

## SUMMING-UP OF THE CONFERENCE

*Mr J.N. Greenfield, Director, Commodities and Trade Division, FAO.*

It is my task to draw a few conclusions from two days of intensive discussions on sugar in the world and of course with particular reference to the Asia/Pacific region.

I would like to divide this summary into three parts - first our discussions on overall sugar market developments, secondly the country studies and thirdly something on the global policy environment.

First on the world sugar market, it was agreed that the industry has been undergoing a period of considerable change, a lot of deregulation has been going on, partly linked to development in global policy changes as reflected in the Uruguay Round. An important change that we discussed is the improved world market stability. We had a useful debate on the causes of this enhanced stability but the rising share of developing countries in world imports were clearly an important factor.

We also saw the rise of the Asia and the Pacific region in the world sugar economy and we had a preliminary debate on its future. Growth would continue to be high even the growth rate would probably fall from the "tigerish" rate.

In this connection, we had a useful round of comments of FAO's draft projections for some countries in the region. The FAO Secretariat is very grateful for the comments, which will be taken into account in their review.

We also noted that there have been some sharp changes in export performance with particularly fast growth by two of the relatively free market trading countries - Australia and Thailand. A related trend that was widely noted was the decline in marginal costs of production in real terms. Currently a floor level of costs for efficient producers could be estimated at about 10cts/lb.

Another important change regards nutritional views on the status of sugar. In the past there were widespread concerns at the healthiness of consuming sugar. In an important discussion of the latest scientific evidence on this topic the beneficial effects of sugar consumption were highlighted and the negative connotations were shown to be unfounded. It was demonstrated that moderate consumption of sugar in a well balanced diet was consistent with good health.

A common change in all the region was the marked growth of sugar consumed in the form of products (confectionery, bakery products, ice cream and particularly soft drinks which is also an area where other sweeteners were the most competitive in a number of countries).

The second part of our proceedings concerned a number of very interesting country studies. I am not going to summarise them but I will limit myself to some of the issues raised of a more general interest.

The first of the points that strikes me is the great role everywhere of the sharing formula. Each country studied had different formula and it seems that success here has been an important part of success in the growth of the sector.

The second point is that the industry has had to undergo continuous policy changes and policy reviews to reflect both domestic exigencies as well as to deal with shocks in the external market.

Every study laid great emphasis on the need to cut costs because of the recognition of increased competition on world markets and increasingly on domestic markets too. The impact of currency fluctuations on relative cost of products was stressed.

For most of the developing countries in the region, the link of sugar to food security was an issue. While sugar is a good source of food in its own right, it was often grown in competition for food grain (rice and maize). However sugar earnings were usually vital for the food security of the farmers, particularly the small farmers.

There was a lot of interest in the use of bagasse as a source of energy as well as other uses. More or less all countries reported on developments in this area.

The third part of our proceedings concerned developments in the overall world trading system and its implications for world sugar policy. I refer to such developments as the Uruguay Round, discussions on the Lomé Convention and discussions on the continuation of the reform process scheduled to begin in 1999 in the World Trade Organisation.

The meeting agreed on the advantages of a fair and rules based trading system and that the trend was for further liberalisation.

There was an important discussion of the problems that were occurring for many developing countries during the reform process.

There was the risk of marginalisation and further reform would need to take into account the factors as the stages of development, the needs of small island states and land locked countries; the problems of single commodity dependent countries; lack of alternative crops to the cultivation of sugar; freight costs; technological gap that has opened up; and the need, therefore, for special and differential treatment for developing countries, including the need for a considerable period for adjustment.

In particular there were lengthy discussions of the special importance to many ACP countries of the ACP-EU Sugar Protocol, which guaranteed prices for a fixed volume for an indefinite period. Representatives of these countries were concerned to note the pressures that sought to question the validity of this arrangement. In their view, the absence of special arrangements such as the sugar protocol would have serious consequences for ACP sugar supplying states, on employment, social conditions, export earnings and income. In this connection, the preamble to the WTO agreement was recalled where the objectives of reform were stated to raise living standards, to ensure full employment and to achieve sustainable development in a way consistent with different levels of economic development.

Regarding the preparations for 1999, the need for developing countries to be equal and well informed partners was emphasised. Governments would need to review their experience with the implementation of the Uruguay Round Agreement; they should assess the impact of the implementation of the reform programme on the markets for their commodities.

They should prepare special analyses of the issues that are likely to be covered in future negotiations such as a reduction in protectionism that could put world prices under upward pressure, the administration of tariff quotas; the environment; the possible erosion of preferential margins; and their experience as food importers. In preparing for 1999 developing countries needed to strengthen their administrative arrangements, including co-ordination mechanisms and their presence at Geneva as well as seek allies among other groups of countries to strengthen their bargaining position.

To conclude, Mr Chairman, I should like to thank you and John May together with your staff, the Sugar Industry, as well as the Government of Fiji, for the excellent support you have given to the successful conclusion of the meeting.

### OPENING STATEMENT

*Mr J.N. Greenfield, Director, Commodities and Trade Division, FAO.*

Honourable Ministers, Distinguished Participants,

It is a great privilege for me today to address this Conference. On behalf of the Director-General of FAO, Dr. Jacques Diouf, I should like to extend our thanks to the Government and people of Fiji for this opportunity to take part in the discussion on the future of the world's sugar economy.

My task today is to discuss the international scene within which sugar policy takes place but before doing so I should like to note a few salient trends in the world sugar economy that will have a bearing on the policy discussion. Later there will be a host of specialist papers and speeches on sugar that will no doubt cast a different light on my interpretation of what is and what is not a significant trend. I look forward to following these debates.

To start with I would like to paraphrase another agenda item - sugar is big, challenging, and changing. Sugar is, of course, big, it is one of the major agricultural commodities traded: after the basic foodstuffs, it is the biggest, almost US\$ 12 billion in 1996. The value of world production would be almost three times that figure and sugar accounts for 9% of dietary calories world-wide. Around 10 developing countries can be said to depend for a significant share of their export earning on sugar while a total of 30 are net exporters. It is challenging in a way that appeals to economists - it is many dimensional. There are beet, cane, high fructose syrup and other sweeteners; there are farmers, processors, food manufacturers and consumers; and there is extensive government involvement. But perhaps most significantly the world sugar economy has been undergoing considerable change. On the side of consumption we have seen the growing share of sugar being used in prepared foods and food eaten out of the home. We see changes in preferences linked to dietary concerns, where many people in richer countries have curtailed their consumption of sugar. The world market has been changing: more and more developing countries become net importers, trade among developing countries has expanded, non preferential trade in sugar has been growing quite strongly in the nineties after a long period of stagnation and world prices have been much more stable in recent years than in the past.

The changes underway in sugar should be seen as part of a much wider process of change in the international trading environment. If we look back just ten years, world agricultural policy was then in complete disarray - the use of subsidies was rife, protection of temperate zone agriculture had grown enormously, record stocks of many of these commodities had accumulated, agricultural trade rows were commonplace and the feeling was widespread that nothing could be done. Initially the Uruguay Round of Multilateral Trade Negotiations did little to change people's views but, after the mid-term review, movement was seen even if it was only after 8 years that the Round was concluded. But already during these years many countries started on the road of reform unilaterally, many of them encouraged that they would get credit under the Uruguay Round for their efforts.

The Round led to important changes that are having real world effects. Take for example the opening up of the Japanese rice market and the management of tariff quotas - think of bananas. But the Uruguay Round also led to many more policy changes whose effect will also begin to be felt. Thus many of the exemptions from general GATT disciplines enjoyed by agriculture came to an end - most notably quantitative restrictions on trade like quotas - while new disciplines on

export subsidies have been introduced. Moreover, because the clue to many conflicts in the trading area lay in the domestic front, new internationally agreed disciplines have been developed for domestic policies. The Uruguay Round also made important strides in clarifying Article 20 of the GATT regarding exemptions and as a result we now have fresh interpretations of this Article in the form of the Agreement on Sanitary and Phytosanitary Measures. Agriculture also figured significantly in the new disciplines on intellectual property rights.

Sugar was clearly part of this process even if the extent of liberalization in this sector was relatively small. As has often enough been said, the effect of the Uruguay Round has been more in its qualitative impact than in its quantitative results. Yet in our view the new international agricultural policy framework does not constrain national production policy options for sugar a great deal especially for importing countries. If they so wish importing countries can continue to provide some support to their sugar sectors by a combination of tariffs and, if they have the funds, some limited direct support up to the de minimis ceiling, some input subsidies and Green Box support. For exporters the policy constraints are generally considered to be more binding as, in addition to rules on production policies, countries have, for the first time, to meet limits on the use of export subsidies.

This is, I believe, pretty much common ground today, but what of the future? To adopt an old saying to the present context "The Uruguay Round is dead, long live the Uruguay Round". By this I am sure you will guess I am referring to Article 20 of the Uruguay Round Agreement on Agriculture, which foresees further negotiations on agriculture to pursue the Uruguay Round agenda, discussions on which should begin in 1999. This is a very important date and I believe we really must get busy in preparing for it, and I address this particularly to the many developing countries that, I believe, were under-prepared for the Uruguay Round. Indeed the World Food Summit made a big point about the need for developing countries to become equal and well informed partners in the reform process, "working for effective solutions that improve their access to markets and are conducive to the achievement of sustainable food security". FAO has been specifically mandated to provide such help.

What then is required? To answer this we need to look at what Article 20 of the Uruguay Round says. Its preamble recognizes "that the long term objective of substantial, progressive reductions in support and protection ..... is an ongoing process". This clearly sets the objective of further talks and is only to be modified by the other clauses of Article 20.

The first of these clauses says these negotiations will have to take into account experience from implementing the reduction commitments. This presumably means that each country would have to review its own experience, where it faced difficulties and where ambiguities in the Agreement were unearthed. This could include experience with safeguard mechanisms. This clause also refers to the experience each country has with how others implemented their commitments. Many developing countries would be concerned no doubt with how much market access was improved, the situation regarding tariff escalation and how tariff quotas have been administered.

The second clause of Article 20 concerns the need to take into account the effects of the reduction commitments on world trade in agriculture. This in a general way is rather difficult to assess and it is necessarily open to much interpretation. FAO

is ready to try and help in this difficult exercise but fundamentally governments themselves have to make some judgements on whether they think the volume of trade, price stability etc. are different from what they would have been had there been no such reduction commitments. We must beware of attributing any adverse development in the past 2-3 years to the Uruguay Round. The proper benchmark is the situation that would have prevailed in the absence of the Uruguay Round. In the case of sugar, it is my hope that this Conference will throw some light on this question.

The third operative consideration that countries will have to take a position on what is called non-trade concerns. Now "Non-trade concerns" are potentially a very wide set of issues but probably are mainly to do with food security and the need to protect the environment. Sugar of course figures in both and I shall return to both these matters in a while.

The fourth operative matter is the need to take into account the special and differential treatment to developing member countries. Now this special and differential treatment is already included in the Agreement and in the country schedules so that it is not quite clear what is meant at this point although the very fact that it is mentioned means that developing countries need to judge whether the Uruguay Round has given them such special and differential treatment.

The rest of Article 20 refers back to the main objectives of the reform programme including taking into account the possible negative effects of its implementation on the least developed and net food importing developing countries, another matter that I shall return to in a moment.

What are we to conclude then about 1999?

First, it seems to me that governments should have underway plans, assessments and options to deal with the topics to be discussed in, and after, 1999. Most of these analyses are difficult and time is therefore needed. FAO is committed to help developing countries in this endeavour.

Secondly, there are some particular subjects deriving from the experience gained with implementation that could be taken up next time. These would surely include tariff quota administration, under which a number of countries import sugar, and state trading including both importers and exporters. In this context, some have queried price pooling by parastatal trading bodies, a matter that could be of considerable interest to some sugar exporting countries.

Thirdly, new areas like environment will probably figure in 1999. Important work is currently underway at the WTO Committee on Trade and Environment, where various alternatives are being discussed including possibly change in the Article 20 of the GATT concerning general exemptions. During the Uruguay Round, the Sanitary and Phytosanitary agreement grew out of one clause of Article 20. The issue could eventually be related to whether protection of the environment could in the future go down the same route as sanitary and phytosanitary measures. But environment could also be concerned with sustainable development, eco-labelling, and recycling and re-use rules. It is unclear to me how much this would affect sugar but it will need to be watched.

Fourthly, if further trade liberalization occurs then surely this will imply a further erosion of the value of preferential trade with all that this might entail for numerous developing countries earning good money on their sugar quotas. For many preferences receiving developing countries, eventual changes in the Lomé Convention could complicate the effects of further generalized trade liberalization. As changes in the Lomé Convention are shortly to be discussed at the November meeting, I shall not discuss this related point here. Mr. Chairman, the preference loss question is perhaps the most difficult

part of trade liberalization to wrestle with. It is where the generally perceived advantages of a move towards a fairer and more market orientated trading system can lead to losses for some countries as preferential access loses its value. Both sides on this question should recognize the dilemma and solutions should be found in a multilateral spirit. One of the obstacles to arriving at a solution is that some countries do not agree that losses of benefits deriving from preferential trade need to be compensated. For them the argument is couched in terms of WTO principles. Yet perhaps the issue is a wider one of general welfare economics. This would say that moves towards great resource efficiency that at the same time lead to some participants suffering decreases in income cannot be said to lead to an increase in global welfare when the losers are among the poorer groups. At the same time there is room, in most cases, for developing countries to reform their own production and processing systems to improve efficiency, to reduce costs in order to be competitive.

Before turning to the three issues that I wish to highlight, I would like to note that over 120 developing countries are net importers of sugar. In this connection, the Uruguay Round Decision on Measures Concerning the Possible Negative Effects of the Reform Programme on Least-Developed and Net Food-Importing Developing Countries is worth noting. As you will recall the World Food Summit called for the full implementation of this Decision. Each March it is up to the WTO Committee on Agriculture to revise the list of the Net Food Importing Countries. All LDCs would be automatically eligible for any assistance under the Decision but other developing countries need to substantiate their net import position in food, including sugar. Progress to date has been slow although some advances were made at Singapore.

Mr. Chairman, the three topics that I consider to be the big themes in current agricultural policy debate are first a continuation of policy reform, second the environment and third food security.

On trade liberalization, existing studies show that the effects on sugar of the Uruguay Round are small but that more thorough going liberalization in sugar could have more substantial effects with higher world prices, lower preferential margins and increased exports from non-subsidizing sugar exporters. An interesting question to my mind in all this is what would happen to High Fructose Syrup if there were a simultaneous reduction in protection in both maize and sugar. Another interesting aspect concerns price stability. Trade liberalization is usually expected to improve world price stability but that need not be the case especially taking into account the probability of lower government stockholding of sugar. Therefore, the recent improvement in price stability since the late 1980s, I believe, may not necessarily get better with further trade liberalization. This point would require further research - in the case of cereals FAO has already undertaken similar research and it would be useful if the same were done for sugar.

What does seem likely is that some further trade liberalization will eventually take place in sugar. Now some sugar exporting countries including several developing countries would clearly benefit from trade liberalization in the sector. However, many other preference receiving sugar dependent developing exporting countries could face a reduced value of exports on that part of their exports receiving preferences and hence may require some "special and differential" treatment. Perhaps a package of assistance to boost productivity; some assistance in diversification, greater emphasis on value added products

and/or a further period of adjustment may all be required to help these countries. Net sugar importing developing countries could, as I said above, consider domestic policy changes and take into account the Uruguay Round Decision, which provides for various types of help. I need hardly say that in assisting countries with appropriate policy responses and in developing policy options, the FAO stands ready to help.

Environment has been one of the growth areas in policy in recent years and may well figure more prominently in 1999 discussions. This is not the right occasion for a lengthy exposé of how environment and trade concerns interact but the general drift of thinking in this area is that if environmental protection is going to be a justification for trade restrictions it would have to be a bona fide concern not a disguised form of protectionism. While such rules are mostly unlikely to be commodity specific, they could have commodity implications including for sugar. Our approach in FAO to assessing the trade impact of environmental measures is to examine the compliance cost with such regulations in importing countries. If it costs more for the exporter to comply with the importers environmental regulations than a local producer in importing countries then the trade effect is equivalent to protection.

Another area of environment and trade interaction is where there are environmental side-effects of production or processing. When governments regulate to reduce negative effects, this can increase costs to the producer or processor. In FAO we have estimated these costs for a number of commodities and while they usually are not very high, in some cases they could become so. The so called "internalization" of environmental costs could clearly affect competitiveness and pressures may well grow on all countries to internalize such costs. FAO has developed a methodology on the measurement of such costs, which has not yet been applied to sugar. Finally, there is one important environmentally linked sugar policy, which has often been noted - the use of sugar or bagasse into energy, i.e. the replacement of a resource mining - activity (petroleum) by a sustainable alternative. At current petroleum prices this option may not always be so attractive.

Finally, it is always good to finish a speech by talking about food but I am sorry I am not the man in charge of refreshments - It is food security that I would like to refer to. For all of us at FAO the World Food Summit last November was a very special occasion. Commitments were entered into by the world community that put food security close to the top of our consciousness. Without food security there can be no peace and prosperity let alone clear consciences for those who have their own food security while others are without.

How does sugar fit into this over-riding objective? Well it has several basic contributions to make. First of all it is a food - just under one-tenth of calories world-wide derived from sweeteners, principally sugar. You will have an opportunity to debate this subject later in the Conference but it is an awful lot of food by anyone's reckoning.

Secondly, it is a major source of income to millions of small farmers in the developing countries. Their food security is directly related to their income - after all the first cause of hunger is poverty. FAO is currently engaged in some research on the link between small farmer's incomes from the export of agricultural commodities and their food security - our pilot studies have been done on tea but much the same methodology could be extended to sugar. We would be happy to collaborate in such work.

All foodcrops and income earning crops for small farmers have problems of stability both in production and in earnings. Sugar helps stability of overall food production if it is itself stable or if it offsets fluctuations in other crops. Sugar helps stabilize incomes if its price and quantity movements are relatively stable or if they offset changes in other sectors. Historically, I do not think that sugar could be described as particularly stable but in recent years it looks to me as though things

have improved. Certainly it is hoped that ongoing policy change towards a more stable policy framework for the conduct of world trade will contribute but, as I said before, this is an area where further research is required.

The World Food Summit recognized that developing countries would need assistance in managing the changing world policy environment and called upon the international community including FAO to help and this is indeed what we are doing and planning to do more of. Only these days at Geneva discussions are taking place on how help to the least developed countries can be stepped up. FAO has just prepared its own plan for technical assistance on the Uruguay Round including preparations for 1999. I would be happy to illustrate our technical assistance capacity.

In conclusion, Mr. Chairman (Your Excellencies) reform is pressing on the sugar sector. At the very least we can expect some reductions in general tariffs, which while beneficial for global trade could erode the value of trade preferences of many developing countries. The precise pattern of further trade liberalization will influence the competitiveness of sugar with other sweeteners. In the long run sugar must stay competitive with other sweeteners but in the medium run adjustment needs to be handled with care and sensitivity to the multifarious interests involved. What may be required is special consideration for some exporting low income countries, i.e. those that enjoyed preference earnings in the past and could suffer losses of earnings due to an erosion of preference margins. I would assume that the large number of net sugar importing countries can, through a combination of their own effects and various types of assistance, manage an eventual increase in world sugar prices. In this complex path of reform, FAO stands ready to help. I look forward this week to learning more of the complexity and more about the path to be followed.

## **PART I - THEORETICAL OUTLOOK, FRAMEWORK ANALYSIS AND BACKGROUND DOCUMENTATION**

### **BACKGROUND STUDIES**

#### **AUSTRALIA**

##### **INTRODUCTION**

Australia's sugar industry is widely acknowledged as one of the lowest-cost in the world. Australia currently ranks seventh among world sugar producers well behind the European Community (EC), China, India and Brazil, and closely behind the United States and Thailand. Among exporters, Australia is surpassed at the global level only by the EC and Brazil, competing with Thailand for third place. Sugar, first grown experimentally as early as 1820, was not cultivated commercially until the 1860s, when production spread rapidly from northern New South Wales (NSW) up the Queensland Coast. Originally a plantation industry relying upon indentured labour, it became a family-based industry from the late-1890s. By the end of the nineteenth century, there were over 70 small sugar and juice mills operating in Queensland and NSW. Today there are 29 including the recently established small mills in the Ord River.

In its formative years the sugar industry supplied the Australian domestic market, along with imports, but during the First World War, shortages resulted in the stimulation of the industry by the state and federal governments. Australia became a net exporter of sugar in 1923, and at the same time,

an embargo was introduced on sugar imports, which remained in effect until 1989.

In 1915 the Queensland government introduced the Sugar Acquisition Act and Regulation of Sugar Prices Act which effectively regulated sugar production in Queensland until 1991 when a new Sugar Industry Bill was introduced. NSW sugar was produced and marketed within this general framework, while a Commonwealth/State agreement allowed the domestic price of refined sugar to be regulated.

From 1923, when Australia became a net exporter of sugar, until 1990, there were only three planned substantial increases in the area assigned for cane growing. These took place in 1953-54 in response to new export market opportunities provided by the then recently negotiated Commonwealth and International Sugar Agreements; in 1964/65 after a period of high world market prices and in 1990/91. There were smaller increases approved in 1975/76 and 1981/82, again in response to dramatically improved (but not sustained) world market prices. Under the prevailing regulatory arrangements, cane could only be grown on assigned areas and only on a fixed proportion (net) of the gross assignment. Mill peaks had been established in 1929 in order to ensure that production was kept in line with domestic consumption requirements plus anticipated export outlets and were only increased in line with market growth. There were also corresponding farm peaks. There was a strong sentiment among sections of the industry, which prevailed well into the seventies that regulation provided some assurance of security, and this position was broadly supported by government.

## PRODUCTION

About 95 percent of Australia's sugar are produced in Queensland, one of Australia's seven States located on the northern half of Australia's eastern coast. Most of the remaining production is to the south of Queensland in NSW, and there is a small new growing area in the Ord River district of western Australia.

Most sugarcane is grown in a strip within about 50 km of the Queensland coast, stretching about 2 100 km from Mossman and the Atherton Tablelands in North Queensland to Grafton in northern NSW. There are four growing regions in Queensland, each with between 1 500 and 1 700 growers, and an average farm size around 77 ha NSW has 600 growers with an average farm size of about 33 ha, whereas in western Australia which commenced operations only in 1995 the industry has a target of 560 000 tonnes of cane from 22 farms covering 4 000 ha.

As indicated above, sugarcane growing was initially highly regulated, under various Australian and Queensland government laws. These controlled the land on which cane could be grown, specified the mill to which it could be delivered, and the framework for distributing revenues to growers. However, the Sugar Industry Act of 1991 introduced significant regulatory reforms. Whereas previously cane had to be grown on clearly specified plots of land, the 1991 Act allowed for a more flexible assignment system and eased the process of transfer within a grower's own land holdings, between growers, and between mill areas. One of the most important contributions of the 1991 Act was that it specified that assigned cane area should be increased at least 2.5 percent annually, where previously the assigned area had tended to be stagnant.

