REVIEW ARTICLES

SUGAR CROPS AND SUGAR POLICY OF PAKISTAN

Inayatullah Khan and Muhammad Jamil***

ABSTRACT

The average yield of sugarcane in Pakistan stands around 47 tons per hectare, which falls below the potential if compared with other sugarcane-producing countries of the world. The domestic requirement of sugar and the demand for sugar is expected to rise, mainly on account of the facts that as growth-rate rises, urbanization takes place, and that industrial & domestic use of sugar will increases. So to cope with the increasing demand, domestic production should also increase.

Sugarcane is basically a tropical crop in nature. It requires a suitable high temperature, a lot of sunshine and rainfall ranging from 1250-2500 mm for its growth and yield. Relatively speaking, it is an intensive user of water relative to other crops. The total water required to mature the crop is about 64-80 acre inches. Although globally, Pakistan has attained an important place in the production of sugarcane, i.e. it ranks 5th in the production of sugarcane amongst 100 of the more sugarcane producing countries & ranks 15th viz sugar production. But in spite of this, the average yield of sugarcane is still very low as compared to other countries of the world, such as Egypt, USA, Brazil and India. Water has been one of the crucial factors affecting the production and productivity of sugarcane.

There are 77 sugarmills in the country and there is competition amongst the mills for acquiring more sugarcane. There is reduction in weight of sugarcane by about 2% and reduction in recovery by 0.1% each day after harvesting of sugarcane. Real breakthrough can only come if we are able to increase per-acre yield of sugarcane and recovery of sucrose. This is only possible when we formulate a developmental strategy, which is not only production-oriented but also provides desired motivation to the cane-growers and the sugar industry.

IMPORT AND EXPORT OF SUGAR

The story of sugar crops and sugar policy starts with import and export of sugar (Table-1). The import of sugar is usually done when the crop is short and the production of sugar is insufficient for the domestic requirement (Table-2). The surplus sugar is produced in years when the crop size is above the country's requirement. The Government of Pakistan takes care of sugar-imports by regulating duty-structure on sugar-import to ensure a stable (per kg) price to the consumers (Table-3). The Federal Government is also influencing farmers' crop through a pricing-policy mechanism. Sugarcane is an important cash-crop after cotton. Self-sufficiency in sugar is a prime goal; however, it has proven illusive inspite of having two crops, i.e. sugarcane and sugarbeet. Sugarbeet is restricted to the North West Frontier Province of Pakistan.

PRODUCTION

In Pakistan, sugarcane is grown on about one million hectare, with a total production of about 47 million tons. The contribution of the Punjab in the total cane-production is around 60%, Sindh about 30% and NWFP 10% (Table-4b). About 2/3rd of the total production of sugarcane is used in the production of centrifugal sugar every year, while the remaining harvested crop is used for the preparation of non-centrifugal sugar (Gur) and for seed purpose. In the Punjab, rice and cotton are the major crops competitive with sugarcane, while in Sindh there are alternative crops like cotton, wheat and rice. In the Punjab and NWFP about 90% of the crop is planted in spring and only about10% in autumn, while in Sindh 70% of the crop is planted in autumn and about 30% in spring. In the Punjab and NWFP the growing period is only 8-10 months, while in Sindh it goes from 12-16 months. The harvesting of the crop starts in the beginning of November in the Punjab and NWFP, while in Sindh the crop is ready in the month of October. In Sindh, due to long growing period, the yield and recovery is better than the Punjab and NWFP (Table-5). The average yield of sugarcane on country basis is about 45 tons per hectare, which is well below the world average of 60 tons per hectare and also lower than the neighboring country India, where yield is 60 tons per hectare (Table-6). Individual farmers, however, have obtained higher yields upto 100 tones per hectare.

* Sugarcane Commissioner, M/o Food, Agriculture and Livestock, Isb. ** S.O., Sugar Crops Research Programme, NARC, Isb.

