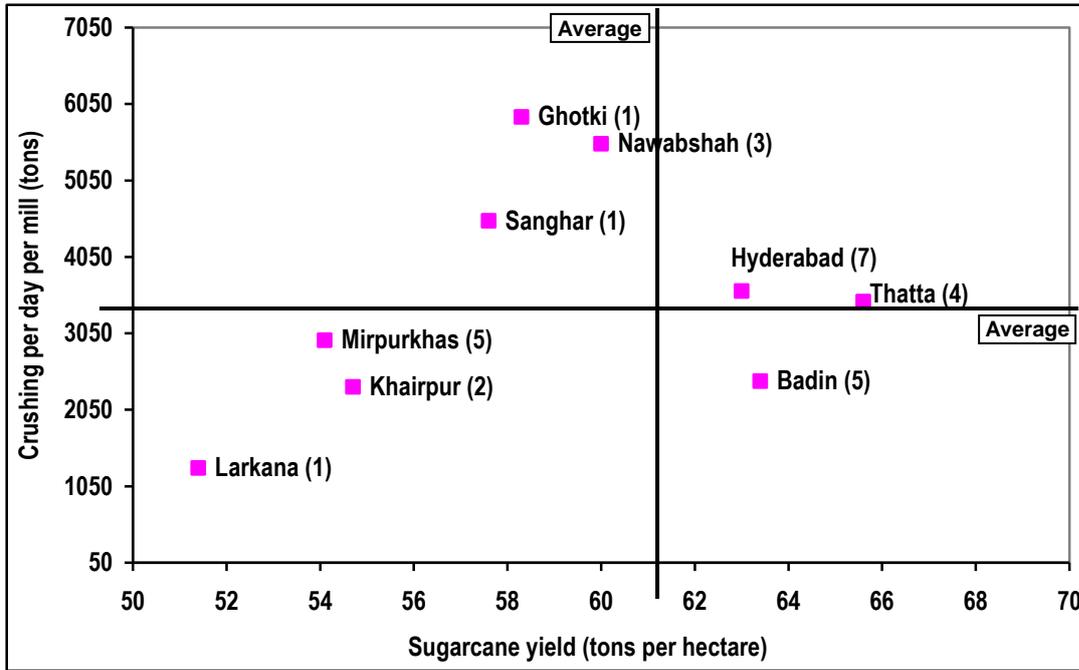
1. Government of Pakistan, MINFAL, Agricultural Statistics 2007/08 (District Level Crop Data).
2. Pakistan Sugar Mills Association (PSMA), Mill-wise Final Statement 2008/09.

* Includes T.M. Khan, T. Allahyar Khan & Matiari

** Includes Tharparkar & Umer Kot.

Chart 1.1

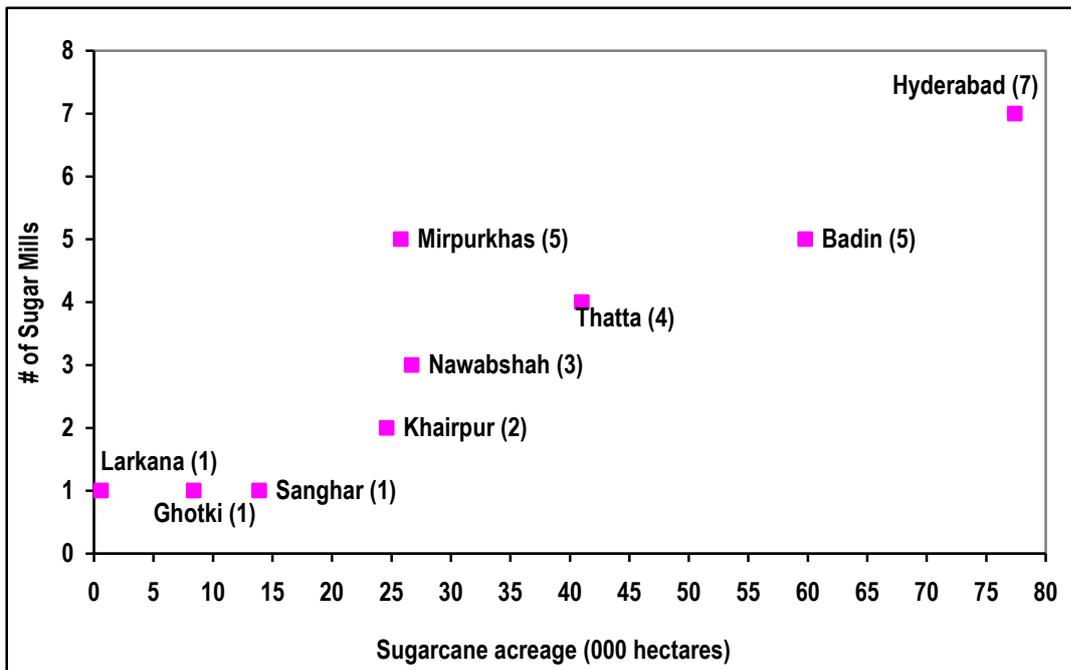
District-Wise Levels of Sugarcane Crushing per Day per Mill and Average Sugarcane Yield in Sindh Province



Note: Figures in parenthesis show # sugar mills in operation during 2008/09.

Chart 1.2

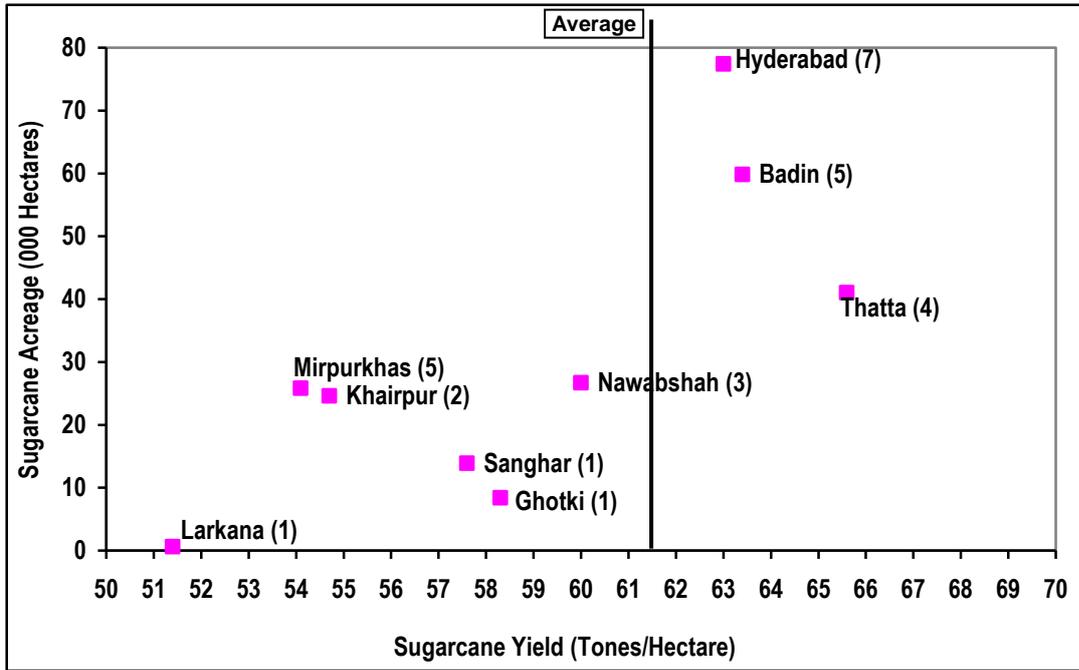
District-Wise Levels of Sugarcane Acreage and # of Sugar Mills in Sindh Province



Note: Figures in parenthesis show # sugar mills in operation during 2008/09.