The area under assignment has grown rapidly since 1991, and exceeded 400 000 ha for the first time in 1996. While a large area of land has been allocated for increased assignments since 1988, potential for growth still remains. Movements in world prices, exchange rates, and seasonal cultivation conditions are major determinants in the amount of land assigned to grow sugar cane. Growers have responded to the opportunities to expand production as the returns from sugar cane production are currently more favourable than many alternative

enterprises, which include tobacco, cattle, vegetable and rice production.

Since 1979 all sugarcane is mechanically harvested. In areas of North Queensland where heavy rainfall occurs, special tracked harvesters with high flotation have been developed for the wet conditions. Both "green harvesting" and "harvesting after burning" are practised, and efforts continue to develop better methods for handling green cane. Partly because of concerns about the environment, the percent of cane harvested green rose from 3 percent in 1982 to over 40 percent by 1995. The growing season lasts for 12 to 15 months. Many farmers practice crop rotation, and after growing several ratoon crops, farmers may then plant a cover crop such as legumes prior to replanting cane. Irrigation is also practised, mainly on the Atherton Tablelands and in Burdekin, Proserpine, Mackay, Bundaberg, Maryborough. In Queensland, about 40 percent of cane land is irrigated.

Transportation of the cane to the mill is done mostly by narrow-gauge railway (tram) lines. Only 6 mills use road transport. The cane transportation system allows for rapid and efficient delivery of cane to the mills, usually within 16 hours to minimize deterioration. In recent years, computerization of the system has greatly increased efficiency.

Over the past ten years, the harvested area of sugarcane increased from 311 000 ha in 1986 to 400 000 ha in 1996, a record level. Correspondingly, sugarcane production increased from around 25 million tonnes in 1986 to 39 million tonnes in 1996, a 56 percent increase. During the same period, sugar production has expanded from around 3.4 million tonnes to 5.3 million tonnes, a more than 50 percent increase. Australia has consistently achieved among the highest yields in the world, and recorded record yields of 97.7 tonnes per ha in 1995 and 97.3 tonnes in 1996.

## PROCESSING

Sugar milling in Australia has become more concentrated in recent years. In 1980, 19 companies operated 33 mills; in 1990, 12 companies operated 28 mills. Currently, there are 25 mills in Queensland while 3 operate in NSW, and one in western Australia. In Queensland, there are seven cooperative companies with 10 mills, three public (stock) companies with 14 mills, and one privately-held mill. The three largest groups, the Colonial Sugar Refinery Company (CSR), Bundaberg, and Mackay Sugar Co-operative Association Ltd own 17 of the 25 mills.

CSR Ltd operates about 40 percent of Queensland's milling capacity, and one of the largest mills in the world at Victoria. Bundaberg Sugar Company Ltd is Australia's largest cane grower, with about 7 000 sugarcane hectares, and they are also a large miller accounting for about 15 percent of Queensland's milling capacity at their six mills. Bundaberg is a wholly owned subsidiary of Tate & Lyle PLC. With a refinery with capacity of about 150 000 tonnes a year, Bundaberg is fully integrated in the growing, milling, refining and marketing of sugar. The Mackay Sugar Co-operative Association produces about 750 000 tonnes of sugar at 4 mills in the Central Region. There are over 1 000 shareholders. In 1994, Mackay entered into a joint venture with ED&F Man to produce refined sugar at a new refinery adjacent to the Racecourse mill.

For many years the industry did not crush sugarcane on weekends. At least 75 percent of Queensland's mills now run continuously. This practice lowers costs by allowing for more cane to be processed during the season. The length of the

crushing season varies from 18 to 27 weeks. The average mill can crush up to 1.4 million tonnes of cane, a substantial increase from the 200 000 tonnes in 1950, although there is a wide variation among the size of mills.

The Queensland Sugar Corporation (QSC) is a statutory authority established under the provisions of the Sugar Industry Act of 1991. The QSC receives no financial support from the Government, as it obtains funds from its sales of raw sugar before distributing the net proceeds back to the mills. It is responsible for managing the regulation of the quantity and quality of sugarcane and raw sugar produced in Queensland, deciding issues relating to the size of the Queensland sugar industry, acquiring and marketing all raw sugar produced in Queensland and distributing the net proceeds resulting from the marketing to mill owners. The QSC may also acquire, construct, manage and maintain bulk terminals and other storage facilities for the processing, storing and handling of products of the Queensland sugar industry.

After the deregulation of the Australian refining industry on 1 July 1989, the NSW sugar industry withdrew from its previous voluntary participation in the Queensland arrangements. The growers supply three raw cane sugar mills in NSW, of which they are joint owners. Production has risen from under 200 000 tonnes in 1989 to about 250 000 tonnes in 1995.

In NSW, all relations between growers and the New South Wales Sugar Milling Cooperative are handled by contract. Cane growers are required to contribute capital to the Cooperative, which is returned over several years if they choose to leave the industry. By breaking away from the Queensland arrangements, the NSW industry hoped to obtain higher average returns.

The Australian sugar refining industry is currently undergoing a period of significant change that may enable Australia to become an even greater exporter of white sugar in the future. Industry analysts currently estimate that Australia has the capacity to produce around 1.2 million tonnes of white sugar, a significant increase from the 850 000 tonnes capacity prior to 1989. Before the sugar import embargo was removed in 1989, sugar was refined by CSR on behalf of the Queensland Sugar Board. This arrangement covered approximately 95 percent of the Australian market, with the remainder being controlled by Bundaberg sugar.

A joint venture was established in 1989 between the NSW Sugar Milling Cooperative and the Manildra group of companies. This joint venture built the Manildra Harwood refinery at Harwood near Grafton, NSW. This refinery handles all of the sugar produced in NSW and supplies about 20 to 25 percent of the entire domestic refined sugar market with a current capacity of 250 000 tonnes per year. The major Australian refiner is CSR, with Manildra, Bundaberg and Mackay holding the remainder.

A loss of market share has prompted CSR to close refineries in Adelaide and Sydney, which had throughput of around 60 000 tonnes and 250 000 tonnes, respectively, and to upgrade the capacity of the Melbourne refinery. Bundaberg Sugar, which was purchased by the international sugar company Tate and Lyle in 1991, has upgraded its refinery capacity from around 40 000 tonnes to 80 000 tonnes. Mackay Refined Sugars, a partnership between the Mackay Sugar Co-op and the British commodities house ED & F Man, commissioned a 350 000 tonnes capacity refinery in April 1994.

The first new cane mill to be built in Australia in seven decades is now in production. The Ord River irrigation area in the Kimberley region of western Australia was the subject of hopes for a number of years, and it appears that earlier problems have now been solved. The first cane crop harvested in 1996 produced 75 000 tonnes of cane, and with an expected sugar content of around 16 percent, sugar production is

estimated at 1 200 tonnes. In 1997, it is estimated that the Ord River industry will produce around 40 000 tonnes of raw sugar for the domestic market rising to 60 000 tonnes during the 1998 marketing year. Subsequently, potential would exist for production of around 80 000 tonnes of raw sugar annually. The new industry is expected to target the domestic market in western Australia which consumes around 50 000 tonnes annually, with the remainder going to nearby Asian markets of Indonesia and other South East Asian countries. The Ord River industry has a commercial agreement with the QSC for any potential export marketing of its raw sugar.

## CONSUMPTION

At an average of 50 kg per caput per year, Australian sugar consumption exceeds that of European countries at around 40 kg per year, the United States of America at 33 kg and Japan at 20 kg. The Australian industry is constantly monitoring domestic sugar consumption and attitudes to sugar, and adapts its marketing strategies and educational material as needed.

An increasing proportion of sugar is being consumed in manufactured goods, rising from 32 percent in 1938/39 to 72 percent in 1992/93. The percentage shares of key market sectors in domestic industrial sugar consumption in recent years are as follows:

Non-alcoholic beverages	29
Retail sale	23
Confectionery	11
Bakery	8
Preserved foods	8
Alcoholic beverages	7
Dairy foods	5
Other	9

Refined sugar faces its strongest competition in Australia from fermentables such as glucose syrup, starch and some grains products, which can be used in the production of beer. There is currently one dextrose and one High Fructose Syrup (HFS) manufacturing plant in Australia. The major starch source is wheat, as Australian maize production is limited and often more expensive than wheat. Alternative sweeteners have had difficulty increasing market share due to the aggressive marketing strategies employed by the sugar industry.

In the early nineties, alternative sweeteners accounted for 17 percent of the total sweetener market in Australia, as compared with 14 percent in the mid-eighties. This proportion is lower than in the United States, the EC and Japan. The use of non-nutritive sweeteners in Australia is strongly influenced by food regulations.

The diet soft drink sector leads the demand for non-nutritive sweeteners. Aspartame is a leading sweetener, but some other intense sweeteners have not fared as well. A slump in Australian sales of cyclamates has caused the closure of Australia's only cyclamate producing plant. The expiry of the Nutra Sweet patent at the end of 1992 has resulted in more products using either aspartame or sucralose. Sales of saccharin are expected to increase in the next decade, although the total share of saccharin in the diet sweetener market may decrease as a result of competition from other sweeteners.

## TRADE

Outside of Australia and New Zealand, the QSC contracts with CSR Raw Sugar Marketing as agent to handle export sales. C. Czarnikow acts as the QSC's principal sugar broker. The QSC

sells sugar directly to end users, rather than sugar traders as is common for most other major exporters.

Prior to 1 July 1997, Queensland raw sugar was sold to domestic refiners (for sale either in Australia or for subsequent export) at an import parity price. Beginning 1 July 1997, when the 15 percent import tariff was abolished upon recommendation of the Sugar Industry Review Working Party (SIRWP), raw sugar may be sold to refiners at an export parity price (i.e., lower than the previous import parity price).

Sugar exports from Australia have risen from about 2.5 million tonnes in the eighties, to a record 4.3 million tonnes in 1996. Australia is well positioned to take advantage of rising demand for both raw and refined sugar in the rapidly-growing Asian market. The main competition is from Thailand, which has significant capacity to export either raw or refined sugar.

The largest importers of Australian sugar in recent years have been Canada, Japan, Malaysia and the Republic of Korea. China is a regular customer, but in 1996 exports to that destination amounted to only 302 000 tonnes compared to 397 000 in 1995 and 720 000 in 1994. Exports to the United States, the only premium market for Australian exports, vary with the size of the import quota. In 1996 exports to the United States amounted to 234 000 tonnes, which was less than 6 percent of Australia's total exports. Asia accounted for around 60 percent of the industry's exports in 1996, compared to just over 30 percent in the seventies. Canada, the largest single market, accounted for nearly 19 percent of exports in 1995-96. The Australian industry recently made sales for the first time to Slovenia, Kazakhstan, Latvia, Croatia, Mexico and the Philippines. Long-term supply arrangements are in place with Canada, Malaysia and Singapore.

Imports were nil prior to the lifting of the embargo in 1989. After rising to 15 000 tonnes in 1991, imports subsequently fell gradually to about 2 000 tonnes in recent years. The main cause of the decline was severe competition from the Australian refined sugar industry, which drove domestic prices below import parity levels.

In 1996, the Queensland and Commonwealth governments established the SIRWP, which reviewed the tariff on raw and refined sugar and the Queensland industry regulatory arrangements. The key conclusions of the review included not only that tariffs should be removed effective from 1 July 1997, but also that the single desk selling function of the QSC should be retained for both domestic and exported raw sugar. In addition, the pool price differential should be phased out over two years. A new producer pricing scheme would be introduced which would not compromise the benefits of compulsory acquisition and single desk selling, while giving cane growers and mills the opportunity to manage their own price risks.

Following implementation of these proposals, the Australian sugar industry would be among the least regulated in the world. The domestic sugar price would not provide higher returns than exported sugar, except to the extent that potential sugar imports would face some transportation costs. Expansion would be largely conditioned by the local situation of mills and growers, although there would remain some central oversight to assure that expansion did not exceed facilities for storage and export.

#### **PRICES**

The 1990 season saw the end of administered price arrangements for refined sugar, with domestic sugar prices being determined on the basis of import parity considerations (including the import tariff). However, in July 1997 the import tariff was removed. With sole acquisition rights in Queensland, the QSC was authorized to sell raw sugar to domestic refiners at prices based on the export parity price of raw sugar. Similar sole acquisition powers also exist in NSW.

In Queensland, proceeds from the sale of sugar are pooled for payments. The QSC acquires all raw sugar production. The revenue is distributed back to mills and growers after being adjusted for net profit or loss arising from risk management activities in currency and commodity futures markets, marketing costs, transportation costs and administration costs incurred by the Corporation. The pooling of funds is done primarily to smooth the effect of price fluctuations, enabling producers to receive an average of prices received during the year and not the sales price on the day their output is physically sold.

Prior to 1990, the "No 1" Pool price mainly consisted of returns from the domestic market and from sugar sold on long term contracts (including the United States sugar quota). Each mill was assigned an amount of sugar output called the "mill peak", and any sugar in excess of the "mill peak" received a lower, "No. 2" Pool, price. Similarly, each grower was assigned a peak entitlement under a cane price formula, and received a cane price based on the "No. 2" pool price for cane production above the peak entitlement.

The 1989 crop was the last season in which the difference between the No. 1 and No. 2 pool price was based on the different sales destinations. Since then a fixed (and somewhat arbitrary) difference has been established each year, for example, at 10 percent in 1993, 8 percent in 1994, and 6 percent in 1995 and 1996. For the 1997/98 crop year, the "No. 1" and "No. 2" pool prices would be reduced to 4 percent and then discontinued from 1998/99 onwards.

Technically, sugar produced from cane grown on unassigned land is paid at a penalty rate of A\$1 per tonne, but, in practice, this is not a constraint since assignment allocations have been expanding and further liberalization of the assignment system may occur in the future.

Mills test each farmer's cane using a measure called Commercial Cane Sugar (CCS), and payments to the farmers are based on this indicator of the recoverable sugar. In order not to discriminate against farmers who deliver early in the season, there is an adjustment in the payment scale to compensate for early-season deliveries, as these tend to have lower CCS measurements.

#### **FUTURE PROSPECTS**

A recent industry study assessed that by 2003 the harvested area of cane in Queensland could expand to nearly 440 000 ha, an increase of nearly 80 000 ha from the area harvested during the 1995 season. Most of the expansion would occur in the Tully, Herbert, Burdekin and Proserpine areas. Production on the Atherton Tablelands, where up to 5 000 ha may be available, has the potential to expand as tobacco growers look to alternative enterprises.

The Australian sugar industry is more directly dependent upon the future direction of the world price than any other major producing country. The industry forecasts that with present capacity, production in 2000 would be about 6 million tonnes, with further strong expansion possible in the longer run, depending of course on domestic and world market developments in the interim. At the international level, the industry's prospects would largely mirror the future direction of world prices, which in turn would depend on the decisions taken in many other countries (particularly other major producers such as Brazil and Thailand); and also on any developments in international trade policies affecting sugar, as for example might result from the next round of multilateral

trade talks in World Trade Organization. The growth of world population and income, especially in Asia, should provide an underpinning of support for the world sugar price, and thus the industry's future.

**Table 1: Australia sugarcane area, yield and production**

Year	Harvested	Yield	Production
	area '000 Ha	Mt / Ha	'000 Mt
1976	288	81	23 344
1977	295	79.6	23 493
1978	252	85.2	21 457
1979	267	79.2	21 151
1980	288	83.2	23 976
1981	316	79.4	25 094
1982	318	77.9	24 817
1983	307	78.8	24 191
1984	313	81.4	25 450
1985	304	80.3	24 402
1986	311	79.6	24 742
1987	307	80.8	24 832
1988	335	81	27 146
1989	337	79.9	26 940
1990	320	76.2	24 370
1991	341	62.7	21 366
1992	339	86.9	29 461
1993	340	94.2	32 011
1994	366	95.7	34 943
1995	383	97.7	37 438
1996	401	97.3	39 017

**Table 2 : Australia sugar production, trade and consumption**

Year	Production ... '000 Mt 94 net titre ...	Trade		Consumption	
		Import	Exports	Total	Per caput
		'000 Mt raw equivalent.			kg/year
1976	3 296	0	2 002	785	55.8
1977	3 344	0	2 558	781	55
1978	2 902	0	2 481	782	54.6
1979	2 963	0	1 842	761	52.8
1980	3 330	0	2 203	798	54.8
1981	3 435	0	2 560	791	53.7
1982	3 500	0	2 499	788	52.8
1983	3 171	0	2 549	750	49.5
1984	3 548	0	2 358	780	50.6
1985	3 379	0	2 525	804	51.4
1986	3 371	0	2 751	789	49.7
1987	3 439	0	2 472	766	47.5
1988	3 679	0	2 777	787	48
1989	3 797	8	2 803	826	49.6
1990	3 515	11	2 853	837	49.6
1991	3 100	15	2 614	805	47.1
1992	4 256	12	2 278	893	51.6
1993	4 370	9	3 129	901	51.5
1994	5 080	2	3 457	908	51.4
1995	4 979	2	4 026	887	49.7
1996	5 316	2	4 300	909	50.5

## CHINA

### INTRODUCTION

With the establishment of new refineries and the adoption of improved technologies, the sugar industry in China has expanded rapidly over the past two decades into a highly integrated industry. Consumption has also increased, and domestic requirements have been met from both domestic production and imports. Although some amounts of sugar are

also exported, China is a substantial net importer of sugar. An alternative sweetener industry has also been developed, making China one of the world's major producers and consumers of saccharin, however, in recent years health concerns have led to reductions in use.

### PRODUCTION

Sugarcane accounts for about 80 percent of sugar production in China, and sugarbeet makes up the balance. About 80 percent of China's sugarcane crop is grown in the South and Southwest regions, including Guangxi, Guangdong, and Yunnan provinces. Production in Guangxi accounts for about 40 percent of the national total, and for the first time in 1993, overtook Guangdong as the leading supplying province. The general trend is for a move from Guangdong to Guangxi, and from eastern Guangxi to its west and Yunnan, as sugarcane gives way to diversification into more profitable crops.

Over 95 percent of sugarbeet production is concentrated in the Northeast and Northwest regions, with Heilongjiang, Xinjiang, and Inner Mongolia contributing about 75 percent of the total. Within this, Heilongjiang and eastern Inner Mongolia account for around 55 percent of total area. However, beet production is facing increased pressure from competing crops in the traditional Northeast area of Heilongjiang, Jilin, and Inner Mongolia. For example, in Heilongjiang the area under beet has shrunk to an average of 319 000 hectares in recent years, compared with a record 426 000 hectares almost a decade ago. Maize is the principal substitute crop, which gives returns twice those of sugarbeet. In Xinjiang, however, production continues to expand with price support and input subsidies to growers from the provincial government.

Producers are free to plant the crops of their choice. The State Planning Commission establishes "guidance" prices for sugar crops and refined sugar, but often neither the industry nor buyers trade at these prices, and the actual price is influenced by local market conditions. Returns from sugarcane are, on average, not as competitive as those from fruits, vegetables, grains, and oilseeds. For this reason, diversification into other crops is pushing sugarcane production from the east to the west of southern China where there is less competition from alternative crops.

Over the last ten years, sugarcane yields have increased somewhat from about 53 tonnes/ha to a peak at 59 tonnes/ha in 1993. During 1990-95, yields averaged 58 tonnes/ha. Yields in the traditional growing areas (Guangdong and Fujian) are generally higher, than those in Guangxi (the main cane-producing province). The higher yields of the former are attributed mainly to irrigation. In 1996, adverse weather and changes in the procurement procedure for sugarcane, from being based on sugar content to total weight of the cane, resulted in a reduction in yields to 51.8 tonnes/ha.

During the past decade, sugarbeet yields have fluctuated along an upward trend, averaging about 19 tonnes/ha over the 1990-95 period. This yield is exceptionally low by world standards. For example, yields in the United States and Europe have averaged 50 tonnes/ha in recent years. Some of the reasons given for the lower yields include drought, plant disease, shorter sunshine hours and smaller differences in temperature between day and night in key growing areas.

Over the last 3 years, sugar production in China averaged 6.6 million tonnes, raw value, which was significantly lower than the record 8.5 million tonnes production in the early 1990s. Sugarcane production during 1994-96 amounted to 65 million



tonnes, while beet production was about 14 million tonnes. The decline in sugar production reflected both smaller sugarcane and sugarbeet crops compared to the early eighties.

### PROCESSING

The number of sugar mills in China is estimated at approximately 500 (400 for sugarcane and 100 for sugarbeet), with an annual processing capacity of 8.5 million tonnes. The average processing capacity per mill is estimated at 1 500 tonnes/day. The largest mill (in Guangxi) has a processing capacity of 10 000 tonnes/day and the smallest mill only 200 tonnes/day. There are approximately 150 sugar mills with a processing capacity of less than 1 000 tonnes/day. Average recovery rates over the last 3 years has been estimated at between 8.3 percent and 10 percent for sugarcane processing, and 9.1 percent and 12 percent for sugarbeet processing.

### CONSUMPTION

While sugar is the major sweetener used in China, saccharin also plays an important role. China's sugar consumption is normally about 7.0 million tonnes, and over the last decade has grown at average annual rates close to 2.0 percent. HFCS and glucose are also produced in China, but do not play a major role.

Per caput sugar consumption averaged 5.9 kg (raw equivalent) in 1995 and 1996. This level is significantly below the world average of around 20 kg. It is also much lower than the consumption in neighbouring Asian countries (51 kg in Malaysia, 20 kg in Republic of Korea, 26 kg in Thailand, 13 kg in Indonesia). The low per caput consumption can be attributed to traditional eating habits, relatively low per caput GDP and the use of substitutes.

Traditionally, the Chinese diet utilizes less sugar in meal preparations. Direct sugar consumption by households accounts for about 50 percent of the total consumption, with the remainder being used industrially for manufactured foods. In comparison with the eighties, the share of direct sugar consumption by households has increased in the nineties, while the share of industrial use has fallen (from its previous level of 65 to 70 percent to the currently estimated 50 percent).

Even within China itself, regional dietary differences affect sugar consumption. For example, sugar consumption in the north is generally lower than in the south, as northerners tend to eat salty rather than sweet foods. In the southern regions, per caput sugar consumption is about 20 percent higher than the nation-wide average. Also, in rural areas, per caput consumption levels, at only around 1.34 kg, are lower than in urban areas. However, in recent years, sugar consumption in urban areas has shown a declining trend, while consumption in rural areas has been trending upward.