Table - 1(a): Import of Sugar in Pakistan

Year	Quantity (Tons)	Value in ('000 Rs.)	Average Price (Rs. Per ton)
1991-92	116,000	914,000	7,830
1992-93	75,000	552,000	7,345
1993-94	48,000	444,000	9,316
1994-95	5,188	68,760	13,254
1995-96	3,480	54,311	15,606
1996-97	681,083	9,861,825	14,480
1997-98	110,990	1,685,859	15,189
1998-99	10,125	153,110	15,122
1999-00	66,627	769,179	11,545
2000-01	930,142	14,488,242	15,480

Source: *M/o Commerce and Federal Bureau of Statistics, Pakistan*

Table-1(b): Export of Sugar in Pakistan

Year	Quantity (tons)	Value ('000 Rs.)	Average Price (Rs. Per ton)
1991-92	-	-	-
1992-93	-	-	-
1993-94	121,000	1,205,000	9,912
1994-95	315,886	3,770,558	11,936
1995-96	29,134	350,066	12,016
1996-97	-	-	-
1997-98	210,632	2,897,750	13,757
1998-99	906,602	11,549,170	12,739
1999-00	30,487	488,781	16,032
2000-01	-		

Source: *M/o Commerce and Federal Bureau of Statistics, Pakistan*

Table-2: Production and Domestic Requirement of Sugar

Year	Population (million)	Sugar production (million tons)	Sugar consumption (million tons)
1991-92	112.6	2.32	2.41
1992-93	115.5	2.39	2.46
1993-94	118.5	2.92	2.76
1994-95	121.5	3.00	2.72
1995-96	124.5	2.47	2.8
1996-97	127.5	2.39	2.81
1997-98	130.6	3.56	3.00
1998-99	133.6	3.54	3.03
1999-00	136.6	2.43	3.17
2000-01	142.9	3.02	3.04

Source: *Pakistan Sugar Mills Association, 2001*

Table-3: Year-Wise Local Price of Sugar

Year	Rs. Per kg.
1991-92	11.85
1992-93	12.62
1993-94	12.8
1994-95	14.36
1995-96	17.86
1996-97	21.46
1997-98	18.75
1998-99	19.63
1999-00	22.85
2000-01	26.73

Source: *Federal Bureau of Statistics, 2001*

Table-4 (a): Area, Yield and Production of Sugarcane in Pakistan for 1991 - 2001

Year	Area (000 Hec.)	Production ('000 tons)	Yield (t/ha)
1991-92	880	34204	39
1992-93	885	38059	43
1993-94	963	44427	46
1994-95	1009	47168	47
1995-96	963	45230	47
1996-97	964	41998	44
1997-98	1056	53104	50
1998-99	1155	55191	48
1999-00	1009	46333	46
2000-01	960	43590	45

Source: *Pakistan Sugar Mills Association, 2001*

Table-4 (b). Area, Production and Yield of Sugarcane in Pakistan

Provinces	Area (000 hec)	Production (000 ton)	Yield (t/ha)	% of total Area
Punjab	602	24714	41	60
Sindh	252	14069	56	30
NWFP	103	4603	45	10
Pakistan	957	43386	47	100

Source: *Agricultural Statistics of Pakistan, 2000-01*

Table-5. Average Yield and Recovery of Sugarcane in Pakistan

Provinces	Yield (t/ha)	Recovery (%)
Punjab	41	8.52
Sindh	56	9.26
NWFP	45	8.09
Pakistan	47	8.62

Source: *Agricultural Statistics of Pakistan, 2000-01/ Pakistan Sugar Mills Association, 2001.*

Table-6(a): Sugarcane Yield and Potential

	Cane Yield (tons/ha)	Sugar Recovery (%)	Sugar Yield (tons/ha)
Average	45.6	8.6	3.9
Potential	100	10.5	10.5

Source: *Sugarcane Research & Development in Pakistan, by Dr. Maqbool Akhtar*

Table-6(b): Sugarcane Yield Comparison (1976 & 1996)

Countries	1976 (t/ha)	1996 (t/ha)	Change +/-
Australia	81	97	16
China	31	52	21
Pakistan	36	46	10
China	31	52	21
India	51	72	21
Malaysia	35	68	33