Chart 1.3

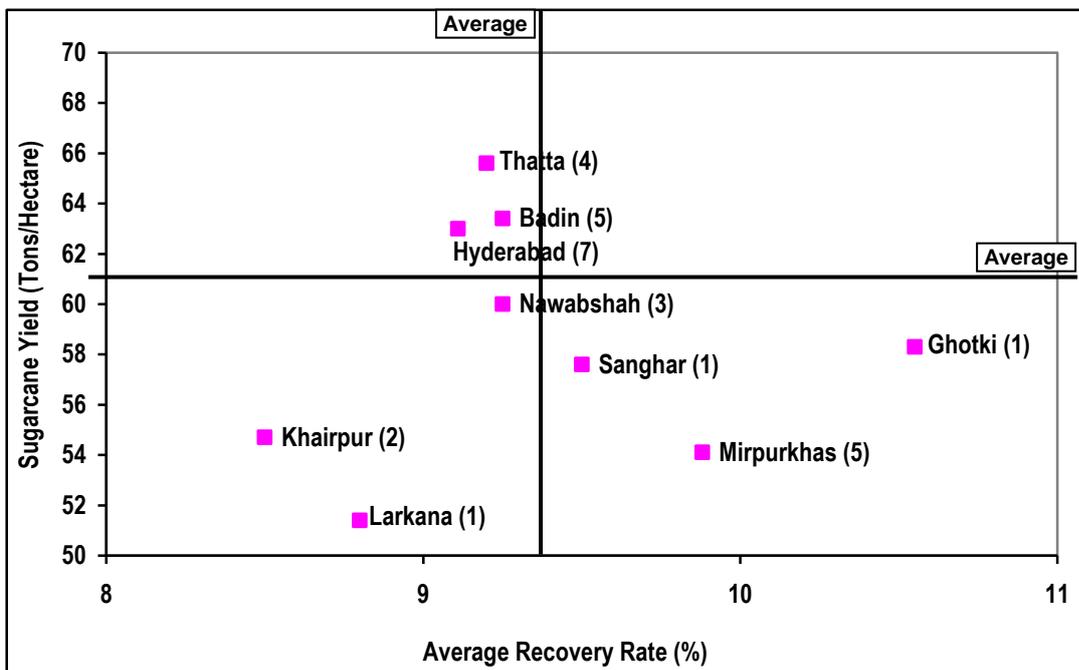
District-Wise Levels of Sugarcane Yield and Sugarcane Acreage in Sindh Province



Note: Figures in parenthesis show # sugar mills in operation during 2008/09.

Chart 1.4

District-Wise Levels of Sugarcane Yield and Average Recovery Rate in Sindh Province



Note: Figures in parenthesis show # sugar mills in operation during 2008/09.

Based on average levels of cane yield in Sindh it shows that:

- i) District-level yield varies by as much as 30 percent in districts that have sugar mills.
- ii) A larger number of mills in a district is associated with low levels of crushing level per day per mill.
- iii) Recovery rates seem to be associated with higher levels of crushing per mill per day.

In the case of Punjab province, Table 3.6 shows that:

- i) Higher recovery rates are associated with higher sugarcane yield levels but not necessarily with higher levels of crushing per day per mill.
- ii) Sugarcane yield levels vary by a large margin of 48 percent.
- iii) Southern and Northern districts have higher cane yield levels.

Table 3.6

District Level Production Status of Sugar Industry in Punjab Province (2008/09)

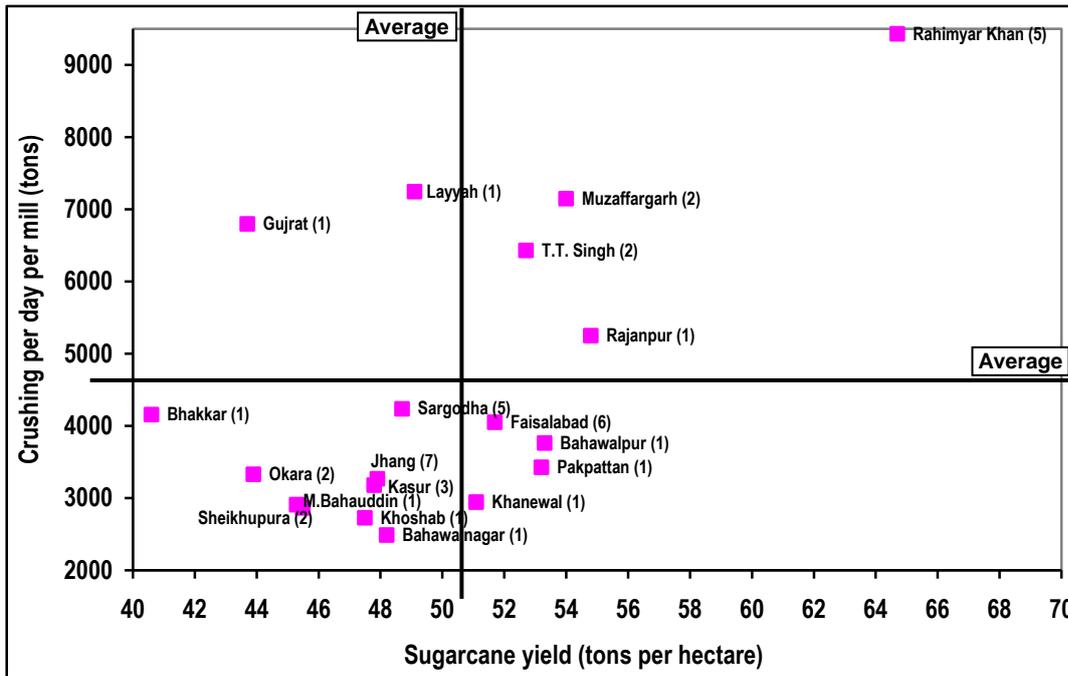
District	# Sugar Mills (in operation) (No.)	Av. Recovery Rate (Sucrose Contents) 2008-09 (%)	District Level Total Cane Area 2008-09 (‘000’ Hectares)	Crushing per Day per Mill (Tons)	Av. Sugarcane Yield (Av. of 2006-08) (Tons/Hectare)
1. Okara	2	8.2	25.5	3328	43.9
2. Sargodha	5	8.6	69.6	4234	48.7
3. Bahawalnagar	1	9.5	21.9	2486	48.2
4. Bahawalpur	1	9.7	12.2	3763	53.3
5. Kasur	3	8.7	52.2	3179	47.8
6. Faisalabad	6	8.6	125.1	4047	51.7
7. Toba Tek Singh	2	9.6	46.6	6431	52.7
8. Mandi Bahauddin	1	8.4	39.3	2909	45.3
9. Khanewal	1	10.2	18.6	2943	51.1
10. Rahimyar Khan	5	10.7	95.5	9430	64.7
11. Muzaffargarh	2	9.0	45.3	7148	54.0
12. Bhakkar	1	8.0	18.6	4156	40.6
13. Jhang	7	9.2	113.3	3266	47.9
14. Sheikhpura	2	9.1	2.0	2863	45.5
15. Rajanpur	1	10.6	13.8	5246	54.8
16. Pakpattan	1	8.7	11.7	3425	53.2
17. Khoshab	1	9.1	8.5	2726	47.5
18 Layyah	1	9.4	17.0	7242	49.1
19. Gujrat	1	9.3	2.8	6797	43.7
Total (Punjab)	44	9.5	827.2	4632	50.7

Source: Computed from:

1. Government of Pakistan, MINFAL, Agricultural Statistics 2007/08 (District Level Crop Data).
2. Pakistan Sugar Mills Association (PSMA), Mill-wise Final Statement 2008/09.

Chart 2.1

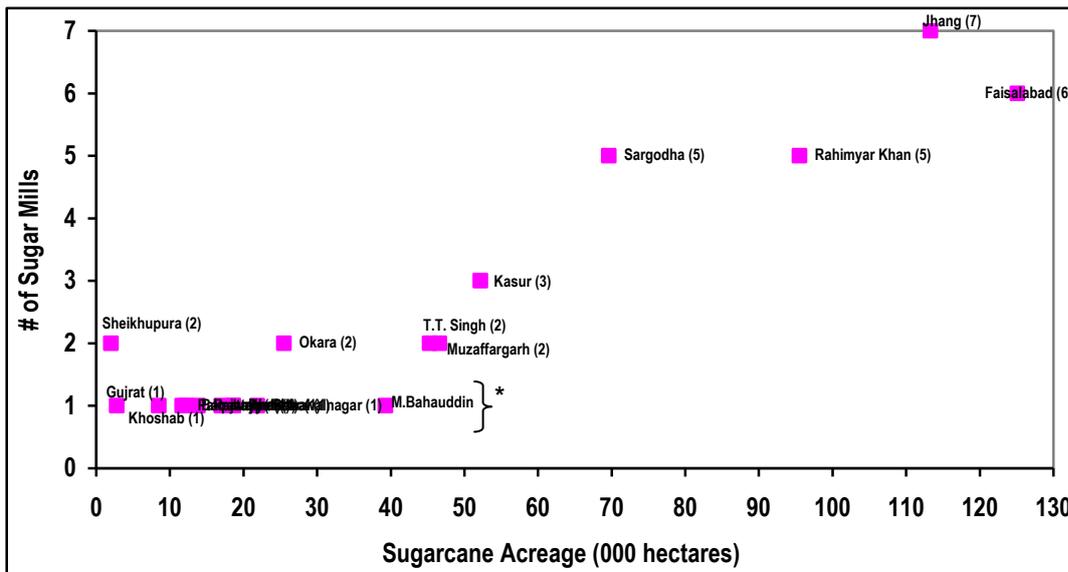
District-Wise Levels of Sugarcane Crushing per Day per Mill and Average Sugarcane Yield in Punjab Province



Note: Figures in parenthesis show # sugar mills in operation during 2008/09.