Sugar consumption is also affected by the widespread replacement of sugar with saccharin, a high-intensity sweetener. However, in 1991 the safety of saccharin was queried, and stricter regulations were introduced on maximum levels that could be used in various products. In 1993, the Government took further steps to control the manufacture and use of non-nutritive sweeteners. It announced the reduction of cyclamate output by 20 to 30 percent, the halt in construction of new factories, limits on the import of all non-nutritive sweeteners and strict control on their use in food and drink. In recent years, saccharin consumption is estimated at 4 000 to 6 000 tonnes per year, mainly by industry. At this level of consumption, about 1.5 million tonnes to 2 million tonnes of sugar were replaced, which was about 25 percent of normal sugar consumption.

### TRADE

The goal of China's sugar policy is self-sufficiency, but this is becoming ever more difficult to achieve as returns from sugar are often lower than the returns from competing crops, and comparative advantage incentives are increasingly influencing planting decisions as the Chinese economy opens up to the world.

China imports sugar primarily from Thailand, Cuba, Australia, Brazil, and Guatemala. Thailand and Cuba accounted for about two-thirds of total imports in 1995. In September 1994, the Government appointed CEROILS, a state-owned company, to be the sole importer. The bulk of the sugar is imported in raw form and processed for domestic consumption. A small proportion is processed and re-exported. Major export destinations include the Russian Federation, Saudi Arabia, Kazakhstan, and the Yemen Republic. In 1993, these countries accounted for about 70 percent of total exports.

Demand for imports and exports fluctuates widely, and makes China a volatile player in the world market. For instance, in 1995 imports rose dramatically to nearly 3.0 million tonnes, and then in 1996, they dropped to 1.4 million tonnes. There are many factors that contribute to this volatility, including incompatibilities resulting from a liberalized sugar market existing alongside the persistent regulatory measures of state institutions. After liberalizing sugar production and marketing in 1992, import and export decisions continued to be made without taking full account of the responses of consumption and production in the liberalized market. In addition, since the prices of major grain crops are still under government regulation, price policies for these crops have an important impact on sugar production because many of them compete with sugar crops.

### PRICES

In 1986, the Government relaxed price controls on most crops, except grains and sugar. The immediate effect was a sudden decline in sugar production as many farmers switched to other crops, with a 1 million tonne drop in production in the following year alone. The competitive situation, which developed, has set the tone for potential sugar shortages in the coming decade.

The State Planning Commission sets guidance levels for producer procurement and mill (ex-factory) prices for sugar. These prices can be adjusted up or down depending on changes in the market during the previous year. However, the actual producer procurement and mill prices may deviate from the guidance prices, depending on current local market conditions. This can contribute to imbalances in domestic supply and demand, as producers react to uncertainty in sugar prices when making planting decisions, also taking into account the often more stable returns from other commodities. For grains, procurement prices for grains are guaranteed by the Central Government, which may be more assuring than the procurement prices offered by sugar mills. In cases where sugar mills are unable to pay producers in cash, payment with promissory notes may also dampen producers' intentions to grow sugar crops.

China's mill (ex-factory) prices of sugar are linked to the world price at the port of entry for imports, after adding a 30 percent tariff and a 17 percent value-added tax (VAT) is applied post-tariff. During periods of imports, mill prices at the ports should be about 50 percent higher than the world price.

### FUTURE PROSPECTS

Towards the year 2000, China is expected to remain a net importer to fill the shortfall of domestic production. Although net imports could stabilize around 1.0 to 2.0 million tonnes over the next few years, the longer-term outlook is for further increases in imports.

Continued competition from alternative crops is expected to reduce sugar area in traditional growing regions. For sugarcane, production areas are likely to continue shifting from the east

towards the west, as land may be diverted to vegetables, fruits, grains, and oilseeds. Despite the guidance prices set for sugar crops, producers may continue to find procurement prices for grains to be more attractive, in addition to the higher returns often obtained from the cultivation of crops not subject to price controls.

The growth in area planted to sugar in regions that are undertaking agricultural expansion may also be limited due to the relatively low returns. For example, the Government's 5 Year Plan in Guangxi calls for an expansion of sugarcane area from 453 300 hectares in 1995 to 466 700 hectares by the year 2000. Even if the plan is fulfilled, the annual growth rate of sugarcane area would only be 0.5 percent, while the average annual increase in sugarcane yields is about 1 to 2 percent.

Thus, domestically produced sugar supplies are not expected to keep pace with the growth in domestic consumption. The population expansion rate has averaged 1.4 percent over the last decade, and this is likely to continue. There has also been significant income growth during the last decade, which is expected to accelerate in the future. The ongoing growth will most likely increase consumer demand for sugar-based processed foods, beverages, snacks, and desserts. Some analysts believe the growth rate of sugar consumption could be as high as 8 percent annually over the next few years. With increasingly focused government efforts to enhance productivity and improve returns from domestic production, the growth rate of imports may be slowed, but over the longer run China will still need to import large amounts of raw sugar.

**Table 1 : China sugarcane and sugarbeet area, yield and production**

Year	Harvested area		Yield		Production	
	Cane '000 Ha	Beet Mt / Ha	Cane '000 Mt	Beet	Cane	Beet
1976	541	357	30.7	8.2	16 630	2 932
1977	507	352	35	7	17 753	2 456
1978	549	331	38.5	8.2	21 117	2 702
1979	512	325	42	9.6	21 508	3 106
1980	479	442	47.6	14.3	22 807	6 305
1981	551	436	53.9	14.6	29 668	6 360
1982	653	462	56.5	14.5	36 882	6 712
1983	653	543	47.7	16.9	31 141	9 182
1984	728	502	54.3	16.5	39 519	8 284
1985	965	560	53.4	15.9	51 549	8 919
1986	949	520	52.9	16	50 219	8 306
1987	858	497	55.2	16.4	47 363	8 140
1988	924	745	53.1	17.2	49 064	12 810
1989	960	569	50.9	16.2	48 795	9 243
1990	1 009	670	57.1	21.7	57 620	14 525
1991	1 164	784	58.3	20.8	67 898	16 289
1992	1 246	660	58.6	22.8	73 011	15 069
1993	1 088	599	59	20.1	64 194	12 048
1994	1 057	698	57.7	17.9	60 927	12 526
1995	1 125	695	58.1	20.1	65 417	13 984
1996	996	596	51.8	19.1	51 590	11 400

**Table 2 : China sugar production, trade and consumption**

Year	Production ... '000 Mt, raw equivalent ...	Trade		Consumption (*)	
		Imports	Exports	Total	Per caput kg/year
1976	1 794	577	153		
1977	1 978	1 598	173	2 268	2.4
1978	2 467	1 299	120	2 768	2.9
1979	2 718	1 096	115	3 068	3.1
1980	2 795	912	235	3 375	3.4
1981	3 441	1 031	136	4 089	4.1
1982	4 186	2 172	73	5 076	5.0

1983	3 868	1 868	66	5 407	5.3
1984	4 691	1 234	57	5 432	5.2
1985	5 549	1 912	196	6 047	5.7
1986	5 730	1 188	289	6 157	5.7
1987	4 706	1 832	492	6 646	6.1
1988	5 356	3 740	269	7 552	6.8
1989	5 668	1 589	467	6 431	5.7
1990	6 880	1 147	620	6 449	5.6
1991	8 578	1 018	373	6 641	5.7
1992	8 402	1 103	1 808	7 589	6.5
1993	6 547	454	2 009	7 136	6.0
1994	5 901	1 558	1 026	6 922	5.8
1995	6 770	2 988	520	7 190	5.9
1996	7 174	1 400	650	7 257	5.9

(\* ) White sugar

## FIJI

### INTRODUCTION

Sugarcane is thought to be indigenous to the islands of the South Pacific, and it is certain that several of the world's principal commercial varieties of sugarcane were obtained from this origin. Crystallised sugar was probably first manufactured in Fiji in 1862. During the development of the industry some 35 sugar factories were established, but only four remain today. With one exception, all the early developments of sugar took place in the wetter areas of Fiji, spreading outward from Suva to Levuka. Early planters mistook the general lushness of the wet zone for fertility. Their objective was first and foremost to grow heavy crops, and they paid insufficient attention to the importance of sunlight for the plant to manufacture sugar. Poor drainage was also a problem in some areas. It was for these reasons that many of the earlier sugar enterprises were short-lived.

The foundation of the current sugar industry in Fiji began shortly after the turn of the century, when the Colonial Sugar Refining Company (CSR) became the major player. Its dominant position continued into the early seventies, when in 1971 the agreement relating to the acquisition by Government of the majority shareholding was enacted by Parliament. To make further provision for milling and related activities in the sugar industry, Government created the Fiji Sugar Corporation (FSC) which came into existence on 1 April 1973. FSC, a public company with Government shareholding of 68 percent, is the sole miller and operates the four existing mills. In 1976 Government established the Fiji Sugar Marketing Company Limited (FSM) to market Fiji sugar.

### PRODUCTION

Sugarcane is currently grown in the two main islands of Fiji, Viti Levu and Vanna Levu, in proximity to the 4 mills, 3 in Viti Levu and 1 in Vanna Levu (Fig 1). About 22 000 growers currently produce around 4 million tonnes of cane on just under 100 000 ha (74 000 ha harvested annually over the past 4 years). Initially, all cane was grown on estates, but from the twenties lands formerly leased to planters were returned to CSR and developed into the successful (10 acre) tenant farm system still functioning today.

The localization of the sugar industry in Fiji was followed by a steady decline in sugarcane production from about 2.9 million tonnes in 1970 to 2.2 million tonnes in 1975. In 1973 a planned effort to revive cane and sugar production was undertaken. The major thrust of this effort was in the Seaqaqa cane development scheme on Vanua Levu, which together with the world market price peak and the establishment of the

Lomé Convention in 1975, contributed to the sustained growth in cane and sugar production from 2.2 million tonnes cane in 1976 to 4.0 million tonnes in 1980, a level which has generally been maintained since then. Production declines have been mainly the result of extreme weather conditions such as the cyclone and drought in 1983 and adverse weather conditions in 1985 and 1987. The Crop Rehabilitation Development Project (CRP) which was implemented following Tropical Cyclone Oscar in 1983 contributed to the recovery in cane production.

Cane production is almost entirely rain-fed, and yields are subject to wide annual fluctuations depending on weather conditions. Average national yields of cane per hectare have increased only slightly over the longer run, from 50 tonnes in 1973-75 to 52 tonnes in 1990-95. In 1996 yields reached 59.2 tonnes per ha. However, sugar content was lower than in 1994, and although cane production was a record the sugar extracted was less than the peak output obtained in 1994 from a smaller amount of sugarcane.

Sugar production averaged 439 000 tonnes during 1990-95, an increase of more than 50 percent compared to 1973-75, immediately after localization of the industry, but prior to the expansion programmes. The growth in production mainly reflected increases in the areas planted to sugarcane. Production reached an all time record in 1994, with 517 000 tonnes sugar from a harvested 4.1 million tonnes of cane, due to favourable weather, but has since stabilized at about 450 000 tonnes.

#### PROCESSING

There are four mills, which crush cane for the FSC. The Rarawai Mill in Ba commenced crushing in July 1886. Although the mill has been realigned and refurbished, cane has been crushed on that site for 110 years without interruption. After the Rarawai Mill, a mill at Labasa was built in 1894. The Lautoka Mill which commenced crushing in 1903 still is the largest mill in Fiji, and it has now been in operation for 93 years. Finally, the Penang Mill at Rakiraki first started to crush cane in 1881.

The steady rise in Fiji's cane production over the years placed ever-greater demands on the mills. The FSC expanded milling and processing capacities, replaced some obsolete plant and equipment and introduced mechanical sugar handling and storage facilities. Between 1973 and 1996 the combined crushing capacity of Fiji's mills expanded from 14 400 tonnes to over 25 000 tonnes of cane per day. However, because of their age the efficiency of these mills could be improved.

Major capital investments have been made over the years to modernize equipment and improve efficiency. New equipment included the installation of a diffuser at the Lautoka mill to increase crushing capacity; vertical crystallisers at Rarawai and Labasa (installation at Lautoka and Penang is also planned) are designed to improve extraction of sugar from molasses; the installation of boilers and turbo generators at Lautoka in 1995, enabling the FSC to supply power to the Fiji Electricity Authority during harvesting, and in Labasa in 1996, providing that town's electricity needs during crushing; and bulk storage, handling and loading facilities at the Lautoka and Labasa mills.

#### CONSUMPTION

Sugar for domestic consumption is produced at the Penang Mill and partly at the Labasa Mill for Vanua Levu consumers. The sugar is a high quality washed raw, polarising at around 98.80 degrees and packed in 35 kg polylined bags. Wholesalers buy the sugar ex-factory and ex-Lautoka Mill store and distribute to retail outlets.

Domestic consumption has steadily increased from 18 000 tonnes (raw equivalent) in 1970 to around 36 000 tonnes in 1996 (Table 1) reflecting mainly population growth. Consumption data have been adjusted downwards to allow for quantities (average 12 000 tonnes)

shipped to neighbouring Pacific Island nations. Over the past five years domestic consumption accounted for only 7 percent of production. This percentage is unlikely to change much over the next decade, and given the fact that the domestic market price is regulated and per caput consumption is already high at 45 kg, the contribution of the domestic market to the overall earnings of the industry is unlikely to vary.

#### TRADE

The export of sugar accounts for an important share of foreign exchange earnings. In 1995, the value of exports of sugar and molasses accounted for 38 percent of the value of total exports. About 90 percent of production are exported, mainly at premium prices under the Sugar Protocol of the Lomé Convention, and bilateral long-term agreements. Exports have increased by more than 30 percent over the last 5 years, from about 382 000 in 1991 to about 500 000 in 1996.

Fiji was one of the 46 ACP States that signed the Lomé Convention on 28 February 1975. For each of the 13 countries, including Fiji, listed in the Sugar Protocol an annual quota was allocated for imports to the EC. These quantities were given in metric tonnes white value (mtwv), and Fiji's quota was set at 163 600 mtwv, equivalent to approximately 175 000 metric tonnes of raw sugar. The Convention expires in 2000 and negotiation between the contracting parties is expected to commence 18 months before the expiry date of 29 February 2000.

#### PRICES

Since 1960 the sharing of proceeds from the sale of sugar has been subject to regulation, initially under a rather complicated formula. In 1970, a formula of sharing of proceeds of sale (65 percent to growers and 35 percent to the miller) was introduced and further modified in 1990 under the Master Awards. Under this award, quantities produced up to a base figure of 325 000 tonnes would entitle growers to receive 70 percent and FSC the remaining 30 percent. For quantities above this base up to 350 000 tonnes, proceeds would be shared 72.5 percent for growers and 27.5 for FSC, while for quantities produced above 350 000 tonnes proceeds would be shared on a 75 percent, 25 percent basis. From the gross proceeds certain "industry costs" are deducted e.g. costs of operating sugar industry institutions (Sugar Commission of Fiji, Mill Area Committees), marketing expenses, contributions towards operating expenses of the Research Centre etc.

The devaluation of the Fiji Dollar by 17.75 percent in June 1987 and by a further 15.25 percent in October 1987, had the immediate effect of increasing sugar industry revenue in Fiji dollar terms which resulted in a large increase in the unit price paid to farmers for cane. The cane price rose sharply from F\$36.56 per tonne in 1986 to F\$52.37 per tonne in 1987 and has remained at between \$45 and \$55 per tonne during the period 1987 to 1996.

Although the sale of sugar for domestic consumption is not under direct price control, any price increase is subject to Cabinet approval. The price for domestic sugar to wholesalers has remained the same since April 1993, at around US 11.07 cts/lb (US 24.35 cts/kg), and the retail price is around US 16.00 cts/lb (US 35.2 cts/kg).

#### FUTURE PROSPECTS

Fiji as a small island economy faces obstacles in the development process that are not present in larger countries. With a small population, economies of scale are difficult to achieve in domestic markets, and investments in infrastructure

are relatively more costly and often uneconomic. Superimposed on the problems of smallness, Fiji is geographically relatively isolated, prone to natural disasters, and suffers constraints on the availability of land and its productivity.

The past decade has seen fluctuating, but increasing real world market prices of sugar. Medium-term price forecasts range from a small decrease to a substantial increase. However the major concern for Fiji is the quantity sold to the EC under the Sugar Protocol of the Lomé Convention.

The future viability of the sugar industry will depend on being able to produce sugar at a profit at a mix of world market prices and possibly lower returns from shipment to the EC. Low yielding, heavily indebted farms located on marginal lands a long way from mills may find it difficult to survive in the future if such conditions materialize. Other cane farms are expected to remain viable if costs can be reduced. Most of these farmers are likely to continue to consider cane cultivation as the preferred land use option. However in a more competitive environment they, together with FSC, are more likely to be receptive to diversification possibilities.

With the right incentives there is ample scope for the sugar industry to improve efficiency, particularly in the cane growing sector. A recent study undertaken for the industry identified ways yields could be increased by 25 percent with better farming practices. In addition, major efficiency improvements are possible within the existing cane transportation system, by introducing a quality payment system for cane, adopting appropriate mechanisation, and by enhancing labour utilisation. Thus the appropriate policy emphasis should be on improving the efficiency of the existing industry. This is indeed necessary as no single crop or group of crops have been identified that could replace sugar in the foreseeable future.

The Fiji sugar industry, while small, is not insignificant in the context of the world sugar economy. It has a basically sound structure, is relatively efficient (albeit with considerable room for improvement) has sufficient critical mass to reap economies of scale, and has a reputation for good quality product. If the industry can respond to the adjustment challenges it now faces, it has a sustainable future.

**Table 1 : Fiji sugarcane area, yield and production**

Year	Harvested area '000 Ha	Yield Mt / Ha	Production '000 Mt
1976	47	46.9	2 212
1977	52	51.2	2 674
1978	54	52.4	2 849
1979	62	65.9	4 058
1980	64	52.1	3 360
1981	65	59.7	3 931
1982	69	58.8	4 075
1983	59	37.1	2 203
1984	69	64.8	4 290
1985	71	60.8	3 042
1986	70	58.6	4 109
1987	66	44.5	2 960
1988	64	49.9	3 185
1989	71	58.1	4 099
1990	70	57.6	4 016
1991	73	46.6	3 380
1992	73	48.6	3 533
1993	74	50.1	3 704
1994	74	54.6	4 064
1995	74	55.6	4 110
1996	74	59.2	4 380

**Table 2 : Fiji sugar production, trade and consumption**

Year	Productio ... '000 Mt, raw equivalent	Trade		Consumption	
		Imports s	Exports *	Total	Per caput Kg/year
1976	296	0	269	18	30.7
1977	362	0	330	20	32.7
1978	347	0	309	21	35.0
1979	473	0	447	24	38.4
1980	396	0	461	21	33.7
1981	470	0	426	23	36.1
1982	487	0	427	28	42.3
1983	276	14	357	25	36.7
1984	480	6	398	24	34.2
1985	341	0	431	24	33.9
1986	502	12	339	23	31.9
1987	401	1	450	24	33.2
1988	363	0	426	26	36.5
1989	461	0	417	25	34.6
1990	408	0	411	28	38.0
1991	389	1	382	32	43.4
1992	426	26	399	33	44.0
1993	442	2	422	34	44.5
1994	517	1	487	31	40.4
1995	454	2	450	36	46.2
1996	454	2	500	36	45.1

\* Includes exports to Pacific Islands

## INDIA

### INTRODUCTION

In India, government policies, both at the Centre and State levels, have played a crucial role in the development of the sugar industry. The sugar economy in India, like many other countries, is highly regulated, starting from sugarcane to the end-product sugar. Even the by-products are subject to government control. The main objectives of the national policy are to ensure a fair price to cane growers, adequate returns to industry and a supply of sugar to consumers at reasonable prices.

The economics of sugar in India are more complicated than those of sugar industries in many other countries. This is because of the existence of the centrifugal mill industry side by side with a large cottage industry that manufactures open-pan sugar, specifically gur (solidified cane juice) and khandsari (semi-white centrifugal sugar). While the two industries compete for supplies of cane on the demand side, white sugar both complements and substitutes for the products of the cottage industry.

In India the white sugar industry is of considerable economic importance. It is the second largest after the cotton textile industry. Sugarcane farmers and their families, numbering over 35 million, constitute about 7 percent of the rural population. The sugar industry employs 350 000 workers and also provides substantial indirect employment through various ancillary activities.

### PRODUCTION

Both area and production of sugarcane fluctuate considerably from year to year. This is due to variations in climatic conditions, the vulnerability of areas cultivated under rainfed conditions, fluctuations in prices of gur and khandsari, and

changes in returns from competing crops. Despite this instability, both area and production of sugarcane have increased considerably over the past three decades. The average area under cane increased from 2.4 million ha in the early-sixties to about 3.8 million ha in the mid-nineties. While the total cane area increased by 57 percent during this period, that of rice, which occupies a surface area ten times as large, rose by 23 percent, but the areas planted to sorghum and cotton declined. Uttar Pradesh accounts for nearly half of the total cane area. Other major producing states include Maharashtra and Tamil Nadu (12 percent each), Karnataka (9 percent) and Andhra Pradesh (6 percent).

Rising yields also contributed to the growth in sugarcane production. Yields per ha rose by more than 60 percent from an average of 43 tonnes in the early-sixties to more than 70 tonnes in the mid-nineties. Following rapid increases in productivity in the seventies and early-eighties the rate of growth slackened in the latter part of the eighties. The extension of cane area to marginal lands and the use of varieties susceptible to disease were partly responsible for the slower growth. In the nineties, however, average sugarcane yields again showed strong increases, although some reductions took place in 1996/97.

Total production of sugarcane during the last three decades more than doubled, increasing from an average of 102 million tonnes in the early-sixties to a peak of more than 280 million tonnes in 1995/96. In 1996/97, however, cane production was some 6 percent lower, reflecting reduced plantings and lower yields.

#### PROCESSING

The Government regulates major aspects of the centrifugal sugar industry including the licensing of factories, the fixation of cane prices, the purchase and distribution of levy sugar and the release of sugar to the open market. In 1952 the Government of India took over from the states, the regulation of the sugar industry, under the Industries (Development and Regulation) Act 1951. The 138 factories which were then operating were registered under the provisions of the Act. Thereafter, all new sugar factories and expansion programmes have required licensing by the Central Government, although some relaxation of state controls and simplification of procedures took place in early-1997.

Under each of its Five-Year Development Plans, the Government has provided for additional capacity to meet estimated increasing demand for sugar. Thus, the number of sugar factories rose from 138 in the early-fifties to 173 in 1960/61, and by the mid-nineties their number exceeded 440. In accordance with the Government's policy to shift the sugar industry away from the sub-tropical zone, most of the new factories were licensed in the tropical zone, which currently accounts for 50 percent of operating mills and 60 percent of sugar production.