Source: *Fiji/Food & Agricultural Organization, 1997*

WATER SITUATION

Water is a scarce source in Pakistan as a semi-arid country, where sustainable availability of water can not be assured (Table7-8). Water has been one of the crucial factors affecting the production and productivity of sugarcane. Sugarcane is a high delta-crop and it requires about 16 to 20 irrigations. Total water-requirements to mature sugarcane crop in Sindh is about 80-90 acre inches, while in the Punjab it requires about 64 acre inches. In Pakistan, average total production of sugarcane in the last decade is about 46 million tons, out of which about 32 million tons of sugarcane have been crushed in sugar mills which are producing about 2.6 million tons of sugar. The average recovery of sugarcane in Pakistan is about 8.6% (Table-9). In every dry year, Pakistan has to import sugar to meet the domestic requirement due to low productivity of sugarcane.

SUGAR PROCESSING

In Pakistan, the sugar industry has grown from 2 sugar-mills in 1947-50 to the current 77 sugar-mills (Table-10): 39 sugar mills are located in the Punjab, 32 in Sindh and 6 in NWFP. If these mills are to be run at full capacity, it would require about 65 million tons of sugarcane, which is still a dream. The sugar production capacity of these mills is above five million tons, which has so far not been achieved, due to short production of sugarcane crop. The sugar sector is operating at only 60 to 70% capacity. There is a strong competition among the mills for acquiring more sugarcane. The middleman is very strong in this setup and exploits the situation in his favor. Sometimes the mill has to pay over and above the minimum price announced by the Government. The sugarmills in Sindh usually have to face this kind of situation, due to short supply of sugarcane. However, in the Punjab the size of crop is large and the situation is some what better. In NWFP, a large part of the sugarcane is used for production of non-centrifugal sugar (Gur) and the situation is even worse because of the low supply of sugarcane to the sugar-mills.

POST HARVEST LOSSES OF SUGARCANE

It takes 4-5 days after the harvesting of sugarcane to off-load the trolleys at the mill-gate. This leads not only to reduction in weight by about 2%, but also affects recovery of sugarcane by 0.1% each day. Pakistan also looses about 5% of the sugar in the bottom of the cup, as the mills are producing bold crystal sugar to meet the consumer demand. Inefficiency of mill in juice-extraction is also one reason for low production of sugar. Efficiency in Juice extraction of the current mills stands around 90-92%, instead of 98%. Cane with trash also affects the efficiency.

PRICING-SYSTEM AND THE SUGARCANE VARIETIES

The support pricing system, adopted in the country, was based on the quantity of cane and not on its quality.

Table-7: Water (*MAF) in Pakistan

Sources	Kharif	Rabi	Total
Canals	52.57	31.65	**84.22**
Tube wells	20.49	20.79	**41.28**
Others	4.63	4.64	**9.27**
Total	**77.69**	**57.08**	**134.77**

Source: *Indus River System Authority, 2002 (*MAF= Million Acre Feet)*

Table-8: Overall water position for Kharif 1999-00 to 2001-02

Kharif Seasons	1999-00	2000-01	2001-02	2002
Allocated share for Kharif (MAF) 1st Apr-10th Aug	67.11	67.11	67.11	67.11
Share for Kharif 2002 up to 10th Aug				45.64*
Actual Release (MAF)	70.84	59.66	54.71	40.79*
Excess/Shortage +/- (MAF)	3.73	-7.45	-12.4	-4.86*
Excess/Shortage +/-(%)	5.56%	-11.09%	-18.49%	-10.60%*
* Position up to 10th August, 2002				