Chart 2.2

District-Wise Levels of Sugarcane Acreage and # of Sugar Mills in Punjab Province



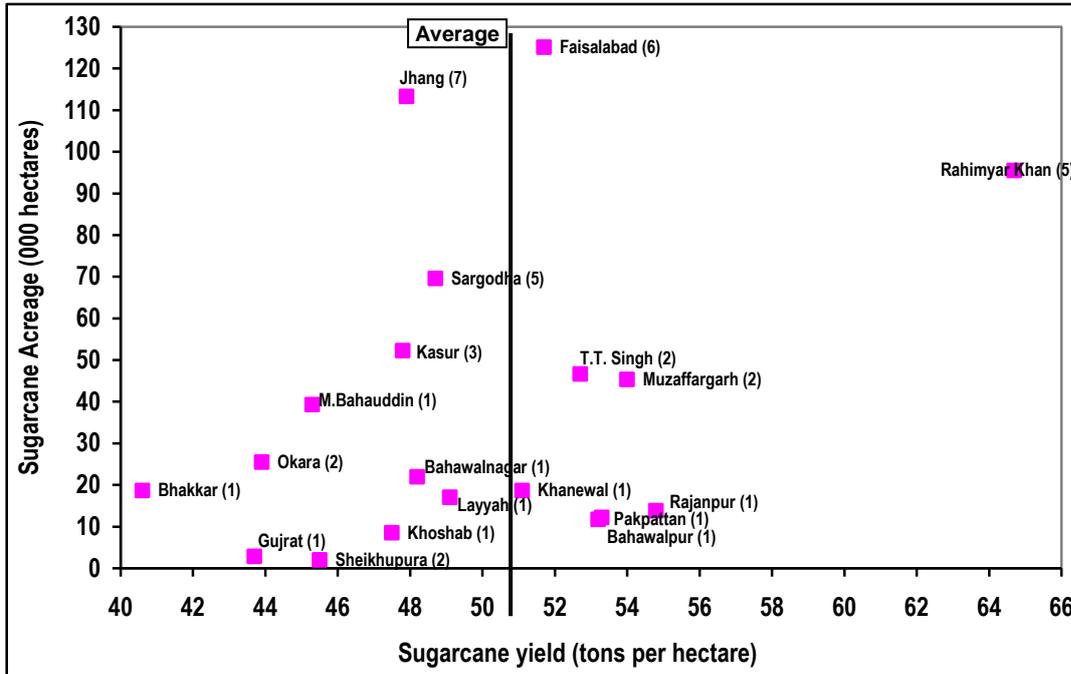
Note: Figures in parenthesis show # sugar mills in operation during 2008/09.

* These include the following:

1. Bahawalnagar	1	6. Rajanpur	1
2. Bahawalpur	1	7. Pakpattan	1
3. Mandi Bahauddin	1	8. Khoshab	1
4. Khanewal	1	9. Layyah	1
5. Bhakkar	1	10. Gujrat	1

Chart 2.3

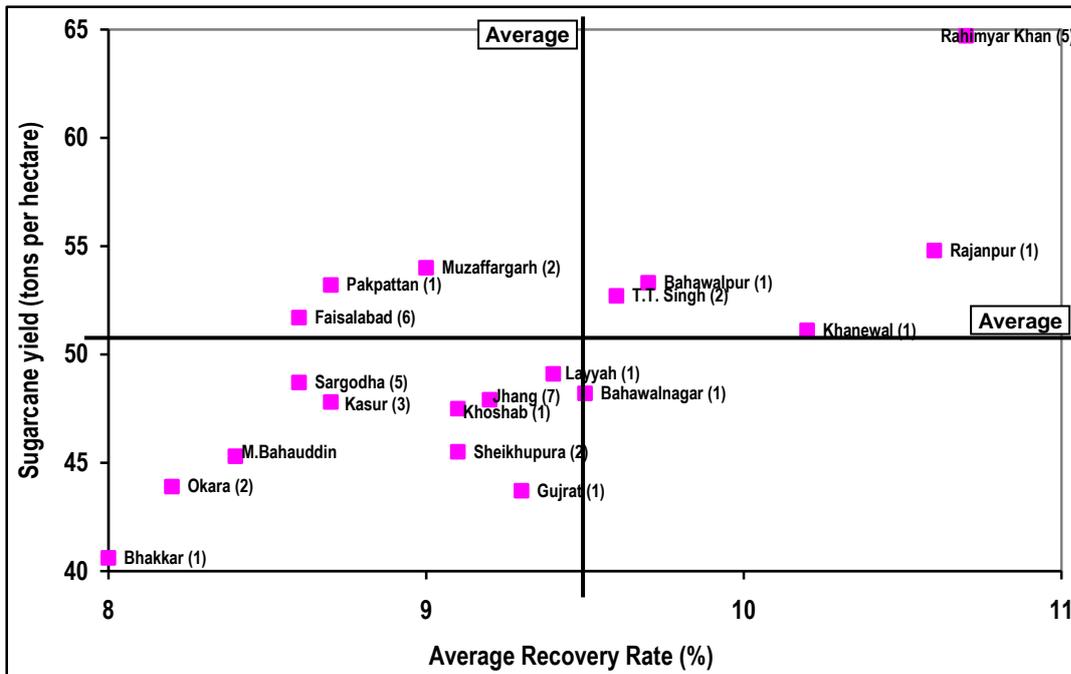
District-Wise Levels of Sugarcane Yield and Sugarcane Acreage in Punjab Province



Note: Figures in parenthesis show # sugar mills in operation during 2008/09.

Chart 2.4

District-Wise Levels of Sugarcane Yield and Average Recovery Rate in Punjab Province



Note: Figures in parenthesis show # sugar mills in operation during 2008/09.

In the case of KP, Table 3.7 reveals that:

- i) Dera Ismail Khan (DIK) which has below average yield levels has four out of the total of seven mills in the province.
- ii) Mills in DIK are of a much larger size as compared to other districts as reflected through the levels of cane crushed per mill per day.
- iii) Sucrose level seems to be associated with higher cane yield levels.

Table 3.7

District Level Production Status of Sugar Industry in KP Province (2008/09)

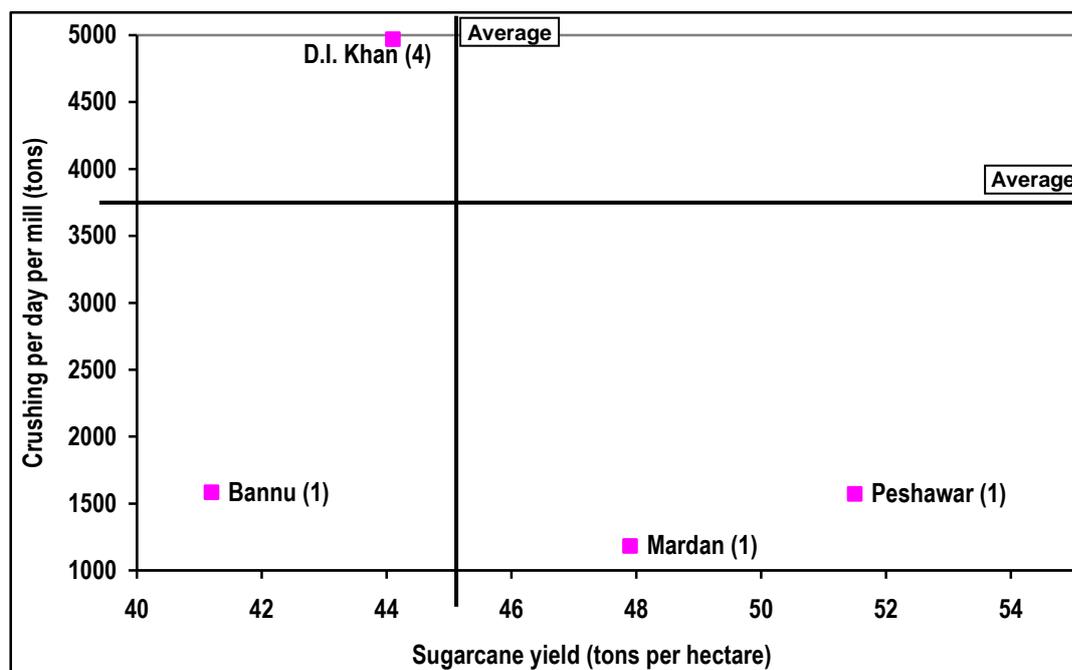
District	# Sugar Mills (in operation) (No.)	Av. Recovery Rate (Sucrose Contents) 2008-09 (%)	District Level Total Cane Area 2008-09 (‘000’ Hectares)	Crushing per Day per Mill (Tons)	Av. Sugarcane Yield (Av. of 2006-08) (Tons/Hectare)
1. D.I. Khan	4	8.3	12.9	4969	44.1
2. Peshawar	1	9.7	11.9	1571	51.5
3. Mardan	1	9.2	29.5	1181	47.9
4. Bannu	1	7.9	0.8	1583	41.2
Total	7	8.4	104.8	3762	45.8

Source: Computed from:

1. Government of Pakistan, MINFAL, Agricultural Statistics 2007/08 (District Level Crop Data).
2. Pakistan Sugar Mills Association (PSMA), Mill-wise Final Statement 2008/09.