In the licensing of new capacity, emphasis has been placed on larger, integrated plants to secure economies of scale. The standard size of the plant that in the past was barely 1 250 tonnes of cane crushed per day (TCD), is now prescribed under the Government Licensing policy at 2500 TCD. Between the early-sixties and the mid-nineties, mills with a capacity between 1250 TCD to 2500 TCD rose from 18 percent to nearly 70 percent, while those below 1250 TCD declined from 78 percent to less than 15 percent. However, the average size of Indian sugar units, currently estimated at about 1 900 TCD, is still considerably below that in other major cane sugar producing countries. About 60 percent of white sugar production are supplied by mills in the cooperative sector, 30 percent in the private sector, and 10 percent in the public sector.

Mills face strong competition for cane supplies from gur and khandsari manufacturers. While the mills must operate within certain government-established cost-return margins, gur and khandsari manufacturers may price their products freely, giving them considerable advantage in bidding for cane supplies, particularly in periods of low

output, as they can pass on higher prices to the consumer. In addition, certain non-price factors also induce growers to sell cane to non-mill processors in preference to the mill sector. In most areas, gur manufacture is a cottage industry and is within the technological reach of growers. The grower can convert his cane into gur with ease, is thus offered a guarantee against the risk of rejection of his crop by the mill, or of delayed harvesting reducing its quality in terms of sucrose content.

Despite short-term annual fluctuations, there has been a marked increase over the last three decades in the utilization of cane for production of sugar as compared to gur and khandsari reflecting the relatively stronger growth in the market for sugar. During recent seasons, supplies of cane crushed by mills ranged between 43 and 59 percent of total supplies, compared to less than 30 percent in the fifties. There is a wide divergence in the pattern of cane utilization in the various cane producing states of India. In Maharashtra, mills use over 80 percent of the cane produced in the state, while in parts of Uttar Pradesh and Bihar less than 20 percent is used by sugar factories, with most of the remainder being used for the manufacture of gur and khandsari.

India is the largest producer of centrifugal sugar in the world. Total production of sugar has grown very rapidly, but also very irregularly. From an average of 2.6 million tonnes in the early-sixties, production of sugar reached an average of 13.4 million tonnes in the mid-nineties. The variability of production is illustrated by data since the early-nineties, which includes a peak of 17.4 million tonnes in 1995/96 and a low of 9.3 million tonnes in 1993/94.

The goal of expanding sugar production to meet domestic requirements has been reflected in targets under each of India's Five-Year Development Plans since the early-fifties. Output objectives have generally been met, though at the end of the Eighth Plan in 1996/97 actual production is estimated to have fallen short of the target of 14.8 million tonnes of plantation white sugar due to short-term crop fluctuations. By the end of the Ninth Five-Year Plan in 2001/02, the target for output has been set at 19.1 million tonnes.

Aside from being the world's largest producer of centrifugal sugar, India also produces large quantities of gur and khandsari. Production of open-pan sugars has increased, despite yearly fluctuations, from an average of about 6.4 million tonnes in the early-sixties to about 9.5 million tonnes in the mid-nineties. Uttar Pradesh accounts for 60 percent of the total output of gur, followed by Tamil Nadu (16 percent) and Karnataka (10 percent).

The Indian sugar industry suffers from structural problems. Over 40 percent of the factories are more than 40 years old. In a large number of these units, mechanical breakdowns are more than normal, fuel consumption much higher, while extraction rates are well below 10 percent. Thus, in order to modernize and upgrade technology, the Government created the Sugar Development Fund (SDF) in 1982, financed through a cess levied on the sugar mills. Of a total of Rs 12 740 million (US\$360 million) accumulated in the Fund, as of 30 June 1995, Rs 4 892 million (US\$140 million) had been sanctioned for modernization and expansion of factories and Rs 4 386 million (US\$125 million) for various cane development schemes.

Research and development activities to improve mill efficiency are undertaken at (1) National Sugar Institute, Kanpur; (2) Vasantdada Sugar Institute, Pune; (3) Central Electronics Engineering Research Institute, Pilani; and (4) various

Institutes of the Council of Scientific & Industrial Research. A Sugar Technology Mission (SMT), established to upgrade technology in the industry is currently conducting trials in several sugar factories while a system of National Awards for Efficiency has recently been introduced.

### CONSUMPTION

In India sugar is an essential item of mass consumption and the cheapest source of energy for the poor. To assure supply of sugar to consumers at a reasonable price, the Government has been following a policy of partial control on sugar distribution under a two-tiered pricing system since 1967, excepting for short breaks in 1971/72 and 1978/79 when exceptional crop conditions made it impossible to implement dual pricing. The first tier applies to "levy sugar". For this, sugar mills have to supply quotas to the Food Corporation of India at prices, which are set by individual State Governments. The levy price paid to mills in 1996/97 was estimated to be some 15 percent below the cost of production. While the price paid to the mill varies by states, the levy sugar is sold to consumers throughout India at a uniform price.

The remaining domestic supplies of milled sugar, plus any imported supplies are sold at free market prices. The proportion of free-sale sugar has been progressively increased from 35 percent in the mid-seventies to an estimated current level of 60 percent. The annual levy sugar quota has remained around 4.2 million tonnes in recent years, while the free sale volume has risen from about 5.0 million tonnes in the mid-eighties to about 8.0 million tonnes currently.

Total consumption of sugar has increased steadily despite fluctuations in production. These variations were moderated by relatively large stock changes and large imports during periods of severe scarcity such as in 1967 and again from 1985 to 1987 and in 1994. Between the early-sixties and the mid-nineties, sugar consumption rose from about 2.6 million tonnes to about 13.0 million tonnes. During this period, annual per caput consumption increased from 5.3 kg to more than 14.0 kg. Per caput consumption of plantation white sugar in urban areas is higher, about 15 kg compared to a 9 kg estimated for rural areas. Given the distribution of population between urban and rural areas (roughly 30 and 70 percent respectively), urban consumption accounts for nearly 45 percent of the total white sugar utilization.

Consumption of gur and khandsari increased from 6.4 million tonnes to more than 9 million tonnes between the early-sixties and the mid-nineties. However, per caput consumption of these products has actually declined significantly from about 15 kg to 10 kg. On a volume basis, per caput consumption of open-pan sugars was overtaken by that of white sugar in the mid-eighties, reflecting distribution of subsidized levy sugar at times at prices close to the retail price of khandsari and gur, and relatively low prices of free market sugar maintained through the monthly release mechanism and the importation of large quantities of sugar when needed, along with bans on exports. As a result of these measures, sugar recorded the lowest price increase vis-à-vis all other essential commodities such as cereals, pulses, edible oils, and even compared to the alternate sweeteners e.g. gur and khandsari.

### TRADE

The policy of the Government is to export sugar on a continuous basis and since 1960 India has been mostly a net exporter of sugar. Until early-1997 the decision to export or not was taken each year, based on expected production and domestic demand, with the surplus, if any, being allowed for export, irrespective of world market conditions. Until then the Indian Sugar and General Industry Export Import Corporation Limited, an organization of the sugar industry, was the only agency appointed by the Government of India under the Sugar Export Promotion Act of 1958 to handle exports. The Corporation was authorised to recover from all factories on a proportionate production basis any losses suffered on exports when world prices were below costs of production. However, since early-1997 trade has been deregulated, and exporters may register freely for export quotas. Despite ample

availabilities from the previous season's peak output, exports in 1996/97 were not expected to increase because of relatively low prices in international trade as compared to the domestic market.

### PRICES

Prices of sugarcane are supported through systems operated by the Central and the State Governments. Based on the recommendations of the Commission for Agricultural Costs and Prices, the Central Government announces at the beginning of each season the Statutory Minimum Price (SMP) that mills are required to pay for sugarcane. The SMP is fixed taking into account (a) the cost of cane production; (b) returns to growers from alternative crops and the general price trends of agricultural commodities; (c) the need to ensure availability of sugar to consumers at a fair price; (d) the price at which sugar produced from cane is sold by mills; and (e) the recovery of sugar from cane. The SMP for cane is specified in relation to a basic sucrose recovery level, with a premium for higher values. The SMP has been increased every year since 1988. The SMP for 1996/97 was set at Rs 45.9 (US\$1.26) per quintal, more than double the level of the early-nineties.

While the Central Government regulates the sugar industry, the State Governments exercise control over supply and distribution of cane as an agricultural crop. Thus, the State Governments announce State Advised Prices (SAPs) for sugarcane in respect of cane supplied to mills within their boundaries. The SAPs which mills are required to pay are generally substantially higher than the SMP. The prices announced by the State Governments of Punjab, Bihar, Haryana, Uttar Pradesh, Madhya Pradesh and Rajasthan are not connected to the recovery percent in cane, while those announced by the State Governments of Karnataka, Tamil Nadu and Andhra Pradesh are based on recovery rates. In Maharashtra and Gujarat, where cooperative mills dominate the sector, initial payments are slightly higher than the MSP with additional payments at the end of season based on mill profits.

The introduction of the SMPs for cane, their repeated upward revision and the introduction of the SAPs have contributed significantly to the expansion in area and production of cane. The relatively favourable prices obtained by cane growers were reflected in the shift in areas, especially in the eighties, away from wheat and other competing crops to sugar. However, recognising that unduly high SAPs could disturb the inter-crop price parities and lead to distortions in cropping patterns, as well as strain the viability of the sugar industry, the Commission on Agricultural Costs and Prices has recommended that restraint be exercised in fixing the level of the SAPs. In addition, since these price systems provide little incentive to improve quality (in terms of sucrose content), the sugar recovery content of cane has remained stagnant at less than 10 percent for the past two decades, against 12 percent or more in some of the other major cane sugar producing counties.

Within this regulatory framework, the cane growers encounter three different market situations: The first is the unorganized market where cane is sold to the gur or khandsari producers. The second is the private sector sugar mills, and the third the cooperative mills. In each of these markets a different price for cane may prevail. In the unorganized market, the price tends to be the lowest, except in seasons of shortage, when gur producers have greater flexibility to bid for supplies. In the case of co-operative sector mill, the tendency is to offer prices which initially are slightly higher than the Statutory Minimum, while the private sector mills generally pay the State Advised Price (SAP).

Government procurement prices of levy sugar are fixed on the basis of the SMP of cane plus conversion costs as recommended by the Bureau of Industrial Costs and Prices. However, as indicated above, the actual support prices of cane are generally much higher than the prescribed minimum prices.

Consumers use ration cards to purchase public distribution sugar (PDS) at Fair Price shops. The PDS price which had remained unchanged for several years was increased in early-1997 to Rs 10.50 per kg (US 29 cts/kg). The industry is supposed to offset losses on subsidized levy sugar from the balance sold on the free market. Though there is no price control on free-sale sugar, market supplies are regulated by the Government through a mechanism of monthly release quotas. Prices are thus indirectly maintained at levels considered appropriate by the Government. During the 1996/97 season, free sale sugar wholesale prices rose from about Rs 1 270 (US\$35) to some Rs 1 430 (US\$40) per quintal. Retail prices also increased to about Rs 1 550 (US\$43) per quintal.

#### FUTURE PROSPECTS

Over the last three decades, production of sugar rose at an average rate of 5.5 percent per year. Following a slackening in growth during the early-nineties, production rose sharply in 1995 and attained a peak level in 1996. Future prospects will continue to be largely dependent on government policy and technological advances, but under current conditions there is potential for production to approach 17 to 18 million tonnes by the end of the decade and 20 million tonnes by 2005.

Although gur and khandsari are still the main sugar products consumed in rural areas, demand for white sugar is expected to continue to increase both in absolute and per caput terms. Rising incomes and urbanization are expected to result in further shifts in demand from open pan to white sugar. Moreover, the growth of sugar demand by food industries and other non-household users, estimated to account for about 40 percent of total utilization, will provide additional impetus to longer term market growth. Under the assumption that pricing and distribution policies remain unchanged, the domestic market could absorb much of the prospective increase in production. In addition, net imports could be needed periodically to offset short-run crop shortfalls. However, if the general liberalization of the Indian economy extends further also to the sugar sector, it may be expected that domestic price levels would adjust upwards, leading to some weakening in the growth of demand and possibly to added incentives to production expansion.

India could generally remain a net exporter of sugar to world markets although availabilities could be constrained by the prospective close balance between supply and demand. The country's net trade position would thus remain vulnerable to short term crop variations, and would consequently continue to constitute an element of uncertainty in the international sugar market.

**Table 1: India sugarcane area, yield and production**

Year	Harvested	Yield	Production
	area '000 Ha	Mt / Ha	'000 Mt
1976	2 762	50.9	140 604
1977	2 866	53.4	153 007
1978	3 151	56.2	176 965
1979	3 088	49.1	151 655
1980	2 610	49.4	128 833
1981	2 667	57.8	154 248
1982	3 193	58.4	186 358
1983	3 358	56.4	189 506
1984	3 110	56.0	174 076
1985	2 953	57.7	170 319
1986	2 862	60.0	171 681
1987	3 079	60.4	186 090
1988	3 279	60.0	196 737
1989	3 329	61.0	203 037
1990	3 439	65.6	225 569
1991	3 686	65.4	241 046
1992	3 840	66.1	254 000
1993	3 570	63.9	228 030
1994	3 420	67.2	229 670
1995	3 820	71.0	271 230
1996	3 910	72.4	283 000

**Table 2 : India sugar production, trade and consumption**

Year	Trade			Consumption	
	Production '000 Mt, raw equivalent ...	Imports	Exports	Total	Per caput
		s		kg/year	
1976	4 633	0	899	4 019	6.3
1977	5 261	0	278	4 084	6.3
1978	7 019	0	517	4 948	7.5
1979	6 350	0	771	6 718	10
1980	4 194	136	127	5 662	8.2
1981	5 595	213	109	5 532	7.9
1982	9 170	13	311	6 186	8.6
1983	8 948	0	605	6 515	8.9
1984	6 410	350	166	8 628	11.5
1985	6 630	1 781	51	8 885	11.6
1986	7 507	1 012	8	8 935	11.4
1987	9 099	683	20	9 710	12.1
1988	9 748	0	7	9 823	12
1989	9 365	146	32	11 007	13.2
1990	11 757	13	27	10 992	12.9
1991	12 891	3	184	11 468	13.2
1992	14 341	1	426	12 329	14
1993	11 351	0	197	13 039	14.5
1994	10 604	1 926	53	12 807	14
1995	15 660	140	471	13 322	14.3
1996	17 455	0	900	13 969	14.8

## INDONESIA

#### INTRODUCTION

Indonesia's sugar industry dates back to the seventeenth century. It reached its zenith in the early-thirties when 179 factories produced nearly 3 million tonnes of sugar annually. Following a slump in the thirties, when low sugar prices prevailed, the industry declined to 35 factories producing about 500 000 tonnes of sugar. A decade later the industry had recovered somewhat, and by the beginning of World War II there were 93 factories producing about 1.5 million tonnes. But a second reduction occurred then, so that by the end of

World War II only 30 factories remained producing less than 300 000 tonnes. During the fifties some recovery occurred and Indonesia again became a net exporter. However, since 1967, Indonesia has reverted to a net importer position. In 1957, the industry was nationalized and to-date remains highly regulated. The national sugar policy seeks to encourage the intensification of production, the rehabilitation of factories in Java, and the establishment of new factories outside Java to meet growing domestic market requirements arising from steady population growth, rising incomes and the growth of the food and beverage industries. Since the mid-eighties imports have continued to rise and could reach record levels in 1997/98. Rising land and labour costs and rapidly growing consumption make Indonesian sugar self-sufficiency a difficult target to achieve, at least in the short run.

### PRODUCTION

Indonesia harvests about 400 000 ha of cane for centrifugal sugar, of which almost three-quarters is on Java. Most of the remainder comes from Sumatra, Kalimantan and Sulawesi. While a decade ago more than half of Java's cane was irrigated, this area has declined reflecting a shift to the cultivation of more profitable crops. Nevertheless, sugarcane cultivation in the major producing islands remains a highly significant economic activity, and covers more than one-third of the total land area.

About 70 percent of the sugarcane areas are cultivated by farmers, mostly on small to medium sized holdings. The remainder is cultivated on sugar factory plantations, both in Java as well as on other islands where the dominant form of sugarcane cultivation is plantation-style. Farmers are organized into groups (Kelompok Tani) responsible for at least 20 ha of land, in order to coordinate the supply of cane to the mills. Sugarcane areas have increased sharply since the mid-seventies at an average annual rate of 7.5 percent from 116 000 ha in 1976 to a peak of 423 000 ha in 1994. However, areas have since declined to 400 000 ha in 1996.

Sugarcane yields have shown little growth, fluctuating during the nineties in the range of 73 to 79 tonnes per ha, compared to an average level of 73 tonnes during the eighties and 83 tonnes during the late-seventies. The average cane yields in the nineties were thus about 8 percent lower than in the mid-seventies, though admittedly on a total harvested area, which was four times larger. During the same period, average paddy rice yields increased by 65 percent, and the area rose by 35 percent. Between the late-seventies and the nineties, average sugar extraction rates also declined from about 10 percent to 7 percent.

Production of sugarcane rose from about 28 million tons in the early-nineties to a peak of 33 million tons in 1994, but subsequently receded to 30 million tonnes in 1995 and 1996. Sugar production showed comparable changes, rising from 2.1 million tonnes in 1990 to nearly 2.5 million tons in 1993 and 1994 and declining to 2.1 million tonnes in 1996.

Sugarcane has had to compete with other crops, especially rice. Relatively less attractive returns as compared to other crops have continued to discourage some farmers from growing cane, leaving certain factories without sufficient raw materials to operate at capacity. In addition, since the 1995/96 season, there has been a weakening in the ratio of producer prices for sugarcane to those for rice. Over the years, aside from price incentives, many Government schemes have been implemented to encourage sugarcane production, including the 1975 Smallholder Sugarcane Intensification Programme and the 1981 Induced Increasing Sugar Production Programme. At present, the Government provides financial assistance to growers in various forms, for example to support production, harvesting and hauling costs through the Koperasi Unit Desa, or rural cooperative unit. Some funds also flow through the factories to assist with fertilizers and chemicals.

### PROCESSING

In 1981 the Government formed the Asosiasi Gula Indonesia (AGI, or Indonesia Sugar Association) comprised of all sugar mills, whether public or private. The AGI is a member of the Indonesian Sugar Council (Dewan Gula Indonesia) and the KADIN (Indonesian Chamber of Commerce and Industry). At present there are some 69 sugar mills in Indonesia, 90 percent of which are publicly owned and organized into management units called Perseroan Terbatas Perkebunan (PTPs). PTBs operate somewhat independently, and many are involved in other businesses such as rubber or palm oil. The share of mills in the private sector is likely to grow if the industry expands as the Government envisages, and if measures are implemented to close antiquated publicly-owned small capacity mills in Java.

At present the total capacity of mills is some 209 000 tonnes of cane per day (TCD). Most mills are small by international standards: 49 have slicing capacity of less than 4 000 tonnes TCD, 12 are between 3 000 and 4 000 and eight are above 4 000 TCD. The efficiency of the small factories is generally relatively low, particularly with regard to the sugar extraction rate. Many countries achieve recovery of over 85 percent of sugar, while Indonesia obtains about 83 percent or less. It is envisaged that by the year 2000, four new sugar factories will be established outside Java with a total capacity of 34 000 to 36 000 TCD and planned sugar production of 445 000 tonnes. By 2005 further sugar processing facilities are planned to bring total production to over 3 million tonnes.

Until 1997, most manufacturers with a demand for highly refined sugar rather than the "standard" domestically produced sugar, depended on imports. The first refinery began operation in mid-1997. It is located in west Java, and will have a capacity to produce 150 000 tonnes of refined sugar per year. The owners include BULOG (a statutory organization), with a 10 percent share, and four other companies. Raw sugar is supplied by Australia, Thailand, Fiji and South Africa.

### CONSUMPTION

The population of Indonesia is young and growing rapidly. Average growth since 1970 has been around 2.0 percent annually though rates have slowed in the latter part of this period. Income has also risen rapidly. Since 1970, total real GDP grew by more than 7 percent annually, and on a per caput basis by 5 percent. These factors have led to a strong growth in the use of many consumer products, including sugar and items containing sugar, such as confectionery and beverages. About 90 percent of sugar is used directly by households and 10 percent by industries. Imported refined sugar is largely for industrial use.

Between 1976 and 1996, total sugar consumption increased from 1.8 million tonnes to 2.75 million tonnes, or by an average annual rate of 2.0 percent (Table 2). Per caput consumption rose by about 0.6 percent annually from about 12.9 kg a year in 1976 to 14.4 kg in 1994. Provisional data for 1996 indicate a per caput consumption of 13.5 kg.

It is expected that soft drink consumption growth in Indonesia would provide a stimulus to increased sugar consumption as incomes grow. At present, consumption of soft drinks is well below the levels in Malaysia and the Philippines. In Indonesia there is a large consumption of "tropicals", a juice concentrate which is mixed one part to nine parts water. The concentrate has a very high content of sugar or other sweeteners.



Consumption of sugar substitutes meets a large share of sweetener requirements, particularly in the food and beverage industries. Indonesia now uses about 70 000 tonnes of domestically-produced glucose a year, about 90 percent in candies and 10 percent in miscellaneous other uses. Most of the glucose producers have been small, producing 5 000 tonnes of glucose a year.

The soft drink companies have not generally used HFS, perhaps due to low volume and varying quality. Some increase in HFS production from cassava occurred during the nineties, though constrained by the relatively high cost of the domestic raw material. Production in 1996 was estimated at about 20 000 tonnes, and further increases are expected as a result of a British Sugar/PT Budi Acid joint venture to build a factory of 35 000 tonnes capacity in west Java to produce HFS from cassava. The factory may come on line in 1997.

Indonesia also produces non-nutritive sweeteners such as saccharin, cyclamates and sorbitol for the domestic market and for use in diet beverages. Total production in 1993 was about 10 000 metric tonnes, enough to replace 400 000 tonnes of sugar.

In addition, at least 500 000 tons are consumed of non-centrifugal sugars, sometimes called village cup sugar, and also sweeteners made from palm.

#### TRADE

Indonesia has been a net importer of sugar since the sixties. Since the mid-eighties, imports have ranged between 50 000 and 350 000 tonnes (Table 2). However, in 1995 imports exceeded 570 000 tonnes, and substantially higher figures are estimated for 1996 and 1997. Lacking a separate refining industry until 1997, Indonesia typically imports refined sugar, or sugars which could be consumed directly.

BULOG is legally the sole importer of sugar and does not pay an import tariff. About five Indonesian firms, and a few international sugar traders, contract with BULOG to handle the actual importation, for which a license is needed.

#### PRICES

Domestic sugar must be sold to BULOG, although incentives for new private investment include potential waivers for some fraction of output to be sold directly and not through BULOG. Being the sole supplier of both domestic and imported sugar, BULOG plays a key role in sugar pricing.

Each year the Government sets sugar producer prices at a parity level with competitive crops, primarily rice. In recent years, the ratio of the ex-mill sugar prices to the floor price for unmilled rice has weakened. With current sugar producer prices set at Rs 960 (US cents 41.0) per kg and the unmilled rice price at Rs 525 (US cents 22.4) per kg, the price ratio has fallen to 1.83, compared to 2.40 in the early-nineties.