Source: *Indus River System Authority, 2002*

This led to growing of cane-varieties with more weight and low sugar-recovery (Table-11). To offset the effects of such varieties, the Government introduced a quality premium system in 1994. Under the quality-premium system, if the average recovery of mill stands above the benchmark recovery of 8.5% in the Punjab and 8.7% in Sindh, then the growers are eligible for an additional amount at the rate of Rs 0.32/40 kg of cane for every 0.1% increase over and above the benchmark recovery. This system also failed to work and became sub-judice in the court. The payment for cane on the basis of weight also gives birth to some imported cane varieties like COJ 1148 in the Punjab. Such varieties were fit for the farmers, but not for the millers, due to low recovery and were negatively affecting the mill-efficiency. To neutralize the effects of such varieties, the present government has assigned MINFAL a task to link sugarcane-price with recovery and do away with the support-price system in sugarcane crop. In this regard, much of the work has been done; however, there are some technical issues which need to be addressed before the new system is implemented.

RESEARCH AND DEVELOPMENT OF SUGAR CROPS

God has blessed Pakistan with a diversified climate, ranging from subtropical to sub-temperate and temperate. About 105 countries of the world are growing sugar-crops. Among these countries Pakistan ranks 5th in terms of area, 15th in production and 60th in terms of yield. Pakistan is only harvesting 3-4 tons of sugarcane per hectare, in spite of the work of Sugar Crop Research Institute one each at Mardan, NWFP, and a Research Station at Dargai, one Sugar Crop Research Institute at AARI, Faisalabad, with two station one at Khanpur and one at Murree. Sindh has three sugarcane research stations: one at Tando Jam, one at Sajawal and one at Larkana, while Pakistan Agriculture Research Council (PARC) is also running one sugar crop Research Institute at Thatta in Sindh. Apart from these, four sugar mills, i.e. Habib, Dewan, Mehran and Fauji are working on the development of cane in Sindh, while in Punjab, ShakarGanj and JDW sugar-mills are active in the development side of cane. Inspite of all these resources, neither could Pakistan produce sugar for export to the international market on competitive rate nor could got rid of import.

Where lies the problem? I am of the view that the problem is not that these public institutions are unable to produce the results. They can bring fruits, but need proper management as well as, availability of required financial resources. The Federal Government, through ECC of Cabinet decision, has conveyed to the Provinces to allocate 15% of the sugarcane developmental funds for the R&D of Cane crops. The case is still waiting for implementation.

Table-9: Sugarcane Crushing, Utilization and Sugar Recovery (%) in Pakistan

Year	Cane Production (Mill. Tons)	Cane crushing (Mill. Tons)	Sugar made (Mill. Tons)	Utilization (%)	Recovery by mills (%)
1992-93	38	27	2.37	72	8.71
1993-94	44	34	2.9	77	8.49
1994-95	47	34	2.98	72	8.72
1995-96	45	28	2.45	62	8.7
1996-97	42	27	2.38	65	8.76
1997-98	53	41	3.55	77	8.64
1998-99	55	43	3.5	77	8.21
1999-00	46	28	2.41	62	8.33
2000-01	43	29	2.47	67	8.39
2001-02	48	37	3.2	77	8.71
Average	46	32	2.8	71	8.6

Source: *Pakistan Sugar Mills Association, 2001*

Table-10: Province-Wise Sugarcane Production, Crushing and Utilization %

	Punjab	Sindh	NWFP	Total/Average
No. of sugar mills	**39**	**32**	**6**	**77**
Cane production (million tons)	26	14	5	46
Cane crushed (million tons)	18	12	1	31
Utilization by sugar mills (%)	68	87	17	57

Source: *Pakistan Sugar Mills Association, 2001*

Table-11: Sugarcane Varieties – (Province-Wise)

Varieties	Av. Yield Potential (t/ha)	Recovery (%)	Area (%)
Punjab			
CO-1148	119	9.82	50
CO-54	102	10.53	10
BL-4	127	11.18	7
Other	-	-	33
Sindh			
PR-1000	130	9.9	20
BL-4	145	10.8	50
L-116	95	11.7	20
Other	-	-	10
NWFP			
CP-65-357	60	12.04	40
CP-48-103	55	11	10
MARDAN-92	75	12.17	10
MARDAN-93	70	12.43	10
Other	-	-	30