Chart – 3.1

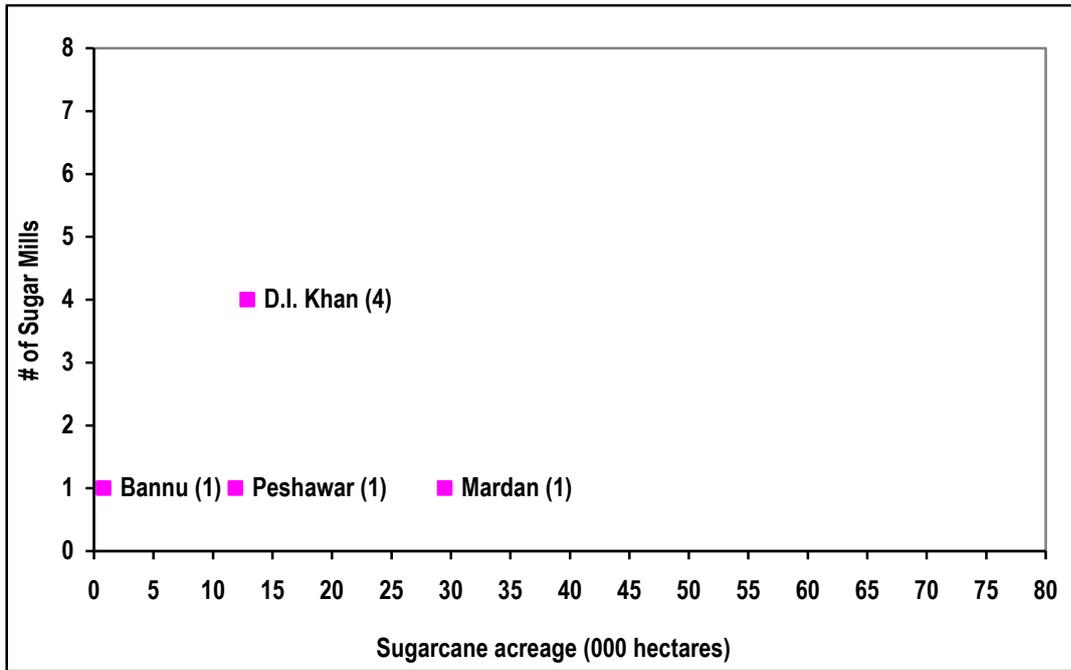
District-Wise Levels of Sugarcane Crushing per Day per Mill and Average Sugarcane Yield in KP Province



Note: Figures in parenthesis show # sugar mills in operation during 2008/09.

Chart – 3.2

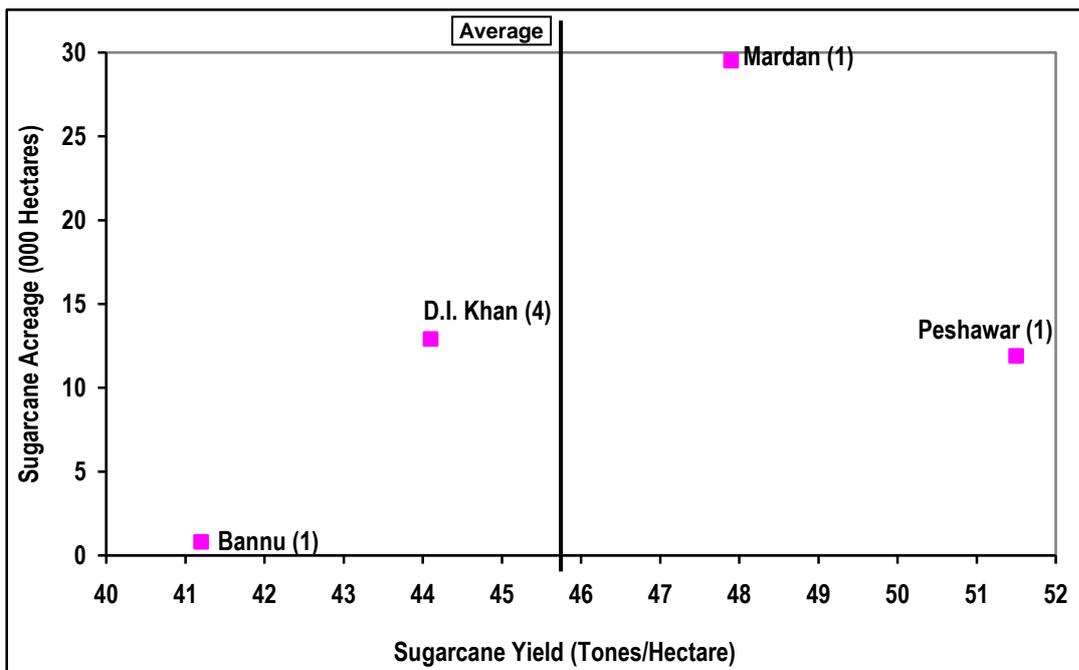
District-Wise Levels of Sugarcane Acreage and # of Sugar Mills in KP Province



Note: Figures in parenthesis show # sugar mills in operation during 2008/09.

Chart – 3.3

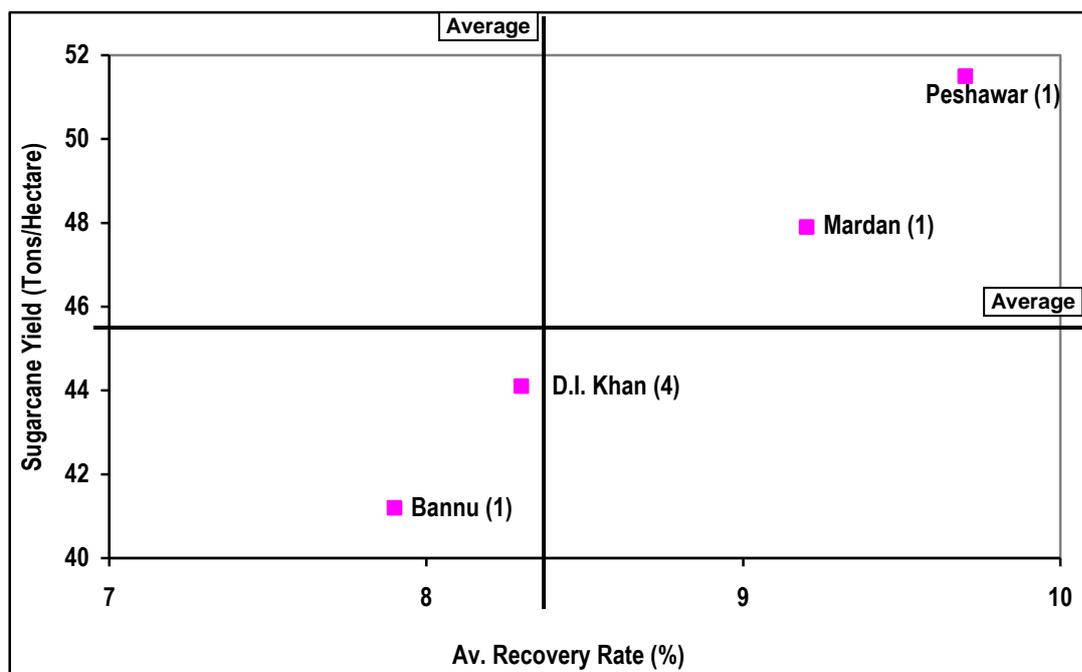
District-Wise Levels of Sugarcane Yield and Sugarcane Acreage in NWF Province



Note: Figures in parenthesis show # sugar mills in operation during 2008/09.

Chart 3.4

District-Wise Levels of Sugarcane Yield and Average Recovery Rate in KP Province



Note: Figures in parenthesis show # sugar mills in operation during 2008/09.