Farmers are paid on the basis of average sugar content of delivered cane, with quality premiums or discounts. In April 1997, in addition to raising the producer selling price of sugar by 5.5 percent to Rs 960 (US cents 41.0) per kg, the Government increased the farmers' share under the production sharing agreement with sugar mills from 62 percent to 65 percent.

Despite higher producer prices, retail prices of domestically produced sugar have been maintained relatively stable in recent years, averaging Rs 1 477 (US cents 63.0) per kg in 1995, and Rs 1 500 (US cents 64.0) per kg in 1996 and the first half of 1997. In real terms (deflated by the consumer price index), prices have declined by about 10 percent over this period. However, these levels may have constrained consumption and encouraged the production and use of substitutes.

#### FUTURE PROSPECTS

At current real prices, demand for sugar is expected to continue to increase in line with population growth and rising incomes. Given the

potential growth in demand, a major challenge facing the Indonesian industry is the extent to which domestic production can be expanded. Despite the dynamic growth in output between the early-eighties and the early-nineties, in more recent years production of sugar appears to have stabilized reflecting the emergence of constraints at both the agricultural and industry level. This has resulted in substantial increases in net import requirements.

Competition for land, particularly irrigated areas, not only from other crops and livestock production, but also increasingly from urbanization in densely populated areas of Java, has resulted in a shift in the cultivation of sugarcane to non-irrigated areas and to poorer lands. Thus, unless yields can be sufficiently increased to enhance the economic viability of crop, possibilities for growth will continue to be dampened. Improved productivity is particularly important because scope for raising producer prices is limited by the need to maintain balanced growth in paddy production, acceptable profit sharing with millers, and adequate margins in the marketing, storage and distribution of supplies without unduly raising retail prices for this essential and sensitive consumer product

In the processing sector, there is also scope for enhancing mill efficiency, thereby contributing to better returns to both industry and agriculture. However, certain structural rigidities make the rationalization of the industry, particularly in the older mills of Java difficult to achieve, including the need to find alternative employment and income opportunities for mill workers.

**Table 1 : Indonesia sugarcane area, yield and production**

Year	Harvested area '000Ha	Yield Mt/Ha	Production '000Mt
1976	116	82.4	9 558
1977	125	89.5	11 188
1978	153	84.2	12 883
1979	179	77.3	13 837
1980	189	71	13 419
1981	193	68.4	13 208
1982	255	70	17 850
1983	255	75.4	19 247
1984	231	73.9	17 102
1985	273	76.6	20 934
1986	303	77	23 329
1987	335	63.7	21 334
1988	366	78.8	28 804
1989	340	79	26 854
1990	364	76.9	27 976
1991	386	73	28 178
1992	395	79.2	31 248
1993	418	79.5	33 202
1994	423	75.4	31 913
1995	405	75	30 375
1996	400	76	30 400

Given current production and market developments, sugar import demand is expected to remain relatively large by historical standards. However, with the increase in production capacities resulting from new plantations and the larger-scale sugar factories that are being set up outside Java, the projected deficit could be reduced substantially. The longer-term viability of the industry would, however, depend on improved agricultural and industry productivity, particularly as the sector becomes increasingly integrated into the world market and exposed to free market forces.

**Table 2 : Indonesia sugar production, trade and consumption**

Year	Production	Trade		Consumption	
		Imports	Exports	Total	Per caput
<i>... '000 Mt, raw equivalent ...</i>					
1976	1 056	219	0	1 791	12.9
1977	1 105	240	0	1 881	13.3
1978	1 320	467	0	1 954	13.5
1979	1 363	318	0	2 068	14.0
1980	1 250	432	0	2 089	13.8
1981	1 247	782	0	2 495	16.2
1982	1 629	745	0	2 387	15.2
1983	1 572	178	0	2 357	14.7
1984	1 500	0	0	2 317	14.1
1985	1 767	1	0	2 219	13.3
1986	1 980	54	0	2 237	13.1
1987	2 086	141	0	2 284	13.2
1988	2 004	141	0	2 316	13.1
1989	2 005	352	0	2 336	13.0
1990	2 075	304	0	2 344	12.8
1991	2 215	330	0	2 489	13.4
1992	2 300	355	0	2 617	13.9
1993	2 483	239	0	2 692	14.1
1994	2 454	120	0	2 805	14.4
1995	2 098	574	0	2 630	13.3
1996	2 100	850	0	2 750	13.5

<b>MALAYSIA</b>
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**INTRODUCTION**

The sugar industry in Malaysia is characterized by rapidly increasing direct domestic consumption supported by an equally fast growing food processing industry, and on the supply side by a small domestic production base that is unlikely to expand. To meet the growth in demand, imports have expanded steadily to record levels in recent years. With excess refining capacity, some of the imports of raw cane sugar are refined and re-exported to regional markets.

**PRODUCTION**

The cultivation of sugarcane in Malaysia is surprisingly small. Production is concentrated in the Northwest extremity of peninsular Malaysia in the states of Perlis and Kedah (Figure 1). This area has a distinct dry season needed for cost-efficient sugarcane production. Plantings in the states of Perak and Negri Sembilan were unsuccessful due to high unit costs as producing conditions were less suitable. Areas for potential expansion have been identified in the state of Johore and in Sarawak, but no projects have yet been undertaken.

In recent years the sugarcane harvested area has averaged between 20 000 and 24 000 hectares (Table 1). Most of the cane areas is under the management of three sugarcane plantations, two in the State of Perlis and one in the state of Kedah, with smallholders contributing only about 15 percent of the total. The lack of growth in cane areas largely reflects the higher remuneration received by farmers for other crops, especially oil palm. Over the past 20 years while the sugarcane area has remained at around 20 000 hectares, that planted to oil palm has expanded from 600 000 hectares to 2.2 million hectares. Other leading crops in terms of planted areas are rubber with 1.8 million hectares, rice with 670 000 hectares and cocoa with 380 000 hectares.

Sugarcane yields have increased steadily over the years. They rose from 40 tonnes per hectare in 1980 to 65 tonnes per hectare in 1990 and reached 68 tonnes per hectare in 1996. The increase in yields can be attributed to the planting of improved varieties and greater input use. There are some annual fluctuations, but in recent years yields have remained relatively constant. Differences in yields also exist between plantations and smallholders with the latter's yields averaging generally around 40 tonnes per hectare owing to reduced access to irrigation water.

Production of sugarcane generally ranges between 1.3 to 1.6 million tonnes annually depending largely on yields. Sugar content has been around 7 percent. The harvest takes place between January and April. Labour availability for harvesting is a serious problem for the industry because of increasing employment in the country's manufacturing sector. As the domestic producing area is near the border with Thailand, the sugar industry has come to depend heavily on labour from this country, particularly during the harvesting season. If the harvest is delayed, (e.g. by extended rain) into May or June, labour shortages develop as these workers begin to return home to plant paddy rice in southern Thailand. Because of labour constraints, the industry is planning a gradual shift to mechanical harvesting.

**PROCESSING**

Malaysia has four sugarcane processing facilities, one each in the states of Perlis, Kedah, Penang, and Selangor. Two of the facilities, Gula Padang in the state of Kedah, and Perlis Plantations in the state of Perlis, are integrated mills processing cane into raw and refined sugar with the added capability of refining imported raw cane sugar. The other two facilities are refineries handling imported raw cane sugar. One is the port-side refinery on peninsular Malaysia across from Penang island owned by the Malayan Sugar Manufacturing Company (MSM). The other is the Central Sugar Refinery (CSR) located near Kuala Lumpur in the state of Selangor. Malaysia's sugar processing industry depends on imports for about 90 percent of its raw materials. With a total annual refining capacity of over 1.0 million tonnes, all of the imported sugar is raw, with the bulk being processed at the MSM and CSR refineries.

### CONSUMPTION

Domestic consumption of sugar in Malaysia has increased rapidly in recent years (Table 2). During the first half of the nineties, sugar consumption averaged about 800 000 tonnes annually, compared with about 500 000 during the first-half of the eighties, a 57 percent increase. In 1995, a record 1.03 million tonnes was consumed and the provisional estimate for 1996 places consumption at 1.16 million tonnes. Population and income growth account for most of the gains, as 66 percent of total sugar consumption in Malaysia occurs in the household. However, the country's buoyant economy has also led to a particularly strong growth in the food processing industry. Ice cream, chocolates, sweetened condensed milk, and soft drinks are some of the items that have created new demand for sugar. On a per caput basis, the level of sugar consumption in Malaysia at about 50 kilograms (raw equivalent) is among the highest of the region. However, some of the sugar-containing products manufactured in the country are exported.

Substitute sweeteners have not made a big impact on the Malaysian market. Apart from limited production of palm sugar which is required for cooking traditional desserts, there is a corn wet-milling plant producing HFCS 42 which is used in the manufacture of tomato and soy sauces. There are no statistics on these sweeteners, but industry sources believe that the quantities involved are insignificant compared to the total sweetener supply.

Non-nutritive sweeteners are making inroads in the Malaysian market. However, the Ministry of Health closely regulates the use of these sugar substitutes. A license is required to import, use, manufacture or sell non-nutritive sweeteners, and detailed records of all transactions must be maintained. These products are limited to use in low-energy or dietary foods and beverages, and all such products must be clearly labelled as containing non-nutritive sweeteners. Relatively few dietary products are manufactured in Malaysia, although diet soft drinks seem to be gaining in popularity. Table sugar substitutes are also becoming more common. However, non-nutritive sweeteners still make up only a small portion of the total sweetener market.

The Malaysian Government estimates domestic requirements each year and sets a quota allocation for refiners and millers to supply the domestic market. Based upon this estimate the refiners and millers are issued licenses to import raw sugar. Quantities imported above these quotas require prior approval. The level of imports permitted is dependent upon expected domestic production and may be adjusted according to the progress of the crop. Tariffs on raw sugar imports are waived for the refiners and mills. Raw sugar imported for re-export as refined sugar is also covered by licenses.

### TRADE

Malaysia is a net sugar importing country. In 1995, imports of raw sugar reached a record 1.0 million tonnes, while exports were 101 000 tonnes (Table 2). Increasing quantities of sugar have had to be imported to meet rising demand and compensate for the stagnant domestic production. For example, imports for the first 5 years of the 1990s averaged 885 000 tonnes per year, compared with 494 000 tonnes for the first-half of the 1980s, a 79 percent increase. In recent years, sugar and corn have been Malaysia's largest agricultural imports, with annual sugar imports valued at between US\$200 to 300 million.

The main suppliers of raw sugar to Malaysia are Australia, Thailand and Fiji which account for 98 percent of total imports. For a number of years, Malaysia has maintained long term agreements (LTA's) with Australia and Fiji for its sugar supplies. Shipments under these LTA's have accounted for between 40 to 60 percent of annual import requirements. Other import origins have been Cuba and the Philippines, but both have faded in importance since the mid-1980s. Import licensing, administered by the Ministry of Trade and Industry, has replaced the duty levied on imports of refined sugar.

The sugar industry also utilizes its excess refining capacity to produce refined sugar for export. The key markets for that refined sugar have been nearby Singapore and Indonesia, New Zealand and periodically South Asia and Middle Eastern countries, especially Saudi Arabia. The Philippines have also imported refined sugar from Malaysia in 1994 and

### PRICES

Wholesale and retail prices for refined sugar in Malaysia are regulated under the Supplies Regulation Act of 1974 and have remained at M\$1 145 (US\$452) per tonne and M\$1.20 per kilogram (US 47 cents a kilogram), respectively, since November 1989.

### FUTURE PROSPECTS

The National Agricultural Policy Plan (NAP) for the period 1992 to 2010 gives minimal attention to sugar compared with oil palm and fruits and vegetables. Apart from encouraging improvement in the productivity of existing areas and milling efficiency, the Government is reportedly not anxious to foster expansion of sugarcane cultivation in the country. However, support is extended to the industry through sugar import quotas and relatively high domestic retail prices. According to the NAP, more research and development efforts are to be channelled to the development of alternative sources for sugar.

Sugar consumption can be expected to continue its upward trend in Malaysia reflecting population and income growth. Higher incomes also translate into growth in the consumption of processed foods containing sugar. Malaysia is likely to import increasing quantities of raw sugar to meet domestic needs. The development of re-export trade appears less certain. Unless refining capacity is expanded, a greater share of domestically processed refined sugar will be retained in Malaysia and less will be available for export. International market developments which would influence trends in exports would include increasing competition from Australia in regional refined sugar import markets and the impact of new raw sugar refineries in the Near East on import demand for refined sugar from countries such as Malaysia. On trade policy, the general view is that LTA's have served Malaysia well, and

the agreements with Australia and Fiji are likely to be renewed in the near future.

**Table 1 : Malaysia sugarcane area, yield and production**

Year	Harvested area '000 Ha	Yield Mt / Ha	Production '000 Mt
1976	25	35	870
1977	20	50	1 000
1978	21	45	963
1979	20	50	1 005
1980	18	40	720
1981	17	40	680
1982	20	50	985
1983	21	50	1 025
1984	22	50	1 100
1985	22	49.1	1 080
1986	23	53	1 219
1987	17	71	1 207
1988	19	60	1 140
1989	19	64	1 216
1990	20	65	1 300
1991	20	61	1 220
1992	20	66	1 320
1993	23	68	1 547
1994	23	68	1 541
1995	24	68	1 601
1996	24	68.1	1 600

**Table 2 : Malaysia sugar production, trade and consumption**

Year	Production '000 Mt. raw equivalent	Trade		Total kg/year	Per caput
		Imports	Exports		
1976	63	337	33	372	29.7
1977	81	408	22	476	37.1
1978	69	395	18	457	34.8
1979	75	418	16	486	36.2
1980	52	491	15	534	38.8
1981	49	452	55	453	32.1
1982	70	421	31	474	32.7
1983	77	543	71	568	38.2
1984	82	561	117	536	35.1
1985	81	593	93	589	37.6
1986	94	646	131	613	38.1
1987	98	639	180	557	33.7
1988	88	710	116	681	40.1
1989	100	772	230	634	36.4
1990	105	815	228	677	37.8
1991	95	874	235	715	39
1992	104	902	258	733	39
1993	106	878	175	797	41.4
1994	114	960	182	880	44.7
1995	108	1 033	101	1031	51.2
1996	113				

## PAKISTAN

### INTRODUCTION

As is true in many countries, the Government of Pakistan is heavily involved in the sugar industry, regulating mill construction, trade and prices, and influencing farmers' crop decisions in various ways. One reason for the large government involvement with sugar is the political importance of the crop. Sugar is also the second most important cash crop in Pakistan after cotton. Self-sufficiency in sugar is a goal, but

one that to date has proven illusive. The major sugar crop is sugarcane, but there is a small sugarbeet industry in the cooler high elevations of the Northwest Frontier Province.

### PRODUCTION

Pakistan grows about 1 million hectares of sugarcane, more than all other cane producing countries except Brazil, China, Cuba, India and Thailand. Cane is also used for non-centrifugal sugars and seed, so that the amount of land harvested for centrifugal sugar each year is only about two-thirds of the total.

The Punjab Province accounts for 60 to 65 percent or about 650 000 ha of the area under sugarcane. Rice, cotton, and sunflowers are major competitors for land use among farmers in that province. Other producing areas include the Sind Province which accounts for 25 to 30 percent of sugarcane land, the Northwest Frontier Province (NWFP) about 10 percent, and Baluchistan which accounts for less than 1 percent. In Sind Province, cotton, wheat, rice, and sunflower are alternative crops, and the growing of bananas is becoming more popular. Due to higher yields, the share of Sind Province in total sugar production is about 40 percent.

The harvesting period follows the pattern of many other northern hemisphere crops, beginning in November/December and ending in April/May. Planting can be done in autumn or spring, with autumn planting (September-October) providing better results due to a longer growing season. Punjab and NWFP mostly plant in spring, and harvest 8 to 10 months later. In the Sind Province most planting is in autumn, allowing growth for up to 16 months. Harvesting begins in October in Sind, November in Punjab and the NWFP, and continues until April or May.

Pakistan's sugarcane yield averages about 46 tonnes per hectare, well below the world average of above 60 tonnes, and below neighboring India's yield of 65 to 70 tonnes. However, yields are increasing over time, at a rate of between 0.5 and 1.0 tonne per hectare annually. Yields in the Punjab, were relatively constant at 37 tonnes per hectare for about 10 years and only recently started rising to over 45 tonnes per hectare. However, individual farmers have obtained yields of 120 tonnes per ha. Precipitation averages only 335 ml a year in the Punjab, so irrigation is crucial, but the total supply of water is limited. Yields in the Sind Province are above 50 tonnes per hectare, significantly higher than in Punjab. The growth rate in sugarcane production in Sind has exceeded Punjab in recent years. However, because of its larger area under sugarcane, the Punjab produces the major share of the national output, and for 1997/98 output in this province is forecast to increase by 10 percent to 29 million tonnes, while Sind is expected to produce 13 million tonnes, unchanged from 1996/97.

Sugar production first rose above 1 million tonnes in 1982. In 1989, output reached 2 million tonnes, and 3 million tonnes in 1994 and 1995 (Table 1). However, production fell to 2.7 million tonnes in 1996 due to a combination of bad weather, lower acreage, and diversion of cane to non-centrifugal sugar production, mostly gur. Production for 1997 is projected at about 3 million tonnes, as farmers respond to the higher prices received the previous year.

### PROCESSING

The Pakistan milling sector has grown from 2 mills after World War II to the current 75. Milling capacity is 5 million tonnes of sugar, but the sector is operating at only about 60 percent. Difficulty in acquiring sufficient cane due to

competition with non-centrifugal sugar producers (such as gur) is the major factor contributing to the underutilization. Given the sometimes overriding efforts of mills to acquire cane, security of supply for any one mill is low. The other associated problem is the low extraction rate mostly due to deterioration in cane quality. In seeking the highest price for their crops, some farmers are willing to engage middlemen who market their cane to the highest bidder. In certain cases, sugarcane is transported several hundred kilometers, and can be as much as several weeks old by the time it is milled. The poor condition of some roads, and vehicles, adds to this problem.

The issuing of licenses to build new mills is not done according to a set of specific criteria. Mill owners can sometimes get soft government loans to build new mills, and within each province mill ownership is relatively concentrated. With the current over-capacity, many mills are reported to be in financial difficulty, and in recent years some have ceased operating.

There is a waiver of the domestic excise tax for any sugar produced above the average of the previous 2-year period. However, the waiver only applies if the mill grinds continuously for at least 160 days. Mills react to this policy by starting early, running late, or running only part of each day to meet the criteria.

### CONSUMPTION

Sugar consumption in Pakistan is growing with the expanding population, and in 1997 is expected to increase to 3.24 million tonnes. In the last 10 years consumption grew at an average of 110 000 tonnes yearly, or over 4 percent a year. In the previous decade (1977-87), consumption had grown much faster at over 10 percent a year when population growth was above 3 percent. In the last decade the population growth rate has declined to 2.3 percent. Per caput sugar consumption continues to rise, but its growth rate has also slowed down from earlier decades, and from 1987 to 1997 it increased only about 1 percent a year.

Per caput sugar consumption in Pakistan, at about 22 kilograms a year, is slightly above the world average and compares to India's per caput use of 15 kilograms. If the consumption of non-centrifugal sugars were added, apparent consumption would be much higher. In 1996/97 it was estimated that 32 percent of the sugarcane crop was diverted for the production of an estimated 1.4 million tonnes of gur. The consumption of gur is difficult to track since there is a large amount of unrecorded trade along the borders of Afghanistan and the Islamic Republic of Iran, where there is a preference for gur. There was a ban on gur before 1987, but now it is freely traded.

There is not much use of other sweeteners in Pakistan. There is a negative public image of saccharin, and many soft drink companies do not sell diet products. The appeal of diet products is limited since sugar is an important source of calories. Approval of Sucralose and/or acesulfame-potassium are pending, but any influence on sugar use would mostly likely be only in the distant future. The largest industrial users of sugar are soft drink manufacturers.

### TRADE

Pakistan has had brief periods of sugar surpluses, exporting 132 000 tonnes in 1994 and 343 000 tonnes in 1995. These surpluses were short-lived, however, and net imports in 1996 were 340 000 tonnes.

Exports have recently been banned, and imports are under the control of the Trading Corporation of Pakistan. Imports have come mostly from India, Brazil, China and Thailand, with China and Thailand especially being able to provide a type of large-grain sugar which some consumers prefer.

### PRICES

The Agriculture Department calculates a detailed cost of production and sets a minimum price for sugarcane based on this calculation.

However, in recent years these minimum prices have been lower than the prices which mills have actually paid, due to the shortages of cane. There have been occasional harvest stoppages such as in late 1995 and early 1996 when farmers refused to deliver cane at the minimum price which was being offered by mills. The production of gur provides an alternative outlet for cane.

The price of sugar itself is not directly controlled, though imports and exports are strictly regulated in ways to affect price. In 1996, average retail sugar prices in urban areas were around 18.5 rupees/kg (US 51.28 cents/kg). A less refined grade of sugar, sakria, was selling at 16 rupees (US 44.35 cents/kg), and gur at 14 rupees (US 38.8 cents/kg). The wholesale price of sugar was only slightly lower, at 18 rupees/kg (US 49.9 cents/kg). Outside the cities, sugar prices are generally slightly higher. Some amounts of low priced sugar are sold through government stores to the needy.

In 1997, retail prices rose significantly to 20 to 24 rupees/kg (US 55.4 to 66.5 cents/kg), indicating short domestic supplies. Also, the devaluation of the rupee against the dollar which was highest in 1996 contributed to the rise since sugar is traded internationally in US dollars. As imports have increased in the last 2 years, the rising price of imported sugar (in rupees) was also reflected in the rising domestic price. An import tariff of 10 percent was removed in mid-1997 so as not to contribute to increasing sugar prices.

A "cess" (tax) on sugarcane, half from farmer and half from mill, originally intended to support sugarcane research, is now being used for building feeder roads. The cess varies among the provinces. In 1995/96, the sugarcane development cess in the Punjab, Sind and NWFP were paisas 108, 100 and 53 per 40 kg (about US\$ 3.0, 2.8 and 1.5 cents), respectively. The deduction from the sugarcane growers was 54, 25 and 27 paisas (US 1.50 0.69 and 0.75 cents), and from the mills 54, 75, and 27 (US 1.50, 2.08 and 0.75 cents), respectively. These different tax rates affect the net support price, and change the net relative prices received by farmers and mills in the different provinces.

In addition to the announced support price, a premium to be paid to growers who deliver high quality cane is announced each year by the Government. For 1996/97, the quality premium was to be paid if average recovery was higher than 8.5 percent in Punjab and NWFP Provinces, and 8.7 percent in Sind Province. The rate of payment was 0.32 rupees (US 0.89 cents) per 40 kilograms of cane for each 0.1 percent point recovery over the base level. For example, if a Punjab mill averaged 8.6 percent recovery, growers would be paid an extra 0.32 rupees (US 0.89 cents) per 40 kilograms of cane.