Source: *Agri. Deptt. Punjab/Sindh/NWFP.and K.B. Malik Pakistan Society of Sugar Technologist workshop, 2001*

Table-12: Support Price of Sugarcane in Pakistan (price/ Kg)

Year	Punjab	Sindh	NWFP	Quality Premium
1991-92	16.75	17	16.75	0.22
1992-93	17.5	17.75	17.5	0.22
1993-94	18	18.25	18	0.27
1994-95	20.5	20.75	20.5	0.27
1995-96	21.5	21.75	21.5	0.27
1996-97	24.5	24.5	24.25	0.32
1997-98	35	36	35	0.5
1998-99	35	36	35	0.5
1999-00	35	36	35	0.5
2000-01	35	36	35	0.5
2001-02	42.00*	43.00*	42.00*	0.5
Note: *(Indicative Price)				
Source: *Ministry of Food, Agriculture & Livestock, Islamabad*				

COMPETITIVENESS AND SUGAR EXPORT

The sugar production cost in Pakistan is on the high side as compared to other sugar-producing countries of the world. Our cost is even higher than the neighboring country India. As such, the ex-mill price of sugar in Pakistan, which is about Rs 21/kg (2001), makes it uncompetitive in the international market where the per kg sugar price ranges between Rs. 9 & 12. The reason for this high ex-mill price is not only the raw material (sugar crops), but also the by-products, which are not properly utilized by the mills. For instance, molasses, which is one of the main by-products (Table-13) is being exported at low price instead of value-addition through distillery or in fertilizer or in animal-feed or as gasohol. The extra power-generation by the mill is also not proper. In Queensland, Australia, the sugar-mills supply power to the city for domestic and commercial use. In todays' world, sugar is becoming a bi-product while the bi-product are becoming the major products through value-addition process. Filter-Cake, which is rich in organic matter as well as phosphorus, is useful to improve soil-health. In Mauritius, the mills supply filter-cake to cane-growers free of cost in proportion to the cane they supply to the mills, to improve the organic level of soil for better yield and recovery of cane. Here in Pakistan, sugar cake is mostly used to cure bricks, instead of providing it to the sugarcane growers. These factors, if properly addressed, could certainly reduce

Table-13: Molasses Production in Pakistan ('000 tons)

Year	Punjab	Sindh	NWFP	Pakistan
1991-92	545	582	41	1168
1992-93	632	653	46	1330
1993-94	973	678	45	1695
1994-95	1010	692	48	1651
1995-96	821	504	36	1361
1996-97	798	483	33	1320
1997-98	1238	685	56	1979
1998-99	1276	760	77	2114
1999-00	800	534	63	1397
2000-01	902	550	40	1502
Source: *Pakistan Sugar Mills Association, 2001*				

the per kg cost of sugar and would enable us to become competitive in the international market, instead of the negative factors which lead to sugar import or bring uncompetitive surplus sugar producer.

The last two points that need mentioning are as follows: One that sugar mills and the sugarcane growers both are the main stakeholder of sugar production in the country. They must realizing and make themselves competitive, to meet the future challenges of WTO regime. Two that in the coming WTO regime, we must harvest more sugar crop by utilizing less water-resource. This can be possible if we provide an alternate, like sugar-beet crop, to supplement sugarcane so as to harvest more per-hectare sugar. Sugar beet is not only a 4 to 5 month crop as compared to sugarcane, which occupies the field for about 10 months in the Punjab and 14-16 month in Sindh, but also that the recovery from sugar-beet is much higher than sugarcane. Unfortunately the beet-crop is restricted only to NWFP. MINFAL is putting all efforts to introduce this new crop in the Punjab and Sindh. In this regard, successful experiments have been conducted by MINFAL, with the collaboration of the Provincial governments, in the last two years, and they have obtained very encouraging results. This new crop will not only enhance the farmer's profitability, but will also extend the crushing- period of the sugar-industry by about 45 days. This alternative source is also important in the sense that Pakistan could thereby afford horizontal expansion of sugarcane crop inspite of scarce water-resources.

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