The above analysis depicts inefficiencies and raises important policy questions, especially regarding the rationale of expanding sugar mills in different agro-climatic regions.

v) **Current Cost Structure of Sugar Production: (A Sensitivity Analysis)**

In the context of the recent sugar crisis in the country, an analysis of the current cost structure of sugar production was carried out. It starts with a base picture of 2008/09 as scenario-1 and builds ten additional scenarios by altering key variables like cane price, recovery rates, cost of conversion to judge the variability in the total cost of sugar production (i.e. ex-mill price) and consumer price level.

The attached Table 3.8 portrays 11 different scenarios. The scenario1 depicts the baseline picture where modest levels of recovery and maximum cost of conversion were taken into account. The remaining ten scenarios are based on different assumptions related to:

- i) **Sugarcane Prices:** The reason for sensitizing this variable rests with the fact that sugar mills keep extending their crushing season and prefer to pay high prices for cane to achieve their private breakeven (Reference Scenarios 2, 3 & 4).

Table 3.8

Current Structure of Cost of Production of Sugar in Pakistan and Its Variability under Different Scenarios

Status	Difference Scenarios of Cost of Sugar Production										
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9	Scenario 10 (Bleak Scenario)	Scenario 11 (Brighter Scenario)
	Baseline (as of 2008-09)	Sugarcane price increased by 25%	Sugarcane price increased by 50%	Sugarcane price increased by 75%	Keeping sucrose contents at 9.25%	Keeping sucrose contents at 9.5%	Keeping conversio n cost at Rs.3.50 per Kg.	Keeping conversio n cost at Rs.4.0 per Kg.	Keeping conversio n cost at Rs.4.50 per Kg.	Sugarcane price 175/40 Kg - Recovery 9% - Conversion cost Rs.5/Kg.	- Sugarcane price Rs.105/40 Kg. - Recovery 9.5% - Conversion cost Rs.4/Kg.
1. Cane Prices (Rs./40 Kgs.)	100	125	150	175	100	100	100	100	100	175	105
2. Cane Prices (Rs./100 Kgs.)	250	312.5	375	437.5	250	250	250	250	250	437.5	262.5
3. Recovery Rate	9%	9%	9%	9%	9.25%	9.5%	9.0%	9.0%	9.0%	9.0%	9.5%
4. Sugar produced from 100 Kgs. of cane	9 Kg.	9 Kg.	9 Kg.	9 Kg.	9.25 Kg.	9.5 Kg.	9.0 Kg.	9.0 Kg.	9.0 Kg.	9.0 Kg.	9.5 Kg.
5. Cost of Sugar / Kg:											
i) Sugarcane Cost (Rs.)	27.8	43.7	41.7	48.6	27.0	26.3	27.8	27.8	27.8	48.6	27.6
ii) Conversion Cost (Rs.)	5.0	5.0	5.0	5.0	5.0	5.0	3.5	4.0	4.5	5.0	4.0
iii) Excise Duty (Rs.)	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
6. Ex-Mill Price (Rs./Kg.)	35.40	42.3	49.3	56.2	34.6	33.9	33.9	34.4	34.9	56.2	34.2
7. Marketing Margin including marketing, storage, wholesale profit (Rs./Kg.)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
8. Consumer Price (Rs./Kg.)	39.40	46.3	53.3	60.2	38.6	37.9	37.9	38.4	38.9	60.2	38.2
9. Cost of cane in sugar cost (as per Ex-Mill Price)	78.5	82.0	84.6	86.5	78.0	77.6	82.0	80.8	79.7	86.5	80.7

Source: Computed on the basis of PSMA Annual Report, 2008, and field level data collected for the study.

- ii) Recovery Rate: The latest unpublished data for 2008/09 shows significant variation in the level of recovery across individual mills, ranging from 7.5 to 11.3 percent. Based on this information, the variable was sensitized within a reasonable limit (Reference Scenarios 5 & 6).
- iii) Conversion Cost: It is a cumulative indicator of all other costs (except that of sugarcane) including wages/ salaries, chemicals, depreciation, repairs and maintenance and internally determined profits, etc. Currently it ranges between Rs 3.50 to Rs 5.0 per kg of sugar produced. Keeping in view this efficiency indicator, the variable was sensitized to assess its respective impact (Reference Scenarios 7, 8 & 9).

Based on the above, scenarios 2 to 9 were prepared. Scenarios 10 and 11 were prepared to account for extreme situations.

The sensitivity analyses show that efficiency gains (or losses) associated with each scenario depict obtainable levels of performance. These estimates, therefore, do not reveal the actual potential latent in the soil, climate and human resource capacity of the industry which are obtainable in the long run if drastic policy measures are taken by the government.

In summary, the results of the sensitivity analysis show a range of sugar price levels for consumers. It shows that a tighter control over the length (as well as on the starting date for crushing) needs to be exercised in order to ensure that sugarcane prices paid to the growers do not exceed the competitive price level. This would require an appreciable increase in the level of cane crushed per day of the crushing season (i.e. rate of capacity utilization needs to be increased significantly from a low level of 50 to 60 percent as present). Since the cost of cane accounts for over 80 percent in the cost of sugar production, it is apparent that a hike in the cane price level may lead to substantial increases in sugar price.

The improvements in sucrose contents may also reduce sugar prices. The efficiency indicator of management (i.e. conversion cost) shows that some reduction in sugar prices can still be achieved with improvements in technical management at the level of mills. More efficient use of by-products through establishing downstream industries to produce a large number of derivatives would also boost the income of sugar mills and would thus help reduce the cost of conversion of sugarcane into refined sugar.

On the whole, the analysis reveals that if sugarcane prices are determined by market forces through competition and based on sucrose contents, sugar price (i.e., consumer price) may remain well under Rs 40.00 per kilogram during 2009/10.

vi) *Mill-Farmer Interaction*

The de-zoning process in the cultivation and sale of sugarcane has provided free entry and exit to farmers but has reduced mill-farmer interaction. Although de-zoning did not aim at disturbing such interactions, in practice it did. The farmers and sugar mills both paid an invisible cost i.e., de-zoning led to de-linking of farmers with sugar mills. As a consequence, farmers did not receive the benefits of credit and extension services.

The situation was further aggravated by the emergence of middle men who while ostensibly bridging the gap between farmers and mills in practice caused significant distortions in cane price levels and delays in shipment of cane to mills. Both these factors escalated the cost structure of sugar. The practice of collusive behavior started not only across mills in suppressing cane prices but also amongst farmers by dictating higher cane prices to mills. The role of the middlemen was quite apparent.

A strict adherence to sucrose contents in the base price, instead of the minimum price, for cane supplies will not only harmonize the price structure but should create the basis for increased competition among growers to increase their income through qualitative improvements in cane production. Simultaneously, the mills would not hesitate in paying a higher cane price in exchange for higher sucrose content which would be advantageous for them due to the reduced cost of sugar production. Mill-farmer interaction would be promoted since the mills would like to encourage farmers to improve the quality of cane supplies. This should also reduce the role of middlemen. However, it remains relevant to point out here that pricing based on sucrose contents alone does not rule out collusive price fixing by the millers or the growers.

3.3 Taxation Policies

i) *Sugarcane Cess Fund*

The growers of cane have historically had to contribute to a sugar cess fund deducted from the cane price received by growers. The purpose was to establish a road infrastructure to facilitate transport of produce to mills, as well as to carry out research. It is evident that significant revenue was generated by the government through the cess fund. In the earlier period, it was kept by the district administrations, and after the establishment of local government system it was controlled by local government officials. The PSMA claims non-availability of money not only for improving the logistics of the industry - such as farm to mill

roads – but a lack of funds even to establish a ‘public good’ in the form of a research and development institute at Gharo, Sindh¹⁰.

ii) Sales Tax and Excise Duty

Historically, sales and excise taxes have been imposed on the industry in varying forms. For example, at times taxes have been imposed on production levels or alternatively on the basis of capacity of the mills. Until recently sales tax was levied at a uniform rate of Rs 4.62 per kg of sugar produced and has now been reduced to half i.e., Rs 2.31 per kg. This was done as an effort by the government to reduce the cost of sugar production and hence retail prices of sugar.

It seems that succeeding governments have interchangeably used different taxation policies to impose sales taxes on sugar mills. A tax based on capacity of mills is easy to collect and carries a built-in incentive for mills to increase production level. This instrument did not work properly because of increasing discrepancies between actual and rated capacities (i.e., capacity as per record of the Federal Board of Revenue). Due to this tax evasion, the government often switched to impose sales tax on production levels. This approach requires a detailed daily record of production to be maintained and is inherently prone to corruption.