The maximum bound import tariff which Pakistan submitted in the Uruguay Round of the GATT was 150 percent *ad valorem* for both raw and refined sugar, which is at the higher end of the range for all developing countries.

### FUTURE PROSPECTS

The Pakistan government influences the industry through the price of sugar, price of sugarcane, mill licensing, special types of taxation, and import and export controls (some direct, some indirect). Market-based policies are spreading in many parts of the world, and Pakistan is no exception, although the influence of this trend on sugar policies is not clear.

Pakistan is expected to reduce its sugar imports in the short run, as recent firm internal prices are likely to provide stimulus to domestic production, while constraining the growth of

consumption. This would conform to long-stated self-sufficiency goals. However, with clear limits on irrigation water and production inputs, self-sufficiency for Pakistan in any one commodity, such as sugar, may come at the price of foregone production of other crops. The price of refined sugar in the world market in the last decade has been more stable than in earlier decades, and as world trade becomes based more on market-oriented policies, the world price may become a more clear "opportunity cost" against which to compare domestic prices. The currency devaluation which Pakistan has recently experienced provides a window of opportunity for Pakistan's sugar policy to be realized.

However, in the longer run, improved efficiency will be required to create the basis for a competitive industry. There are likely to be ongoing technical efficiency gains in the industry, and Pakistan appears to be well positioned to adopt technological improvements.

**Table 1 : Pakistan sugarcane and sugarbeet area, yield and production**

Year	Harvested area		Harvested area		Production	
	Cane '000 Ha	Beet	Cane Mt / Ha	Beet	Cane '000 Mt	Beet
1976	700	10	36.5	26.3	25 547	273
1977	788	14	37.5	27.7	29 523	389
1978	823	14	36.6	22.5	30 077	327
1979	753	14	36.3	23.8	27 326	335
1980	719	13	38.3	25.7	27 498	339
1981	825	16	39.2	28.8	32 359	453
1982	947	12	38.6	28.9	36 580	360
1983	912	9	35.7	23.6	32 534	206
1984	897	8	38.2	21.8	34 287	178
1985	904	4	35.6	27.2	32 140	104
1986	780	3	35.7	39.8	27 856	135
1987	762	10	39.3	33	29 926	320
1988	842	12	39.2	38.7	33 029	456
1989	877	11	42.2	30.2	36 976	342
1990	854	11	41.5	31.3	35 494	343
1991	884	11	40.7	30.4	35 989	319
1992	896	9	43.4	35.3	38 865	315
1993	885	8	43	27.8	38 059	233
1994	963	7	46.1	35	44 427	243
1995	1009	8	46.7	25.5	47 168	194
1996	963	8	47	27	45 230	213

**Table 2 : Pakistan sugar production, trade and consumption**

Year	Production	Trade		Consumption	
		Imports ...Mt. raw equivalent	Exports	Total kg/year	Per caput
1976	685	0	0	598	7.7
1977	736	0	0	801	10.1
1978	930	0	0	843	9.9
1979	662	12	0	874	10.4
1980	624	109	0	798	9.2
1981	927	77	0	894	9.9
1982	1 412	0	0	1 086	11
1983	1 247	4	2	1 151	11.8
1984	1 248	0	54	1 281	13
1985	1 430	0	0	1 426	13.9
1986	1 213	281	0	1 754	16.6
1987	1 398	815	0	2 184	19.9
1988	1 936	273	0	2 000	17.7
1989	2 011	47	68	2 293	19.6
1990	2 017	235	8	2 247	18.5
1991	2 100	497	0	2 420	19.1
1992	2 528	127	0	2 641	20.3
1993	2 603	82	0	2 691	20.1
1994	3 177	52	132	2 852	20.8
1995	3 263	6	343	3 026	21.6
1996	2 684	350	10	3 162	21.8

## PHILIPPINES

### INTRODUCTION

The culture of sugarcane as a commercial crop started in the Philippines in the eighteenth century. By the nineteenth century the crop had adapted to soils and climatic conditions and had become a major export commodity. By the twentieth century, growing demand from the United States fuelled a major expansion of the crop, which together with new technology in sugar milling and the provision of adequate financing, created the Philippine sugar industry. The Laurel-Langley Agreement with the United States which gave practically limitless preferential access to Philippine sugar expired in 1978 and was replaced by the current import quota system which the United States has with selected countries.

In 1974, stimulated by buoyant prices, a monopoly was established to handle all sales of sugar and promote further development of the industry. This monopoly was dismantled in 1985, nationalized sugar mills and refineries were privatized, and the Sugar Regulatory Administration (SRA) was established. The SRA's major mandate was to rebuild the industry, spur its further development, and regulate inventory levels. It allocated sugar production quotas to supply domestic markets and fill the Philippine export quota to the United States, with residual sugar being sold to the world market. The SRA does not have authority to itself buy, own, or market sugar.

### PRODUCTION

Sugar cane is currently grown in 17 provinces which are widely distributed in 8 regions, from the northernmost island of Luzon to the southernmost island of Mindanao (Figure 1). The island of Negros in the central islands (Visayas) of the country, with its 17 operational mills, remains the primary cane-growing region accounting for about 55 percent of the total land area planted to the crop. Rapid industrialization in Central and Southern Luzon, where Metro Manila is located, has

resulted in a significant reduction in hectareage on the island. However, the establishment of new farms on the island of Mindanao has offset some of this reduction and indicates the growth potential of the island for sugar production.

The area under sugarcane has generally declined over the last twenty years from a peak of 553 000 hectares in 1976 to a trough of 269 000 hectares in 1987. Sugarcane production closely followed trends in area, with a peak of 29.3 million tonnes in 1976 to a low of 13.8 million tonnes in 1987. The nineties have been marked by periods of declining productivity, mostly attributed to poor farm cultivation and poor harvesting schedules in addition to insufficient development and extension capability.

In 1976 remunerative prices and assured markets, supported by adequate Government financing led to production of sugar reaching a total of 2.8 million tonnes. However, sugar production declined soon after as the assured market in the United States was subjected to a reduced quota. Price controls in the domestic market and the impact of the Comprehensive Agrarian Reform Programme (CARP) further contributed to the decline in sugar output to a low of 1.2 million tonnes in 1987. Under CARP, plantations in excess of 25 hectares have been redistributed to workers and beneficiaries. As a result of the programme, the average size of sugarcane farms shrank from 14 ha in the seventies to 9 ha in 1993. The distribution of farms in parcels of 3 ha to 5 ha, patterned after rice, and the natural redistribution through inheritance of farms over 100 years, have rendered most single sugar farms uneconomic.

Production has recovered in the nineties and averaged around 1.8 million tonnes from 1990 to 1996 mainly as growers and millers have adapted to the changes brought about by the CARP. For example some mills have begun leasing redistributed lands, so that the production unit is large enough to economically justify mechanization. In addition, supply of cane to the mill becomes secure. Another development is the pooling together of resources by smallholders to form as cooperatives hence achieving economies of scale in the production of cane and securing of supply for the co-operative owned mill. Sugarcane yields currently average about 62 tonnes per hectare while sugar yield is about 4.8 tonnes sugar per hectare, although highs of 100 tonnes cane per hectare and 9 tonnes sugar per hectare respectively have been achieved in most areas where irrigation and appropriate cultural practices have been implemented.

About 41 000 farmers and another 500 000 farm workers are currently involved in cane growing, making the sector one of the largest source of employment in the country. About 80 percent of the 41 000 planters cultivate holdings of 10 hectares and below. Collectively they own only 29 percent of the country's total cane area. Except for about 10 000 hectares of land employing varying degrees of mechanization most farms depend on extensively manual labour and use a mix of tractors and buffalo for ploughing and land preparation.

#### **PROCESSING**

The harvesting season commences from October to December depending on whether the area is on the eastern or western seaboard, and ends in May. Rarely does the grinding season exceed 180 days except in the Victorias Milling District in Negros Island, due to even rainfall distribution, but this has been put in question lately as the Philippine window for cane ripening appears to be limited by a dry period of 120 to 150 days.

There are 41 installed sugar mills in the country of which 37, with varying capacities, are operational and mostly are located in the main sugar growing island of Negros. Each mill employs around 500 workers on either a permanent or seasonal basis. In 1991, the sugar industry began implementing a programme to upgrade mills which had been left in a state of disrepair and obsolescence. Half of the mills have been upgraded in the past five years at a total cost of about P10 billion

(about US \$380 million at 1995 exchange rates). However, others continue to produce inferior sugar which often fetches lower prices and, through lower cane purchase prices, discourages farmers from optimizing farm output. Many in the industry recommend that the SRA be empowered to impose mandatory recovery rates and capacity parameters as conditionalities in granting milling licenses. Most sugar output is in the form of raw sugar (97.5 polarity). Some washed and sulphated white sugars are also produced.

While mechanical time efficiency and mill recovery have improved due to upgraded equipment in some mills, over-all performance has been on a downward trend largely due to low extraction rates of the older factories and overcapacity due to insufficient cane supply. This in turn has led to stiffer competition for cane supplies among millers often leading to long distance hauling and subsequent poor cane quality as the time between harvesting and crushing lengthens. Cane crushing capacity averages about 5 000 tonnes of cane per day.

The refining sector is composed of 16 sugar refineries, 15 of which are annexed to raw sugar mills. Average refining capacity is about 400 tonnes (8 000 50-kilo bags) per day, with Victorias Milling being the biggest with a capacity of 1 250 tonnes (25 000 50-kilo bags) per day. Capacity utilization for the whole sector is about 78 percent using a variety of technologies including carbonation, ion exchange resin, phosphatation, and granular activated carbon. Recovery is about 0.92 tonne of refined sugar per tonne of raw sugar.

#### **CONSUMPTION**

Total consumption of sugar in the Philippines was 1.97 million tonnes in 1996, of which about 35 percent was accounted for by industrial utilization. On a per caput basis, this equated to 28.2 kg. Over the past two decades, total consumption of sugar increased at an average annual rate of about 3.5 percent. A household consumption study commissioned by the industry in 1993 concluded that, on a per caput basis, households in the Ilocos region, Metro Manila and Central Luzon had the highest levels of usage at 18.3 kg, 18.0 kg, and 16.6 kg, respectively. Per caput consumption for all other regions ranged from 11 kg to 13 kg. The study also indicated that while total consumption grew by 3.5 percent since the mid-seventies by main user groups the trends differed somewhat household sugar consumption rose by an annual average rate of 3.5 percent; industrial use by 4.6 percent; and by contrast, institutional use declined by 1.8 percent yearly.

#### **TRADE**

Sugar trading and marketing in the Philippines, returned to the private sector since 1985, after a prolonged period under government monopoly, is proving to be too fragmented. Sugar mills and planters' associations and cooperatives do not market and sell sugar collectively. As individual planters, mostly small, they sell their sugar to intermediary traders. This adds to the cost as sugar volumes undergo consolidation prior to refining, as does the subsequent handling by traders, distributors and dealers prior to reaching the retail markets. The present cost of intermediaries in trading is exceptionally high.

Over the past decade exports have declined as domestic consumption increased. From more than a million tonnes exported annually prior to 1985, shipments reached an all time low of 154 000 tonnes in 1995 and indications are that this trend will continue, at least in the short term. Imports, on the other hand, have risen during the same period to a record 827 000 tonnes in 1996. The Government usually defines the

use of domestically produced sugar each year to determine the quantity that should be exported. For example, for the 1997/98 crop year, production is forecast at between 1.7 million tonnes and 1.8 million tonnes of which the Philippine Sugar Board has directed millers to set aside 12 percent of milled sugar for exports to the United States and the remaining 88 percent for domestic consumption. The United States Government has set an import quota of 151 015 tonnes of raw sugar from the Philippines for 1997/98.

#### PRICES

One of the major objective in creating the SRA was for the implementation of a pricing policy which would make sugar farming and milling profitable, while keeping prices to consumers reasonable. In the Philippines as in most major sugar producing countries, this is done by regulating domestic supply within volume parameters that allow market forces to operate within a certain price band. However, in the Philippines, the mechanisms for this regulation, are not clear in their implementing rules, leading to wild swings in prices. In addition, as a result of concessions offered under the Uruguay Round and the ASEAN Free Trade Area Agreement (AFTA), it would seem that import tariffs no longer afford protection to domestic production in the short, and possibly also in the longer term. Without a pricing formula firmly in place to maintain domestic prices at stable levels, it is estimated that a share of farmers would abandon the cultivation of sugarcane.

#### FUTURE PROSPECTS

It is estimated that about 100 000 additional hectares of land could be made available for sugarcane cultivation in the future, about 50 000 in Luzon and another 50 000 in Mindanao. The Visayan islands of Negros, Panay and Leyte have probably reached their full potential. The present 370 000 hectares under cultivation may soon be reduced by as much as 10 percent due to urbanization and withdrawal of marginal lands because of their low productivity or long distance from sugar mills. Under favourable price conditions, this could mean a net expansion of 63 000 ha.

The integration of mills through the management of large tracts of land is expected to give the mills better control of harvesting programmes and allow them to improve the synchronization of cane harvesting. Inefficient milling operations are at present posing major problems and contributing to significant losses in the sugar content due to delayed crushing of harvested cane.

Finally, analysis of prospective sugar demand, considering price elasticity, comparative trends in other developing economies, and population growth, indicate that the country's consumption of sugar, in raw sugar equivalent, would grow by 3.3-4.3 percent annually, to 2.06-2.19 million metric tonnes by the year 2000.

If the potential expansion in production areas materializes, then output would reach more than 32 million tonnes of cane and 2.1 million tonnes of sugar by 2000 resulting in a deficit of 300 000 tonnes. Net import requirements would thus be somewhat greater than in recent years. However, if yields and sugar recovery rates could be improved, there would be potential for renewed growth in export availabilities.

**Table 1 : Philippines sugarcane area, yield and production**

Year	Harvested area '000 Ha	Yield Mt / Ha	Production '000 Mt
1976	553	53	29,315
1977	514	53	27 222
1978	451	49.9	22 525
1979	483	46.7	22 552
1980	442	50.9	22 490
1981	382	60.3	23 034
1982	496	50.1	24 836
1983	464	51.9	24 063
1984	460	56.5	25 969
1985	406	46.1	18 719
1986	308	52.4	16 124
1987	269	51.1	13 752
1988	270	58	15 664
1989	300	64.6	19 375
1990	335	57.8	19 352
1991	345	59.4	20 499
1992	371	61.5	22 816
1993	376	63.7	23 968
1994	381	59.7	22 753
1995	375	49.3	18 505
1996	368	62.2	22 907

**Table 2 : Philippines sugar production, trade and consumption**

Year	Production n	Trade		Consumption	
		Imports	Exports	Total	Per capit
		... '000 Mt, raw equivalent ...		kg/year	
1976	2 844	0	1 467	839	19.1
1977	2 544	0	2 444	967	21.5
1978	2 335	0	1 124	1 086	23.6
1979	2 287	0	1 150	1 158	24.5
1980	2 343	0	1 747	1 210	25.1
1981	2 395	0	1 245	1 134	22.9
1982	2 440	0	1 261	1 065	21
1983	2 458	0	973	1 205	23.1
1984	2 498	0	1 102	1 285	24.1
1985	1 731	0	583	1 341	24.5
1986	1 447	0	222	1 182	21.2
1987	1 197	28	163	1 440	25.2
1988	1 357	81	143	1 228	21.1
1989	1 814	5	213	1 472	24.7
1990	1 810	1	247	1 582	26
1991	1 736	13	275	1 529	24.6
1992	2 061	17	209	1 619	25.5
1993	2 131	13	325	1 717	26.4
1994	1 873	29	183	1 794	27
1995	1 705	377	154	1 817	26.8
1996	1 791	827	229	1 970	28.2

## THAILAND

#### INTRODUCTION

Opportunities to supply sugar to growing markets in Asia have encouraged Thailand to expand production. With relatively small internal needs for sugar and low shipping costs, especially to growing regional markets, Thailand has become one of the world's leading exporters. The Government policy of maintaining high domestic sugar prices has fostered increased production, dampened growth in use, and increased exportable surpluses.

In recent years growth in sugar production has come largely from area expansion in the North and Northeast



regions. In the future, greater emphasis is expected to be given to the introduction of higher yielding varieties and increased use of yield-enhancing production inputs. Demand for sugar in Asian markets is expected to remain strong. The major constraint to longer term expansion could be the emergence of transportation and infrastructure bottlenecks which would impede the flow of sugar to export markets.

### PRODUCTION

Following a decade and a half of sustained expansion, sugarcane areas and production increased sharply in recent years, with a record output achieved in 1996. The recent success of the industry can be attributed to several key factors, including attractive sugarcane prices, sugar factory relocation and capacity expansion policies which have successfully encouraged the extension of sugarcane areas. A third factor has been favourable weather. Since less than 10 percent of sugarcane area, now over one-million ha, is irrigated, favourable rainfall distribution has been an important factor in improved yields.

There are approximately 107 000 small holders who grow sugarcane in Thailand. Mills do not grow their own cane, but contract from growers. Sugarcane farmers in the Northeast region generally plant their cane in October and November, and in the Eastern Central Plains region, November to February. Planting in the irrigated area of the North region is December to April and May to June in the rain-fed area. In the Western Central Plains area, planting in irrigated areas is from January to March and in the rain-fed area May to June. While the sugarcane crop calendar varies by region, the growing period is about 10 to 14 months depending on the variety of cane. Farmers generally grow only one or two ratoon crops, and as a result they can change area planted relatively quickly in response to world price changes. For example, the total sugarcane area increased sharply on the heels of the global price spikes of the mid-seventies, early eighties, and since the second-half of the eighties (Table 1). The expansion reflected the relative attractiveness of sugar prices compared with alternative crops such as cassava and watermelon in the Northeast, and beans and corn in the North.

Yields of sugarcane have been gradually improving with the greater use of fertilizers and pesticides and improved cane varieties. Until the late eighties, yields were below the Asian and world averages. Expansion of irrigation is especially important as more land is put into cane in the drought-prone Northeast-region. Research to develop new improved varieties is being undertaken at Suphanburi Field Crops Research Center at U-Thong in Suphanburi province.

### PROCESSING

Currently there are 46 mills in operation with an estimated daily crushing capacity of 571 190 tonnes. This compares with 42 mills at the beginning of the eighties and a capacity of 196 561 tonnes. Thailand has no stand-alone refineries, and all sugar refineries are part of cane crushing mills. As a result, raws go directly to remelt for refining, and by using power from the mill the refining costs are reduced.

Sugarcane is harvested from November to March in Thailand. During the 1996 season a record 62 million tonnes of cane were processed and 6.3 million tonnes of sugar produced (Tables 1 and 2). This represented an 8 percent increase in cane and a 13 percent increase in sugar output over the previous peak levels of 1995. These results indicated greater utilization of crushing capacity, a long-term goal of the industry.

During the eighties, the significant increase in mill capacity met the crushing requirements for expanding cane output, including harvesting peaks. However, the development of over-capacity in the Central region caused the Government to seek ways to achieve

a better balance between the availability of milling capacity and the production of sugarcane. While no new licenses were issued for mill construction, a mill owner could close a mill and use the existing license to build a new plant in a different location with greater capacity. This policy encouraged some mills to relocate to the North and Northeast regions and expand facilities. These important changes in the structure of the industry were reflected in the re-distribution of output levels. In the early eighties (1982/83 to 1984/85) sugar production in the Central region averaged 1.32 million tonnes and accounted for 58 percent of the national production. By the early nineties (1992/93 to 1994/95) the Central region was producing 1.73 million tonnes, but accounted for only 41 percent of production. The Eastern region also showed a decline in share from 16 percent to 9 percent while production remained roughly the same. The regions of greatest growth were the North which increased from 13 percent to 23 percent by the early nineties, and the Northeast from 14 percent to 26 percent over the same period.

Structurally the milling and refining sector is comprised of a mix of government, independent and private ownership groups. The State owns 3 mills, and there are 15 independent mills. There are 9 groups of owners which operate 2 or more mills. The largest is the Thai Roong Ruang Group which operates 7 mills.

The Government, in addition to granting milling and export licenses, provides regulatory and planning functions for the milling sector. On a year-to-year basis, the Ministry of Industry arranges production quotas for individual mills, based on the past 3-year crushing performance, and access to cane supplies.

### CONSUMPTION

Thailand's domestic sugar consumption is expected to total a record 1.59 million tonnes in 1997, spurred by a growing population now estimated at 60.6 million, a thriving economy, and increased industrial use of sugar for soft drinks and other products (Table 2). This level of consumption represents an increase of almost 50 percent since 1990. Per caput consumption in 1997 is estimated at 26.2 kg, compared with 14.1 kg in the mid-eighties. Despite this growth, domestic sugar consumption as a percent of production has remained under 30 percent, relatively low for one of the world's leading producing and exporting countries.

The traditional relatively low Thai domestic sugar use also reflects the availability of locally grown, low-priced sugar substitutes such as coconut (palm) sugar, long a mainstay of the Thai diet in home cooking; and the traditionally low consumption of processed foods, especially in rural areas where about 75 percent of the population continues to reside. There is also a small level of production of high fructose syrup (HFS) derived from cassava root and utilized by some segments of the soft drink industry. In addition, there is a small amount of non-nutritive sweeteners such as saccharin and aspartame used in diet soft drink products. Despite these moderating forces, sugar usage increased significantly in the eighties, and the pace of consumption growth has accelerated in the nineties as a result of the rapid modernization of the economy which has increased the demand for processed foods and beverages containing sugar.

### TRADE

Thailand is now firmly established as one of the world's leading sugar exporting countries. During the first half of the nineties, sugar exports averaged 3.1 million tonnes per year, nearly double the level of exports during the first half of the eighties. This upward trend in exports has been spurred by growing regional markets, higher domestic production, low internal consumption relative to total production, and favourable export policies.

Sugar export earnings have been an expanding contributor to the agricultural sector's robust earnings growth. For the period 1992-94, Thailand's total exports averaged US \$38.3 billion of which the agricultural sector amounted to 27 percent of the total or US \$10.3 billion. For 1995, sugar export earnings were a record US \$1.2 billion, up 50 percent from 1994, and were surpassed in dollar terms only by fishery products, animal products and by-products, and cereal grains, mainly rice.

The composition of sugar exports includes raw, refined, and plantation white shipments. In calendar 1995, raw sugar exports amounted to 2.80 million tonnes or 74 percent of the total. For the period 1990-94, raw sugar exports averaged about 2.0 million tonnes per year, while refined and plantation white sugar exports averaged 831 000 tonnes, both well above the levels achieved in the early eighties.