Over time, with the rapid increase in the size of the industry both in terms of new mills and enhanced capacity of existing mills, the rate of capacity utilization of mills started declining below the 100 percent mark. This led to an exclusive selection of sales tax on actual production at the cost of ignoring incentives to increase production levels. This approach suited the sugar mills which were suffering from increased expansion of the industry.

Excise duty is levied on the basis of 0.1 percent of the selling price of sugar after subtracting sales tax. Excise duty on sugar is a direct function of the price of sugar, whereas sales tax is levied at the prevailing rate of 16 percent under normal circumstances.

¹⁰ PSMA Chairman’s Annual Review, 2008

CHAPTER 4

Diversification through Vertical Integration

As discussed earlier, the sugar industry has remained under the influence of various factors at different points in the value chain that have led to inefficiencies in a cumulative fashion. As a consequence, the entrepreneurial urge required in the industry for the establishment of a competitive environment, has not emerged. The direct and indirect impact of such a situation has not remained confined to the industry itself. Its spillover effects have badly damaged the prospects for establishing downstream industries, which might have assisted in job creation and hence reduced poverty levels in the country. PSMA's role in this regard in creating an environment in which the forces of competition and innovation have not thrived deserves to be noted.

4.1 Impact of Distorted Policies

In the sugar industry in Pakistan, prospects for wide-ranging import substitution and export expansion through downstream industries have been essentially neglected. In the process, technological advancement has not been used as an instrument for growth and diversification in the industry. Instead, the approach adopted by the industry has been that of production of only sugar and a few by-products. More fundamentally, it has been based on *manipulating both sugar and sugarcane price levels* either through policies determined by the government and/or through collusive type of behaviour between sugar mills as well as by the larger farmers, obviously within the limits set by international sugar prices. But, whereas consumers have experienced higher domestic prices when international prices have been higher than the former they have never benefited when the situation has been reversed.

Taking advantage of unusually high sugar prices in the international markets, arguments are presented for a high domestic sugarcane and sugar prices based on the virtues of free markets. However, at times when international sugar prices relative to domestic cost of production are low, the industry is foremost (and very vocal) in seeking protectionist policies. On many occasions, financial subsidies are provided by the government for the industry to remain competitive with the rest of the world, or sugar imports are controlled to provide artificial support. In either case, the industry has never felt comfortable with a competitive environment across the industry at home or with other competing regions across the world. Over time, this tendency has caused considerable economic and social hardship to society. At times the political consequences of sugar crises on the country have been very visible and damaging for the government in office at the time.

The pricing policies followed for sugarcane and sugar by the government, at the cost of technological growth in the sugar industry, has created distortions in its development and pushed it into the ranks of countries with low levels of productive efficiency in the industry. Such a situation has encouraged *the growth of an anti-competition mind-set in the industry.*

4.2 Path towards Optimal Resource Use through Competition

Technological development assists in maximising benefits from the use of a particular set of resources. In the process it helps in diversifying the production process to generate a wider array of products. Given the possibilities of diversification at any point in the value chain, appropriate incentives are required to maximize economic gains offered by technological change. Whereas the former (i.e., technological possibilities) help maximize levels of technical efficiency, the latter (i.e., pricing policies) assist in improving allocative efficiency on the part of investors in the industry. However, for the achievement of overall economic efficiency, both technical and allocative efficiency is required and *the process that delivers both is competition*.

Technological developments also carry the benefit of not only reducing the extent of waste in any production process, but also contribute through opening of new avenues to extract additional benefits. The process of vertical (as well as horizontal) integration of products of any industry is exclusively based on extracting benefits through a series of value-addition steps in the production chain. Indeed, from a forward-looking perspective, such developments should also incidentally help reduce the emission of hazardous gases from the production process, thereby providing gains through environmental sustenance and often financial and economic returns associated with emission controls e.g. carbon credits through reduction in the emission of carbon dioxide (CO₂).

4.3 Latent Potential of Pakistan's Sugar Industry

In the light of the preceding discussion on the relationship and impact of technological development on economic rates of return, the sugar industry of Pakistan presents a classic case where despite operating on a relatively large scale (i.e., being fourth or fifth largest country in terms of sugarcane acreage), a conducive natural environment, controlled and reliable irrigation practices, ample labour, competent technical personnel, a varied industrial base and stable financial institutions, the industry has not established itself as a strong economic activity, i.e. one that can be internationally competitive. Conversely, deeply ingrained political underpinnings have created a somewhat questionable basis for its existence and expansion through price fixation and subsidies which have negated the spirit of competition. As a result, several inefficient mills continue to exist in the sector and as sugar is both relatively price and income inelastic, more efficient mills have to operate at a suboptimal level leading to dead weight losses for society.

The resulting imperfections in the factor-product markets related to the industry continue to cause economic and social losses for the country. Society has also faced a greater loss due to the narrow confines within which the industry has so far worked to produce limited outputs thereby denying a stream of benefits to the economy other than sugar.

Amongst all the major sugar producing countries around the world, the production of refined sugar is regarded as a natural by-product in economic

terms. In fact, real economic benefits are derived from residuals like molasses, baggasse and press mud which in turn create a chain of other by-products and derivatives. The three main economic benefits that arise out of the technically efficient utilization of these residues include creation of more employment, greater import substitution and export expansion. These include a large number of products which saves scarce foreign exchange, thereby making a significant contribution towards reducing rising trade deficits.

Whereas it is true that creating a chain of downstream industries based on the residue of sugar mills is not necessarily a task to be performed by the sugar industry alone, it nevertheless provides the basis for the existence of downstream industries. Furthermore, the demand for the residues of the sugar industry by downstream industries itself increases economic returns to the sugar mills. This factor reduces the unnecessary dependence of sugar mills on extracting exclusive returns from refined sugar. A relatively higher return from residues would increase returns to sugar mills and should reduce the cost of processing sugar and also eventually its price. Above all else, it should reduce incentives for anti-competitive behaviour in the industry.

4.4 Value Chain Originating from Sugar Industry

It has been argued earlier that a sugar industry using sugarcane can create the basis for a large number of by-products and derivatives to be produced by downstream industries that can fundamentally alter the economics of the industry. Chart 4.1 explained this phenomenon which is relevant to Pakistan's sugar industry. It showed that a total of four direct products are produced; refined sugar, baggasse, molasses and press mud. In addition, there are another five by-products; electricity generation, chipboard, animal feed, ethanol and spent wash.¹¹ The last three of these are produced from ethanol generated by distilleries.

Currently, Pakistan's sugar industry produces all four direct products. It also generates power through baggasse, while press mud is used as a nutrient for soil enrichment. The most significant use of molasses is its conversion into ethanol. The chart also shows a large number of value added products (29 products) which can be produced from ethanol, whereas the industry's output is currently restricted to the production of by-products only (the shaded boxes show the extent to which products are made). The un-shaded boxes show the prospects which are not tapped yet. Ethanol is exported thereby ignoring the huge potential for value chain products. Rs 1 billion rupees/year, on average, was earned through the export of ethanol during the period 2005-08.

¹¹ Engr Tajammal Hussain, 'Sugar mills can act as power plant', Business Recorder, 24 August 2007. ECC of the Cabinet also deliberated on the possibility of electricity generation under "National Policy for Power Co-Generation by Sugar Industry", 13th November. 2007.

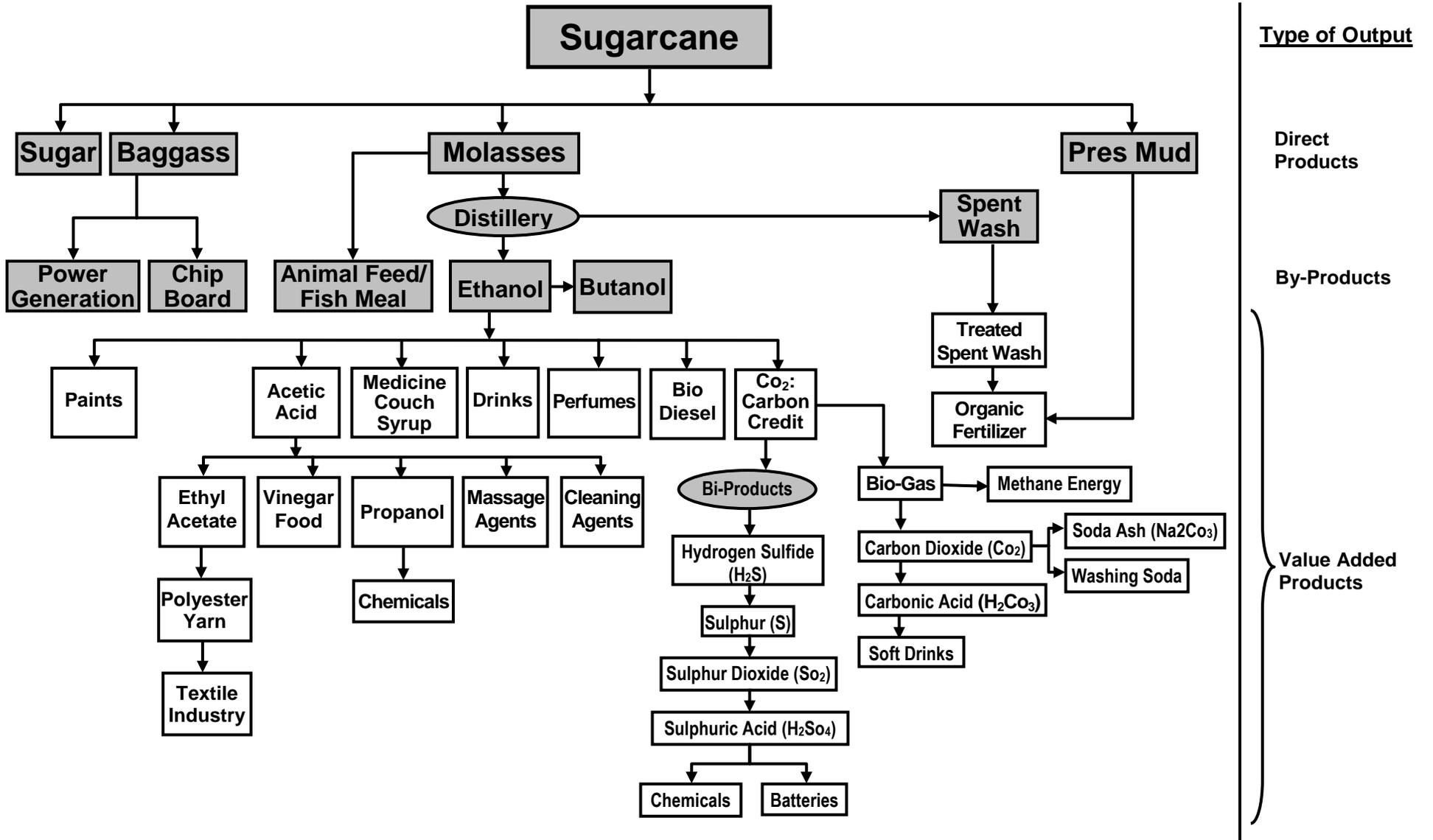
Utilization of Molasses

It is also interesting to note that only 17 distilleries have been established in the country to cater to over 80 sugar mills which jointly produced 2.66 million tons of molasses in 2007/08 and 1.560 million tons in 2008/09. However, effectively only nine distilleries function properly which process only 5 to 10 percent of the annual production of molasses. About 50 percent of molasses was exported during 2007/08. The rest was consumed locally and a significant portion was wasted because of presumed low returns.

In the light of Chart 4.1, if we follow the chain: Molasses → ethanol → 29 value-added products. It is important to highlight that:

- i) the predominant disposal of molasses is through direct export;
- ii) only 5 to 10 percent of molasses is used to produce ethanol which is largely exported;
- iii) only a handful of distilleries have been established keeping in view the total molasses produced.

Chart – 4.1
 POSSIBLE CHAIN OF PRODUCTS ORIGINATING FROM SUGAR INDUSTRY



This implies that:

- i) export of molasses is highly inefficient given the possibility of its conversion into ethanol at home;
- ii) distilleries currently in operation are extremely low in number, given the total molasses production in the country;
- ii) a fairly large part of the ethanol produced is exported which is extremely inefficient, given a large number of ethanol based value-added products that can be produced at home.

The situation demands that in the foreseeable future:

- i) export of molasses be closed completely;
- ii) the number of distilleries be increased substantially to increase ethanol production;
- iii) export of ethanol also be closed and it be exclusively used for production of value-added products.

Though the conclusions drawn above would take time to be implemented, they nevertheless suggest the basis for a reversal in the production processes existing currently. Such a reversal should convert the sugar industry of Pakistan into a more economically viable and vibrant industry and reduce the need for anti-competitive practices by mill-owners.

4.5 Impact of Diversification on Cost of Sugar Production

The discussion in the preceding section demonstrates that the sugar industry has a potential to play a major role in creating downstream industries for the production of value-added products. It also shows that at present the industry is exclusively focusing on refined sugar as the only major output and the by-products, mainly molasses, which too is inefficiently utilized. Such a state of affairs goes with the industry's uncompetitive structure.

The identified downstream industries carry potential for a rapid increase in employment, import substitution and export expansion. Establishment of these industries would create substantial demand for ethanol and other by-products of the industry. Returns from these by-products would undoubtedly increase, which would help reduce the cost of processing sugar and would contribute towards a reduction in the price of sugar.

In addition to the earnings on carbon credit as per international framework, it would also generate additional returns on by-product utilization. Assuming the entire molasses output is converted into ethanol, the resulting carbon dioxide (CO₂) will be to the tune of 200 million cubic meters annually. Instead of releasing this quantity of CO₂ into the atmosphere, it can be bottled and sold at around Rs 20 billion. This benefit would be in addition to the benefits of carbon credit earnings.

CHAPTER 5

5.1 Conclusions

- a) The foundation of the sugar industry in Pakistan has regrettably been on the basis of political influence and not on the basis of an arm's length evaluation of its economic merit. As a result, a rational framework of policies, *including the use of competition among farmers and among sugar mills*, which is required to achieve greater technical and price efficiencies has never been established. More importantly perhaps, in a sector where uncertainty is a major risk factor, the government has not established a strategic food reserve system and thus enabled growers to plan for the future on a more secure basis. This has allowed distortions in the form of large price fluctuations to enter the sector.
- b) Anti-competitive practices such as price fixation for sugarcane and sugar has been excessively used in the name of protecting and safeguarding the industry; these have effectively negated the spirit of competition and any entrepreneurial urge to innovate on the part of investors, save with one or two minor exceptions.
- c) In the wake of price fixation for sugarcane, collusive behaviour of sugar mills in controlling sugarcane prices is not unexpected. Had free and fair competition among growers been promoted on the basis of quality gains in sugarcane, the possibility of collusive behaviour would have been greatly reduced if not eliminated altogether.
- d) In the absence of quality factors (e.g. sucrose content) influencing pricing policies for sugarcane, the growers have also exhibited signals of collusive behaviour in attempting to obtain higher prices for their cane supplies. The entry of middlemen has further complicated the picture.
- e) In pure economic terms, the industry has harmed itself on three counts as follows:

First, as a consequence of price fixation policies, the options available for the industry's development through investment in technological development have been ignored. The status thus achieved by the industry is of a quasi rent -seeking activity in which innovation plays no part. This leaves the industry vulnerable to international price trends. The fear of low international prices has led to the adoption of anti-competitive practices in the industry.

Second, as part of price incentives for the promotion of sucrose content, rewards were given on a collective, instead of an individual basis, which was synonymous to an adverse selection problem.

Third, each old or new sugar mill added additional capacity keeping in mind individual benefit in complete disregard of the expected cane supply constraints and thus caused a collective loss for the industry. No shake-out of inefficient producers has ever occurred in the industry.

On account of these three significant and enduring lapses, the prospects for developing and diversifying the sugar industry have remained problematic. The entrepreneurial urge which develops and sustains an environment of fair competition through innovation has slowly evaporated. This has been replaced by a mind-set of collusive practices that have led to further inefficiencies in the industry's performance - already one of the lowest amongst major sugar producing countries in the world in terms of technological efficiency.

- f) Despite the availability of adequate resources i.e., physical inputs, technical expertise, supportive financial institutions and keen private sector investors, progress in achieving value-addition through by-products or through the development of downstream industries has never been a part of the policy for the development of sugar industry. In this regard, some degree of blame might be laid at the door of the government which has failed to devise a consistent package of incentives for the industry. The enormous benefits of increased employment opportunities, import substitution and export expansion have been largely ignored. As a consequence, symptoms of desperation, anxiety and hopelessness have acquired expression through collusive practices and hoarding leading, in turn, to market distortions, negative externalities, corruption and bad governance in the industry.
- g) An adequately developed road infrastructure connecting farms with sugar mills through the sugarcane development cess fund has never enjoyed the priority of those making and implementing policies. A large part of the fund is still retained by the government. This has caused a crucial loss of sucrose content for farmers due to long travel times as a result of the poor road structure. It also restricts farmers' access to mills and contributes to an environment which is non-conducive to free and fair competition.
- h) The imposition of sales tax on sugar production, instead of on mill capacity has benefited mill owners, given the low capacity utilization at present. More importantly it has provided disincentives for any attempt to enhance capacity utilization.
- i) The emergence of middlemen for the procurement of cane and its supply to mills has led to higher sugarcane prices for the mills and has promoted delayed shipment of cane to mills causing loss of sucrose content. This is an outcome of the deteriorating level of mill-farmer

interaction – an unintended consequence of the de-zoning of sugar mills.