Because of freight cost advantages and reliable services, sugar has become increasingly important in growing Asian regional trade. According to trade sources, sugar moves from Thailand to the major regional buyers China, Japan, the Republic of Korea, and Malaysia, with a freight advantages over Western Hemisphere sugar making it difficult for exporters from the latter region to compete.

In 1995, for example, more than two-thirds of the record 2.80 million tonnes of raw sugar exports went to Asian markets, with shipments to China, Japan, the Republic of Korea, and Malaysia, accounting for 2.44 million tonnes. Sizeable shipments are made annually to smaller markets in the region such as Sri Lanka, Vietnam, and Singapore. The largest non-Asian markets in 1995 were the former Soviet Union, Tanzania, and the United States which combined took 79 000 tonnes.

Refined and plantation white exports in 1995 totalled 1.04 million tonnes, raw value, with China, Indonesia, and the Islamic Republic of Iran accounting for 23, 34, and 12 percent of the total, respectively. Other important destinations included Vietnam, Saudi Arabia, and Sri Lanka. The Philippines has also emerged as an important market for both raw and refined sugar, reflecting its current net importer status. Trade specialists report exports of refined sugar range in quality from "bother grade refined" (equivalent to EC or US refined sugar) to sugar with color over 100 ICUMSA (International Commission for Uniform Methods of Sugar Analysis).

While Thailand and Australia compete as the largest raw sugar exporters in the Asia and Pacific region, the Republic of Korea is Asia's largest refined sugar exporter. Malaysia, Singapore, and China also export refined sugar. Recent trends suggest that Thailand is gaining ground on some of its competitors in the export of raw sugar. For example, as a member of ASEAN, Thailand's recent refined sugar exports to the Philippines entered duty-free whereas refined sugar from Australia faced a 20 percent *ad valorem* duty.

The sugarcane industry is also an important exporter of molasses. In recent years, about 50 percent of annual production has been exported. Molasses exports averaged 945 000 tonnes and earned about US \$47 million annually over the 1990-95 period. Japan

normally takes about one-third of total exports, and the United Kingdom and other European destinations take most of the remainder.

Government policy towards sugar exports has remained generally unchanged in recent years. Each season, the Government estimates production, internal needs, and export commitments and then allocates sugar supplies to three quotas:

#### *Quota A - domestic*

This quota, all refined sugar, is allocated to mills by the Government at the start of each season on the basis of production capacity. The sugar is sold to approved wholesalers at a fixed price. The Quota A for 1995/96 was set at 1.6 million tonnes.

#### *Quota B - long-term contracts*

This 800 000 tonne contract, all raw sugar, is held by several trade houses. They sell on behalf of the Thailand Cane and Sugar Corporation (TCSC) which has overall responsibility for pricing and selling raw sugar under this quota. Half of the amount is allocated to international sugar brokers and the other half is sold to local millers for export.

#### *Quota C - exportable surplus*

The mills undertake their own pricing of this sugar, but must pay growers at least the Quota B sales price achieved by the TCSC. These sales must be made by licensed exporting companies. For 1995/96 the Quota C was set at 3.3 million tonnes of raw or refined sugar.

While licenses to build new factories are not currently being issued, new quota tonnages are annually allocated to mill groups with the largest C Quota production to encourage mills to crush as much cane as possible. Mills must meet production targets for Quotas A and B, before exporting under Quota C.

Quota C (export) sales are usually concluded 6 months prior to the start of the crushing season in November by seven authorized exporting companies: The Thai Sugar Trading Corp., Ltd. (TSTC), Thailand Sugar Corp., Ltd. (TSC), Siam Sugar Export Corp., Ltd. (SSEC), the Sugar Industry Trading Co., Ltd. (SITCO), K.S.L. Export Trading (KSL), Pacific Sugar Corp., Ltd. (PSC) and TISS Co., Ltd. which belongs to the Thai Identity Sugar Group of Companies which started its sugar exports in 1995.

#### **PRICES**

The Government directly negotiates annual sugarcane prices with growers and mills. It also operates a credit programme under which farmers can borrow an amount equivalent to their advance payment for sugar delivered to mills, at below-market interest rates.

The Sugar Act of 1984 introduced a revenue-sharing scheme for growers and mills. Under the scheme, growers receive 70 percent of the revenue from domestic and export sales of sugar and molasses, less costs and taxes, and mills earn the remaining 30 percent. Upon delivery of cane to mills, growers receive an initial payment calculated on a base price negotiated by the government.

This advance payment is not to be less than 80 percent of the share expected at the end of the season. If the actual

"season-average price" is lower than the base price, the difference is adjusted the following season.

The Sugar Act of 1984 also provides for a 21-member Cane and Sugar Board composed of nine growers, seven government, and five mill representatives, which controls cane production levels, encourages improvement in quality, and seeks lower production costs to make exports more competitive. One recent target set by the Board was to limit cane production to zones within 100 kilometers of a mill to lower transportation costs.

#### FUTURE PROSPECTS

Sugarcane production is projected to reach 82.4 million tonnes in 2005, with sugar output attaining some 8.9 million tonnes. For sugarcane, this would represent a 32 percent increase over 1996, or 3.1 percent average annual growth; and for sugar, a 41 percent increase over the 1996 output, or 3.9 percent average annual growth. Given the industry's past performance these projections do not appear unrealistic. The extension of areas under sugarcane is anticipated in the North and Northeast regions, including as a result of converting land from other crops. By 2005 the area under cane is expected to total 1.25 million ha, a 17.6 percent increase over 1996, or 1.8 percent average growth per year.

A pivotal factor in achieving production goals of the industry is the improvement of sugar yield per tonne of cane. Sugar yield depends on several factors relative to the sugarcane (harvesting and handling conditions and quality) and the sugar factory (process, operations and composition of output). Since almost all sugar factories are still affected by underutilization problems, they seek to maximize sugarcane volume, not sugar yield, to mitigate costs. This leads to strong competition for sugarcane which can worsen the quality of crushed sugarcane in terms of purity and freshness, and thus affect negatively sugar yield.

According to international sugar production cost analysts, Thailand ranks among the world's lowest cost producers. Efforts to expand cane production to better match milling capacity should enhance this status. However, in the long run Thailand's future as a very low-cost producer is not certain in view of sharply increasing land costs reflecting rapid industrialization and rising labor costs.

Domestic demand is likely to continue to expand rapidly, but growth in production should continue to allow Thailand to absorb only about 25 to 30 percent of annual output internally. Domestic use is projected to expand to 2.33 million tonnes in 2005, up 50 percent from 1996, or average annual growth of 4.6 percent per year. With stable use of coconut (palm) sugar as a sugar substitute for home cooking, increased demand for sugar would most likely come from industrial users for the manufacture of processed foods and beverages. The growth potential for increased sugar demand by the expanding soft drink industry is projected to be particularly strong in the years ahead as consumption of these beverages approaches the level of Singapore and China, Hong Kong Special Administrative Region. Nonetheless, among the world's top five exporters, only Australia and Cuba use a smaller percentage of sugar production for domestic needs. With anticipated growth in production, exports are also expected to expand substantially. The industry has identified 3 areas for improving the management of the export sector: (1) the transportation system should be upgraded to cope with larger volumes of sugar to be transported from the sugar factories to export terminals; (2) a clearing house for bulk sugar should be established to allow swaps of sugar under fair, established settlement procedures; and (3) the bag-loading system should be modernized to cope with labour shortages.

With respect to markets, the industry is conveniently situated in proximity to expanding Asian import markets which allow

shipping advantages, including prompt delivery and reduced freight rates, not available to competitors outside the region

**Table 1 : Thailand sugarcane area, yield and production**

Year	Harvested area '000 Ha	Yield Mt / Ha	Production n e
1976	374	53.3	19 910
1977	494	52.8	26 094
1978	560	33.8	18 941
1979	504	40.8	20 561
1980	426	30.1	12 827
1981	457	43.5	19 854
1982	613	49.2	30 200
1983	577	42.3	24 407
1984	536	44.5	23 869
1985	531	47.2	25 055
1986	546	44.1	24 093
1987	520	47	24 450
1988	571	47.7	27 191
1989	660	55.6	36 668
1990	686	48.9	33 561
1991	882	52	40 661
1992	917	51.8	47 480
1993	902	40.2	39 827
1994	942	47.3	37 823
1995	957	58.9	57 974
1996	1063	58.7	62 422

**Table 2 : Thailand sugar production, trade and consumption**

Year	Production n	Trade		Consumption	
		Imports ... '000 Mt, raw equivalent ...	Exports s	Total kg/year	Per caput s
1976	1 710	0	1 124	524	12.3
1977	2 282	0	1 657	570	13.1
1978	1 624	0	1 040	603	13.5
1979	1 862	0	1 190	630	13.8
1980	1 098	85	452	540	11.6
1981	1 641	0	1 120	615	12.9
1982	2 930	0	2 216	620	12.8
1983	2 265	0	1 553	656	13.3
1984	2 349	0	1 248	725	14.4
1985	2 572	0	1 870	720	14.1
1986	2 586	0	1 985	740	14.2
1987	2 637	0	2 039	883	16.7
1988	2 704	0	1 872	891	16.5
1989	4 052	0	2 998	987	18
1990	3 506	0	2 426	1 065	19.2
1991	4 055	0	2 986	1 033	18.4
1992	5 106	0	3 869	1 181	20.8
1993	3 792	0	2 266	1 391	24.3
1994	4 009	0	2 672	1 480	25.6
1995	5 571	0	3 843	1 530	25.8
1996	6 300	0	4 500	1 550	26

## VIETNAM

#### INTRODUCTION

The sugar industry of the Socialist Republic of Viet Nam is currently in transformation as growth in sugar consumption has outpaced domestic production, with the shortfall being met by increased imports. In the longer-term, the Government is

implementing a series of projects aimed at attaining self-sufficiency and later achieving a net exporter status. In its development plan, the Government is taking into consideration all stages in the production process; from growing the cane to processing the sugar. Key elements of the plan include: expansion in area planted to sugarcane to increase potential production capabilities, introduction of methods to improve current yields and of new higher yielding varieties, and a major investment initiative to expand the capacity of the domestic processing sector. The Government has set targets of 12.7 million tonnes of sugarcane production and 1.0 to 1.2 million tonnes of sugar production by the year 2000.

### PRODUCTION

Viet Nam's domestic sugar industry is primarily based on sugarcane. The regions in the south account for 80 percent of the nation's cane production. Cane is generally grown in the drier regions of the Mekong Delta area in the south without irrigation, and of the Red River Delta area in the north. The area planted to sugarcane has been gradually expanding in recent years, from about 140 000 ha in the early nineties, to around 225 000 ha in 1995.

The Government aims to expand cane area to 250 000 ha by the year 2000, with 170 000 ha in the south and 80 000 ha in the north. This would represent an almost 100 000 ha expansion from the previous decade. Recent land use studies by the Government indicate that an additional 450 000 ha are potentially suited to sugarcane production.

Cane yields have averaged between 42 and 45 tonnes per ha in the past few years, with a 10.5 to 11.5 percent sugar content. The Government is working towards increasing yields of both sugarcane (to 60 tonnes per ha) and, sugar (to 5-6 tonnes per ha) by improving cane quality. Research is also focusing on developing early maturing varieties with high sucrose and good ratooning properties, along with a programme to introduce new varieties from Taiwan Province of China for new plantings.

Production of sugarcane averaged around 6.0 million tonnes in the early nineties, with the lowest level being in 1990 at 5.4 million tonnes and highest in 1994 at 7.5 million tonnes. The majority of farms are small-holder units, from 0.3 ha up to 1.0 ha, although there are a few larger holdings that are between 10.0 ha and 15.0 ha. It is important to note that although Government officially owns all the land in Viet Nam under their "doi moi" (reform) programme, the 1988 Land Lease Law does provide for long-term land use rights. For certain crops, mainly industrial, this can be up to 50 years. The lease law was designed to encourage farmers to invest in long-term improvements on the land and to foster and maintain future productivity, and it has recently been an encouraging factor in promoting increased foreign agricultural investment.

The recent expansion in area under cane production may be partially reflect the fact that sugarcane is becoming more competitive with other crops. For example, in the southern province of Long An, the area under sugarcane has expanded to over 11 000 ha in recent years, in direct competition with rice, groundnuts, and pineapples. And in the north-central province of Thanh Hoa, increases in sugarcane areas were taken from land formerly used for pineapples and coffee.

Vietnamese growers generally perform manually most sugarcane production operations, including harvesting. The harvest takes place between November to May. The potential for increased mechanization is another option being explored by the Government, as with expanded areas the availability of labour, especially at harvest, may become a constraint.

According to official FAO statistics, sugar output in the early nineties averaged around 411 000 tonnes and in 1995, an estimated 10.7

million tonnes of sugarcane was grown and around 517 000 tonnes of sugar was produced.

### PROCESSING

Currently, the commercial milling capacity is around 13 500 tonnes per day, from 12 mills ranging in capacities from 500 to 2 000 tonnes per day. The Government is strongly promoting expansion in the sugar processing sector, as part of a nation-wide effort to expand overall food processing capacity. Sugar self-sufficiency by the year 2000 is one of the national objectives, but the larger goal is to provide growth opportunities for rural development to increase employment and enhance incomes.

About 30 percent of the sugarcane crop is normally processed by the commercial/industrial cane mills. The remaining 70 percent is processed by numerous small cottage industry plants, with capacities often under 100 tonnes per day. They are often highly inefficient, incur major losses of sucrose, and produce a lower quality of sugar. However, these mills serve a very important function in the processing industry, as they are often centrally located in the key production areas and can be easily reached by the local growers. On the contrary, large movements of cane by growers to the bigger commercial mills can be difficult and costly. In 1993/94, of the estimated 7.5 million tonnes of sugarcane harvested and 326 000 tonnes of sugar produced, these cottage industry or "handicraft" mills processed 70 percent of the total. Towards the year 2000, with the national goal of increasing sugarcane production to up to 12.0 million tonnes and sugar production up to 1.0 million tonnes, the objective is to increase the share of the commercial mills in the processing of the additional supplies, to more than 65 percent.

The Government's sugar processing expansion strategy is characterized by three broad areas: (A) expansion existing capacity, (B) construction of new large scale operations, and (C) increase in the number of small scale operations.

The first area concentrates on mill modernization and expansion of capacity at several existing mills. By the year 2000, the objective is to raise total capacity by 11 percent to 15 000 tonnes and the average mill size to 1250 tonnes. Currently, the Government owns and operates these mills. The Union of Agricultural-Industrial Enterprises of Sugarcane (VINASUGAR), an agency of the Ministry of Agriculture and Rural Development (MARD), is the administering agency. In the south, VINASUGAR No. II operates 5 sugarcane mills and 2 sugar refineries. And, in the north, VINASUGAR No. I operates 7 sugarcane mills and 1 sugar refinery.

The second area is to expand production through the construction of new commercial processing operations, with capacities ranging from 4 000 to 8 000 tonnes per day and at a potential cost of US \$11 million. This effort involves a number of joint venture projects (between Vietnamese and foreign investors) and one project funded by 100 percent foreign investment capital. The projects include:

From Europe, France's Sociétés de Bourbon (SB) is building a US \$95 million sugar mill near Ho Chi Minh City, in partnership with local sugar producers (Union Des Sucreries de Tay Ninh (TANISUGAR) and VINASUGAR No. II). The new mill will be the largest in Viet Nam and is anticipated to begin production in 1997/98. In addition, the United Kingdom based Tate and Lyle Company is expected to construct a new plant in the north-central region at a cost of US \$72 million.

From Asia, a number of large-scale mill projects are being undertaken by the Philippines, India, and Taiwan Province of China. A joint Vietnamese- Taiwan Province of China venture is underway in the north-central region for a plant with a daily capacity of 6 000 tonnes, and contracts have already been negotiated with local farmers for supplies. Another primarily Asian based joint venture involves Viet Nam and the Philippines, and is to be located in the north-coastal region. The mill will have an initial capacity of 4 000 tonnes per day and is expected to begin operations in 1997/98.

In a somewhat different development, an Indian based company is constructing the first wholly foreign-owned sugar plant. The mill is scheduled to begin operations in 1996/97, and will have a daily cane crushing capacity of 3 500 tonnes, which it is planned to double by the year 2000.

The third strategy area involves the building of a large number of small scale operations, with capacities in the range of 500 to 3 000 tonnes per day. This will also involve the co-operation of foreign partners and capital in supplying equipment, machinery, and the transfer of technology. There are 34 mill projects under consideration. If all the projects are undertaken, they could generate an additional 35 000 tonnes of daily mill capacity. A typical project is the new mill in the northern mountain province of Tuyen Quang. The plant began operations in early 1996 and was designed to process 750 tonnes of sugar per day and provide employment for more than 100 workers.

#### CONSUMPTION

Sugar consumption has been increasing in recent years and is expected to reach a record 695 000 tonnes in 1995. Consumption has been growing faster than production and this has led to a corresponding increase in imports.

In the early nineties, per caput sugar consumption averaged around 6.9 kg, about the same level as in the previous decade. However, a distinctive consumption increase occurred in recent years with per caput consumption rising from 6.8 kg in 1993 to 8.8 kg in 1994. In 1995, per caput consumption further increased to 9.4 kg, its highest level ever. However, these figures are still well below the world average of 20 kg and that of other growing regional economies such as Thailand with 28 kg, Pakistan 22 kg, Philippines 28 kg, and Malaysia 50 kg. Consumption is expected to continue to increase in both raw form and for use in the expanding food processing industry. Current macro-economic indicators indicate a potential for expansion in sugar use, as population (currently estimated at 74 million) is growing by about 2.0 percent per year and per caput income would reflect a national annual growth rate of about 6 percent.

In the manufacturing sector, expanding production of sugar-containing products is a contributing factor in the recent consumption increases. The use of sugar-containing products is expected to intensify in the coming years, as these products become more widely available. For instance, a number of new plants are being constructed to produce confectionery and ice creams. The soft drink industry is likely to be the largest industrial user of sugar, with annual average growth estimated at 25 percent over the next few years. In 1994, per caput carbonated soft drink consumption in Viet Nam was estimated at 14 eight ounce bottles (about 3.5 litres), which is much lower than other countries. Thailand for example has a per caput rate of 112 eight-ounce bottles (about 28 litres). The leading global soft drink franchisers are all planning expansion projects in the country.

Taking into consideration the expected growth rates for sugar by industrial users (beverages, dairy products, confectionery, bakery, fruit and food processing) and direct consumption as spurred by population growth, some analysts predict that sugar use could double in the next 5 years. This would suggest that the current supply expansion programmes are likely to just keep pace with the estimated demand

growth. It also seems unlikely, because of relative cost considerations, that an alternative sweetener will become readily available to act as a damper on demand.

#### TRADE

A deficit sugar producer in recent years, Viet Nam has become a sizeable sugar importer. In 1994, imports reached 141 000 tonnes. This was a 76 percent increase over the 1993 level of 76 000 tonnes. In 1995, imports increased to 184 000 tonnes.

Each year, the level of imports is determined by a Government committee through the granting of licenses. In 1995, 74 000 tonnes of raw sugar and 101 000 tonnes of refined sugar were imported, at a value of between US \$45 and \$50 million, with corresponding duties of 25 percent on raw and 35 percent on refined, *ad valorem*.

In previous years, Viet Nam had a long standing barter arrangement with Cuba (rice for sugar), but recently Cuba has been unable to maintain a stable supply and the presence of this origin has faded from the Vietnamese market, as has the presence of the former USSR which was another regular supplier.

In recent years, the bulk of imports have been sourced from neighbouring Asian countries. In 1994, Thailand was the most important supplier, accounting for 74 percent of total imports. In 1995, sugar was sourced from Thailand and Australia, as well as a number of other Asian countries. In December 1995, Viet Nam joined the Association of South East Asian Nations (ASEAN), which has placed ASEAN members at a price advantage to supply the Vietnamese market, relative to non-ASEAN members. This could restrict trade to within the ASEAN region, as Viet Nam is committed to lowering their duty on sugar imported from the ASEAN countries to zero by the year 2003.

In the long run, if the Government plans for increased production are realized and exceed the pace of growth in demand, then Viet Nam's import needs would naturally diminish. Recent reports for 1996 indicate that imports may total only 70 000 tonnes and could be halted in 1997 due to increased domestic capacities and a general economic policy to reduce import expenditures and improve the overall balance of trade.

#### PRICES

The National Price Commission sets an annual minimum price for sugarcane and a maximum price for sugar. For 1995/96, the official cane price was VND \$200 000 (US \$18.2) per tonne and refined sugar was VND \$7 000 (US\$64 cents) per kg. The attractive cane price encouraged growers, as estimated costs of production were VND \$140 000 (US \$12.7) per tonne, and the cane mills provided production input support and a ready market for the cane.

The increased production in 1995 and 1996, combined with relatively large government stocks, has acted to put downward pressure on prices this spring. In the major cane growing provinces (such as Tay Ninh and Song Be) prices ranged from VND \$150 000 (US \$13.6) to VND \$220 000 (US\$ 20.0) per tonne, but in other provinces prices fell below VND \$100 000 (US \$9) per tonne. Faced with relatively low prices, some farmers in the south were reportedly considering alternative crops.

Market analysts and industry experts believe the current market problems are of a short run nature due to sugarcane cultivation capacity outpacing growth in processing capacity.

The Government's programme to expand processing capacity is a long term solution to this situation. In the short term in order to eliminate price distortions, the Ministry of Agriculture and Rural Development (MARD) has proposed several measures, including input subsidies of VND \$21 billion (roughly US \$1.9 million) to cane growers and low interest credit to refineries and processing plants.

At the retail level, prices have been fluctuating. In March 1995 prices in Ho Chi Minh City and Hanoi were VND \$7 000 (US \$0.64) and VND \$7 200 (US \$0.66) per kg, respectively. By March 1996 prices had fallen to VND \$6 100 (US \$0.46) and VND \$6 500 (US \$0.55) per kg. Currently, the domestic sugar prices are lower than the world price. However, the prices of sugar containing products are generally comparable with the prices in other countries. For instance, a single scoop of ice cream was VND \$18 000 (US \$1.65), and a 12-ounce soft drink cost between US \$0.50 and 0.80. When compared to average income levels (approximately US \$200 a year) these prices seem very high, but continued income growth is acting to sustain product demand.

### FUTURE PROSPECTS

The sugar industry is currently undergoing a fundamental change, fostered by the Government's programme of expansion and self-sufficiency. The Government's targets plus the main strategies to be employed can be summarized as follows:

#### Goal:

Production of 1 to 1.2 million tonnes of sugar by year 2 000 (as compared to 450 000 tonnes in mid-nineties).

#### Main Measures:

1. area expansion: increase land in sugarcane to 250 000 ha (as compared to around 200 000 ha in the mid-nineties)
2. increase yields: raise yields to 60 tonnes of cane per ha (as compared to around 45 tonnes in recent years)
3. enlarge cane production volumes for processing to 11 to 12 million tonnes (as compared to around 7 to 10 million tonnes in the mid-nineties)
4. build new sugar mills and expand existing mills.