5.2 Recommendations: Need for Competition

In light of the current obstacles faced by the industry, the inefficiencies of the marketing system, increasing cost of sugar production, issues related to long term sustenance of the sugar industry of Pakistan, a two-pronged strategy is recommended. It encompasses a short-to-medium run approach given the complexity of the issues discussed earlier in the Report.

The purpose of this policy framework is to create the basis for a reversal of the system currently in place which is plagued with inefficiencies and is largely devoid of the impetus to technological advancement taking place in other major sugar producing countries and regions. The goal is to establish a viable sugar industry on the basis of free and fair competition and eliminate the need for periodic interventions in the industry by the government. Establishing a strategic food reserve system would be an important step in that direction.

Box

Role of Pakistan Sugar Mills Association

As highlighted in this Report, two broad characteristics of the sugar sector in Pakistan raise significant competition issues: a) the role of politics remains central as politicians from both sides of the political divide - government and opposition together own more than half of the 80 plus sugar mills. The policy-making process for the sector is thus theoretically at least prone to serious conflicts of interest. b) Sugar is a homogenous product with a relatively low elasticity of demand and Pakistan's sugar refiners operate at the lower end of efficiency. In view of this, the price of sugarcane and the international price of sugar exposes them to challenges that probably impels them to resort to *collective decision-making* either, to earn quasi-monopoly rent, or, to protect themselves against, or take advantage of, international price trends. This can happen both when international sugar prices are lower than domestic Pakistan prices *and* when they are higher. Low international prices create the risk of imports undermining domestic prices while higher prices provide incentives for millers to make windfall profits by withholding supplies. Thus, in both instances it would be in the interest of the mill-owners that domestic markets be 'controlled' in some way and the government is not averse to intervening in the market in one way or another. In this regard, as the industry association in the sector, PSMA's role in the affairs of the sector needs to be looked at from the perspective of competition norms.

In its Memorandum of Association, PSMA lists a number of reasons for its establishment. Firstly, it aims to promote and facilitate accord and unity amongst mill-owners to tackle problems facing the industry. Secondly, it represents its members in dealings with the government at various levels and with the regulatory authorities. This includes entering into agreements with the government, whenever the association

deems it beneficial for its members. Thirdly, it collects and compiles information and statistics relating to the sugar industry and uses this information to advance and promote commercial and technical education in the industry. Last, but not the least, the association promotes the mill-owners' financial interests, facilitates industrial procurement needs, aids smooth interaction between members and supports members with legitimate legal grievances.

These are all valid and worthy aims. However, it is possible that in pursuing these very aims PSMA can stray into areas where it might transgress the limits set for collective action by a trade body within the context of the Competition Ordinance, namely *the collective setting of prices and of production quotas*. In such an eventuality, individual members of PSMA would no longer be *free agents* capable of taking decisions individually but would have to act within a framework devised by PSMA. In consequence, contestability and rivalry between individual producers of sugar – a *sine qua non* of a competitive industry – would be subject to substantial restrictions.

On the face of it, there appears to be strong evidence that PSMA plays a role that takes it beyond its legitimate aims as an information-gathering, advisory association for the mill-owners of the country and instead takes it into areas where it might contravene certain provisions of the Competition Ordinance. The Association had 81 active members as of October 2009.¹² Apart from its headquarters in Islamabad, it has three zonal offices in Punjab, NWFP and Sindh. Each zone has its own managing committee headed by a chairman. The secretariat of each zone is managed by a Secretary. At the Centre, there is a Central Executive Committee headed by a Chairman with members drawn from each zone. The central secretariat is managed by the Secretary General. PSMA has thus built up a formidable organizational capability that can easily go much beyond advice and coordination and provide wide-ranging logistical support to the sugar industry on a collective basis in fixing and monitoring prices and production quotas.

Strong trade associations across the world run the risk of contravening competition norms when they go beyond the aims of information-sharing and technical advice and stray, inadvertently or otherwise, into price-fixing on a collective basis. The sugar sector nearly everywhere in the developing countries is riddled with government interventions of one kind or another that affect prices. Market-clearing processes do not, by and large, operate taking the value chain in the sector as a whole. While the complexity of issues pertaining to value-addition in the sector is a datum and cannot be ignored it is equally the case that if mill-owners and refiners tend to seek solutions in price-fixing or production-sharing arrangements, these have been found to be counter-productive and damaging to the consumer. It is such practices that a competition agency has to, and should, act against.

¹² The number varies from time to time due to the annual registration required of the member undertakings by the Association.

a) Measures Suggested for the Short-Run (upto five years)

- i) A moratorium on the establishment of new sugar mills and capacity expansion of existing mills to avoid losses originating from additional capital investment has been suggested to provide the existing mills with an opportunity to invest in new technology. This would, however, be contrary to a competition-driven process of rationalization in the industry. This report recommends that incentives be provided to the sugar industry as a whole to match national and international benchmarks of technological and financial performance based on a competitive structure.
- ii) Formulation and adoption of a new sugarcane pricing policy for the year 2010/11 based on a base price, instead of a minimum guaranteed price. A carefully defined benchmark for sucrose content is required for this purpose. Upward or downward levels of sucrose content should be reflected in the price of cane. This should help eliminate the ill effects of “fixity” in prices. It will provide correct signals to both the growers and sugar mills in negotiating a fair price for cane, given its quality.

For the success of this policy, the following proposed arrangement may be adopted:

- Establishment of a system of determining sucrose content (e.g. Core Sampler) of any bundle of supplies whether at the mill gate or at farms;
- The system should be transparent such that farmers fully understand the process;
- The system of measuring the weight of cane supplies must also be transparent;
- The mills should re-establish close links with farmers in disseminating latest information on new cane varieties and other technical matters;
- Since the new price policy would allow higher cane prices based on sucrose content, farmers’ interests shall remain protected and it would be immaterial which mills they sell their cane output to. The mills may advance loans to farmers
- Involvement of middlemen must be closely monitored to ensure higher transparency and improved interaction between farmers and sugar mills.

The above-mentioned measures would not only develop farmers’ confidence and enable them to plan the acreage to be

planted in any given year but should also promote new varieties of sugarcane which carry higher sucrose content. The mills would thereby extract a major benefit of increased sucrose through cost effectiveness despite cane price variations. This proposed system for the short-run would encourage healthy competition among farmers based on a free competition. The mills would also be engaged in competition and would seek higher technical efficiency in converting cane into sugar and better utilization of by-products.

b) *Measures Recommended for the Medium Run (five years plus)*

- i) These recommended measures should be read in tandem with the short-run measures recommended above to acquire a comprehensive view of the development framework being proposed:
 - A feasibility study needs to be carried out to ascertain the potential reposed for a chain of downstream industries by utilizing by-products of the industry as intermediate inputs. This would require close consultation with the sugar industry, chambers of commerce and industry, government officials/ planners, financial institutions and sugar technologists. This must be carried out with a view to establish modern sugar complexes at appropriate sites in the country.
 - The feasibility study must also carry out an assessment of the types of products that can be produced with complete analysis of competing regions within and outside Pakistan.
 - The study should also design and recommend appropriate fiscal and monetary measures to encourage high performance sugar complexes as exist in South-East Asia.
- ii) Sugarcane research institutions should be strengthened and expanded to help farmers and mills in acquiring maximum technical efficiency. Similarly, the role of the provincial cane commissioners needs to be rationalized and strengthened in the area of technical advice to farmers and enhancing farmer-mill-owner linkages.
- iii) Sales tax needs to be levied on the installed capacity of a sugar mill in order to incentivize the process of utilizing maximum capacity.
- iv) A strong financial support mechanism needs to be developed in consultation with financial institutions, including the State Bank of Pakistan.

- v) Adequate incentives need to be provided to sugar mills to set up distilleries to promote higher production of ethanol.
- vi) Sugar mills displaying weak performance need to be given signals either to improve their performance or to shut down operations. Mill-owners need to be educated about the benefits of being free agents in decision-making. PSMA should be a forum for giving advice on best practices in the industry and not for price-fixing and other competition-reducing practices.

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