As Viet Nam pursues its sugar industry goals several issues are likely to emerge:

1. Post-harvest losses of sucrose in the cane is high, especially in areas where transportation from the fields to the mills is limited. While movement of cane by water can help to minimize this issue, especially in the Mekong River Delta, deficiencies in the rural road system continue to be a major constraint on the efficiency of the sugar industry in particular and the agricultural sector in general.
2. In several areas where sugar production is targeted for expansion, the issue of availability of rural labour for sugarcane production and harvest may act as a future constraint. Mill managers and government researchers are currently exploring prospects for encouraging increased levels of mechanization, particularly in harvesting.
3. In some areas, increased competition for cane between the "handicraft" mills and commercial mills or between the commercial mills themselves may emerge. This could cause some mills to operate below levels of optimal efficiency, and is a reflection of the process of transition from a high level of dependence on "handicraft" mills to an increased reliance on commercial facilities.
4. The role of trade will become increasingly complex, including the level and composition of imports and their origins. For instance, the impact on Viet Nam's tariff structure from its joining of ASEAN could affect access to its market from non-ASEAN countries.

5. The role of government in setting price policies will be extremely important to the achievement of its targets. The annual setting of cane prices relative to other commodities may influence planting intentions and affect planned area expansions.
6. With consumption of sugar expected to increase as the population and economy expands, the need for improvement in sugar quality will increase. This is particularly important for the food processing and soft drink industries.

## A QUANTITATIVE MARKET OUTLOOK FOR SUGAR TO 2005 IN MAJOR ASIA AND PACIFIC COUNTRIES

*These are preliminary projections prepared by the Sugar and Beverages Group of the Commodities and Trade Division, FAO.*

### INTRODUCTION

It is of particular importance for both government decision-makers and industry leaders to have a good understanding about the future direction and development of the world sugar market. Sugar is one of the most important commodities produced and traded in world agricultural markets. The industry has been expanding in production and processing over the decades. Up to 25 percent of sugar produced is physically traded in the global area. The importance of sugar has prompted many attempts at modelling the world sugar economy. The models have varied widely in their specifications and goals. For instance, some models have aggregated the world into regions, while others have chosen specific countries as representative, and certain models have concentrated on trade flows, while others have examined supply and demand or looked at price behaviour. This study represents the first phase of an FAO project to build a new global sugar model.

### MODEL SPECIFICATION

The FAO model builds upon the strengths of models developed to date, but places a heightened emphasis on demand factors through the use of a habit function, i.e. where current demand is related to previous levels of consumption. In addition, the analysis was strengthened by field visits to the major producing and consuming countries in the Asia and Pacific region. Hence, the models are estimated using a richer data set which gives more reliable and consistent estimates of the elasticities. The study covers Australia, China, Fiji, India, Indonesia, Japan, Pakistan, Philippines and Thailand. As a group these countries accounted for about 40 percent of world sugar production, 30 percent of consumption, 32 percent of imports and 18 percent of global sugar exports in 1996.

### CONSUMPTION

#### The importance of habit

To illustrate the importance of habit, we have recently examined a new extensive set of data on China where people living in the Southeast coastal region prefer sweeter foods while those in the Northern provinces like savoury foods. This is reflected in the different sugar consumption levels which have existed for a long time between northern and southern regions. This type of consistent divergence in sugar consumption levels, largely independent of income, can also be found in cross-country comparisons. Many Asian countries experienced rapid economic growth over the past decades, but the increase in per caput sugar consumption has been much less than the income growth in some of these countries. For example, in Indonesia per caput income in real terms nearly doubled during 1983-1995, but per caput sugar consumption increased only by 23 percent from 11 to 13.5 kg during the

same period. In contrast, although the real per caput income in Pakistan increased by about 30 percent from 1983 to 1995, per caput sugar consumption nearly doubled from 11 to 20 kg in the same period. Japan has the highest per caput income in Asia but its per caput sugar consumption was significantly lower than many developing countries in this region.

The habit formation model reflects past consumption patterns when forecasting consumption levels. The model is estimated for each country separately. For comparison, another model, which excludes habit formation, is also estimated for each country using the same data set. Since the factors driving demand for industrial use may differ from those affecting direct consumption, the demand for direct consumption and that for industrial use were estimated separately, when data were available. For example, in the case of India, the consumption of gur and khandsari accounts for a large share of sweetener consumption and is closely related to both sugar consumption and production. Therefore, the demand for gur and khandsari were also estimated, separately.

In general, the data fit the models well. The hypothesis that consumption habits had no impact on the demand for sugar was tested using the likelihood ratio test, and was strongly rejected in all the country models. This supports the view that habits will also play a role in the future consumption of sugar too.

The price elasticities were in the range of -0.1 to -0.45 for all countries except for Japan and India. The price elasticity in Japan was high, about -0.8 which implies that the demand for sugar was more sensitive to a change in the sugar price. The competition from the highly developed alternative sweeteners industry (HFCS) and the dominant industrial use of sugar are probably responsible for the higher sugar price elasticity. The price elasticity in India is also relatively high, -0.6 which may be attributed to the existing alternative low quality sweeteners market which would induce consumers to shift from white sugar to gur and khandsari if the sugar price increases.

It has been a widely accepted view that income was the key factor in determining future consumption levels in developing countries. As per caput sugar consumption levels were low, future sugar demand in these countries would be expected to increase rapidly with economic growth. However, the empirical analysis provided a somewhat different insight. If the habit effect was taken into account, the impact of income on sugar consumption was very small suggesting that changes in income may not influence sugar consumption a great deal, particularly in the short-run. For instance, the income elasticities for China, Indonesia and Philippines were only 0.03, 0.03 and 0.06, respectively, which suggest that the impact of changes in income is not significant short-run in these countries. The short-run income elasticities for other countries based on the habit formation model were also relatively small, ranging from 0.1 to 0.45, excepting for Pakistan, which has an income elasticity of nearly 0.9. An explanation for the relatively high income elasticity in Pakistan would be that consumer preference for sugar was high, but severely constrained by income. Thus, a change in income would induce significant changes in sugar consumption.

Another interesting finding was that the estimated income elasticity for Australia was negative implying that sugar consumption would decline as income increased. Current high per caput consumption levels and increasing health concerns would appear to be the main factors behind this observation. The industry had recently initiated a series of nutritional campaigns in Queensland to try to reverse the trend.

The income elasticity of demand for industrial sugar use was found generally to be larger than that for direct household use. For example, in China the elasticity was about 0.6 or twenty times that for direct use. The income elasticity for gur and khandsari in India was found to be negative, which suggested that the demand for these sweeteners

would decline as incomes rose. Gur and khandsari are considered to be inferior goods.

The overstated income impact on sugar consumption in the past may be largely attributed to the misspecifications of the empirical model in many analyses of the sugar demand. Comparing the habit formation model and the demand model without habit formation, it was found that income elasticities were much higher in the latter than in the habit formation model. The habit effect on sugar consumption varied from country to country. For instance, it was very strong in China but weaker in Fiji, Japan and Australia, where high per caput consumption already existed.

### Projections

Under the assumption that the current policy regimes includes all trade restrictions on sugar imports and exports, and various domestic controls over sugar production and marketing would remain unchanged; the estimated demand models were used to forecast sugar consumption for each country from 1997 to 2005. The population and GNP data used for forecasting is available in the FAO "Compendium of Demographic and Macro-Economic Assumptions". It was assumed that prices will change at the same annual growth rates as experienced during the last five years. Since the model specification may have significant implications for projecting, for comparison purposes, both a habit formation and a standard model were used. Moreover, given that recent developments in sugar use and government policies toward sugar consumption vary from country to country, particular scenarios were designed for the analysis of each country.

**Australia.** Per caput consumption has been declining steadily over the past two decades. Per caput consumption was about 57 kg in 1976, 50 kg in 1986 and 47 kg in 1991. The decline in per caput sugar consumption reflects changes in consumer preference, due to health concerns, and increasing competition from other sweeteners. Sugar consumption has recovered somewhat since 1992 because of the deregulation of the sugar refining industry, which increased price competition among domestic refiners, and the sugar nutrition campaign. The FAO model projects a decline in per caput consumption in the next few years, given a very high current consumption level and a negative income effect. It is projected that per caput consumption may be about 49 kg by 2005, about 4 percent lower than the current consumption level of 51 kg. However, total consumption may increase by about 5 percent by 2005, as compared with 1996, due to an increase in population.

**China.** Per caput direct sugar consumption is projected to grow in the future at a slower rate than in the past, reaching 2.9 kg by 2005, while the increase in industrial sugar use is projected to reach about 5 kg per person by 2005, 43 percent above the current level. Total sugar consumption is projected to increase significantly in the next decade to reach nearly 11 million tonnes by 2005, about 50 percent higher than the actual 1996 consumption level. As other sweeteners, especially saccharin, are important substitutes for sugar for industrial use and about 6 000 tonnes of saccharin which are equivalent to about 2.5 to 3.0 million tonnes of refined sugar have been used in recent years, an alternative scenario has been designed to investigate the impact of changes in saccharin prices on sugar consumption. It was found that if the price of saccharin increased by 15 percent annually (the annual increase in the saccharin price was only about 5 percent over the last five years) but the sugar price remained unchanged at the current level, the industrial demand for sweeteners would shift from saccharin to sugar. If this happened, sugar demand for

industrial use would reach 10.7 million tonnes by 2005, about 160 percent higher than the current level and total sugar consumption would amount to 14.8 million tonnes by 2005.

For comparison, the general sugar demand model which results in a much higher income elasticity than the habit formation model was used to forecast consumption in scenario 3. It was found that total sugar consumption would reach 15.6 million tonnes by 2005, about 100 percent more than the actual national consumption in 1996 and about 43 percent higher than the projected consumption based on the habit formation model. The substantially higher consumption projection was mainly due to the dominant income effect estimated from the general model.

**Fiji.** It is expected that per caput sugar consumption would grow at a very slow pace. By 2005, per caput consumption would be about 43 kg, about 7 percent higher than the current level, which is consistent with the development of actual sugar consumption over the past few years. As per caput sugar consumption has already reached a very high level, amounting to about 40 kg in 1996, any further increase in consumption would be diminutive. Since habit formation had little effect on the demand for sugar, the projected sugar consumption from the two models are nearly equivalent.

**India.** Per caput sugar consumption has been increasing at a relatively slow rate over the past decade. It was slightly more than 14 kg in 1996, about 18 percent higher than the 1987 level. The slow growth rate was largely attributed to the low industrial demand for sugar, a large quantity of low priced alternative sweeteners (gur and khandsari) consumed and tight control over sugar marketing, distribution and retailing by the government. It is projected that the per caput sugar consumption will increase at a slightly faster rate in the next decade as the industrial demand for sugar picks up and economic reforms give markets a greater role. Under the assumption that the annual income growth rate is 4.4 percent, it is projected that per caput sugar consumption in India would reach about 18 kg by 2005, about 25 percent higher than the current level. At the same time, per caput consumption of gur and khandsari will decline slightly during the same period. Total sugar consumption will be around 20 million tonnes by 2005, about 50 percent more than in 1995.

When habit formation was excluded, the projected per caput consumption was about 21 kg by 2005, which was 21 percent more than that projected quantity using the habit formation model. Correspondingly, the total consumption would be 23 million tonnes by 2005, about 15 percent higher than that based on the habit formation model.

**Indonesia.** During the past decade, per caput sugar consumption rose from 11 kg in 1985 to 14 kg in 1996, while per caput income more than doubled. Projections based on the habit formation model suggested that this relative slow growth trend would continue. It is projected that per caput sugar consumption would increase over the next decade to reach 16.5 kg by 2005, about 17 percent higher than in 1996. Total consumption would be around 3.5 million tonnes by 2005.

When habit formation is excluded, per caput sugar consumption is projected to increase substantially. It would reach more than 24 kg by 2005, about 70 percent higher than the actual consumption level in 1996 and nearly 50 percent higher than projected consumption based on the habit formation model.

**Japan.** The increasing use of alternative natural sweeteners, in particular low-calorie sweeteners which are preferred by consumers has resulted in the decline in sugar consumption over the past decade. The projections suggest that this trend would continue but at a much slower rate because of the higher marginal cost of increasing production of alternative sweeteners. It is projected that per caput sugar consumption

would be 18.5 kg by 2000 and 17.8 kg by 2005 if the current price structure remained unchanged. Thus, total sugar consumption would be 2.34 and 2.26 million tonnes by 2000 and 2005, respectively.

Excluding habit from the model does not affect the result industrial use accounts for most of the sugar consumption in Japan.

**Pakistan.** Per caput sugar consumption has increased significantly in recent decades with economic development. If the trend continued, it is projected that per caput consumption would be above 28 kg, and total consumption would reach 5.2 million tonnes by 2005. Excluding habit formation it was projected that per caput and total consumption would reach 35 kg and 6.8 million tonnes respectively by 2005.

**Philippines.** It is projected that the increasing trend of sugar consumption would continue with its high economic growth rate. The projected per caput and total consumption would be about 35 kg and 3 million tonnes respectively by 2005. While per caput consumption would be about 30 percent more than that in 1996, total consumption would be 50 percent higher, due to the increase in population.

Comparing these projections using the model without habit formation gave a projected per caput consumption at 43 kg or about 50 percent higher than the current level by 2005.

**Thailand.** Economic growth and the expansion of pharmaceutical, soft drinks and bakery industries have significantly contributed to the increase in sugar consumption over the past decades. Under the habit formation model the growth of sugar consumption is projected to remain strong during the next decade. Per caput sugar consumption would rise by about 35 percent over the 1996 level to reach 35 kg by 2005. Correspondingly, total consumption would rise to 2.3 million tonnes from the 1996 level of about 1.6 million tonnes.

By contrast, excluding habit formation, per caput consumption would be 10 percent higher than the habit formation model, amounting to 39 kg by 2005.

## PRODUCTION

**The dynamic supply model for sugarcane and sugarbeet** Separate area yield equations derived from a dynamic sugar supply model have been estimated for each country (the details of model derivations and specifications are summarized in Appendix B). Since the factors affecting production decisions of producers vary from country to country, the general specifications for area and yield have been modified to reflect different policy regimes and production practices in these countries. For instance, to capture the impact of the liberalization of the entire sugar industry in China in 1992, a special variable was introduced in the sugarcane and sugar beet equations of that country. Similarly, since the sugar industry in the Philippines experienced significant changes during the early-eighties, a special variable was included in the area equation to take account of the consequence of these changes.

Other important policy instruments used by governments to manage sugar production were also taken into account in the model specification and estimation. For example, government purchase prices were used as the farmer-received prices for sugarcane and sugarbeet production in China before 1992 when all sugar processing factories were run by the central government (Ministry of Light Industry), but the free market



prices of sugar (crops) were used after 1992. As growers in India would receive either the government minimum price or state purchasing price each year depending on the market situation, a selection procedure was used to construct the farmer received prices by comparing the government minimum price and the state purchasing-price. The switch regression method was used to estimate the model. The expansion of the sugar industry in Australia was regulated by government before 1992 but the assigned planting areas were never binding because the actual planting areas were far below the assigned areas. Thus, the model does not directly take account of the area assignment policy but only the impact of the 1992 deregulation by including a policy change dummy variable. Moreover, when a country produces both sugarcane and sugarbeet, the area and yield equations for these two crops were separately estimated because they were produced in different regions and in competition with different crops.

### Data and estimation

A sugar production data set collected mainly from national statistics was used to estimate both area and yield equations. In addition to price data, including prices of sugarcane and competing crops and various input prices, a weather variable was constructed and used in estimating the yield equation for each country because a large proportion of production was in areas vulnerable to weather conditions. The weather variable was constructed based on FAO weather data sets which contain monthly average temperature, rainfall and other indicators from the records of the major national meteorological stations. Since precipitation had an important effect on sugar yield (both quantity and quality), the deviation of precipitation from the historic average in the major producing regions during the planting and growing periods was constructed as the proxy for weather conditions. When such detailed precipitation data was not available, a weather dummy was included based on country reports about the weather impact on sugar crops - good, bad or normal. As technology has played an important role in sugar production, a time trend was included in the yield equation as a proxy for technical change.

### Empirical results

In general, the data fit the model well except for the yield equation for a few countries, for example, Fiji. In general, the production responses to prices in the short run were not very strong, ranging from 0.2 to 0.4 for most countries, which may reflect the difficulties facing sugar farmers in changing their production decisions, given the existing institutional and economic constraints. In particular, the supply elasticity in India was estimated to be only about 0.01 which suggested that the change in price had little impact on production. The substitute price elasticities of other crops for sugar crops ranged from -0.1 to -0.3. The extremely low substitute price elasticity in Fiji and Indonesia, only -0.01 may reflect fewer production alternatives and difficulties to shift from sugar to other crops facing sugarcane farmers in the short run.

The estimated results from yield equations suggested that technical progress had played an important role in the yield levels as the coefficient associated with the technical change variables in the yield equations for most countries were statistically significant. The changes in farm input prices were also found to affect yield levels. However, when weather had the dominant effect on the yield level, the effect of changes in input prices on yield became statistically insignificant.

### Projections

The estimated equations were used to project sugar production for each country. The basic assumptions for conducting forecasts were unchanged - policy regimes, normal weather, and the same growth rates for all prices as the average annual rates over the last five years. It was also assumed that the conversion ratio from sugarcane or sugarbeet to raw sugar would be the same as the average rate for the last five years. Since a certain proportion of sugarcane was also consumed in other fora or used to produce other types of sweeteners, for example gur and khandsari in India, this assumption implied that the structure of

sugarcane use would remain the same as that during the last five years. To analyze how the changes in government policy would affect sugar production, various different scenarios were also designed for the countries concerned for the model simulations.

**Australia.** High productivity and cost efficiency from large scale operation have contributed and would continue to contribute to the expansion of sugar production in the next decade. The deregulation of the sugar industry since 1991 had also been given the industry greater impetus to compete with exporting countries in the world market. It is projected that planting area and yields would increase by more than 20 percent, from 400 000 ha in 1996 to 490 000 by 2005. Yields are expected to increase by about 10 percent, from 100 tonnes in 1996 to 110 tonnes by 2005. Both the expansion in area and increase in yields would result in higher sugar production. It is projected that sugar production would reach 6.6 million tonnes by 2000 and 7.5 million tonnes by 2005. As sugar production is largely driven by world market price, it was found that the total production would reach 8.6 million tonnes by 2005 if the world sugar price increased by a 5 percent annual rate rather than 3.7 percent assumed in the base projections. This fact suggested an expansion potential and sensitivity to the world market price of the sugar industry in Australia.

**China.** Production has been volatile over the past few years. Although climate and other social-economic factors have an important impact on production, government policies toward sugar and other agricultural commodities also have a profound impact on annual production levels. Since the government still controls prices of grains, the major crops competing with sugar, changes in grains prices would induce a reallocation of resources, especially land, between sugar and grain crops. To analyze how the government policy will affect future sugar production, three different policy scenarios were designed: (a) no changes in the relative price relationship between sugar crops and other competing crops; (b) 5 percent higher prices per annum for grains; and (c) 5 percent lower prices for grains per annum.

Projections indicated that the production of sugar crops were very sensitive to changes in relative prices. Both sugarcane and sugarbeet planted areas would decline from current levels in scenarios (1) and (2). The sugarcane areas would be about 24 and 63 percent lower, respectively for scenarios (1) and (2) than the 1996 level by 2005, while the sugarbeet area would decline by about 30 and 50 percent by 2005 compared with the 1996 level. However, if the annual growth rate of grains prices was 5 percent lower than their average over the last five years, both sugarcane and sugarbeet area would increase to reach 1.4 million ha and 0.8 million ha by 2005, about 29 percent and 14 percent higher, respectively, than the current levels, because the decline in grains prices would make it relatively profitable to produce sugar crops.

Yields of both sugarcane and sugarbeet are expected to continue their increasing trends. It is projected that sugarcane and sugarbeet yield would increase by 25 percent and 33 percent, respectively by 2005, compared to their current levels. As the projected area differed greatly among the three different scenarios, the projected sugar production levels also varied with these scenarios. If the current policy regime remained unchanged (scenario 1), the total sugar output would amount to 6.6 million tonnes by 2005, about the same as the average level for 1993 to 1996 as the impact of the decline in area would largely be offset by increases in yield. If the government carried out a price policy which favoured the grain

sector (scenario 2), sugar output would only be about 3.6 million tonnes by 2005, about half the present level. In contrast, sugar output could reach 8.4 million tonnes by 2000 and 11.3 million tonnes by 2005 if the government's grains purchase prices (support prices) were 5 percent lower annually (scenario 3). These simulation results reveal the prominent role of prices in the future development of the sugar industry in China.

**Fiji.** The decline in yields of sugarcane over the past decade has been attributed to two major factors. As the continuing expansion of planted area pushed production into marginal land, low soil fertility and difficult undulating terrain resulted in lower yields. Moreover, a large proportion of sugarcane farmers operate on a very small scale leading to inefficient production and lower yields. It is expected that given current policies, the downward trend in yields would persist as the expansion in area continued. It is projected that the planted area would expand to about 98 000 ha by 2005, about 19 percent more than the current level while average yields would decline by about 8 percent to 48 tonnes per ha by 2005. Sugar production, however, is expected to increase by about 13 percent from the current level to 0.6 million tonnes by 2005. Given the great potential to increase yield through better farming practice, total sugar production would reach 0.6 million tonnes or higher by 2005 without any expansion of area.

**India.** Both the increase in yields and expansion of sugarcane areas have contributed to the significant increase in sugarcane production over the past decade. The sugarcane output in 1996 was about 50 percent more than in 1986. Based on the forecast made, this trend would continue. It is projected that sugarcane yields and planting areas would reach 79 tonnes per ha and 4.46 million ha respectively by 2005, a 40 percent increase in sugarcane production. Sugarcane has been used for producing both sugar and low quality sweeteners such as gur and khandsari. To project sugar production, it is assumed that production of gur and khandsari would always be equal to their projected consumption levels. Therefore, sugar production could be derived from the residual of the total output, deducting the amount of sugarcane used to produce gur and khandsari. It is projected that the total sugar production would be 19 million tonnes by 2005. An increase in the use of fertiliser would bring about higher yields and hence, the total production level. Given that the projected planting areas would remain unchanged, it was found that the total sugar production would reach 20 million tonnes if there would be a 5 percent decline in the price of fertilizer annually, and a 2 percent increase in sugarcane conversion rate due to quality improvement.

**Indonesia.** The expansion of planted area has contributed largely to the increase in sugarcane production over the past decades. The current analysis predicts a continuing area expansion in the next few years. It is projected that the total sugarcane areas would increase from 400 000 ha in 1996 to 490 000 ha by 2005 while sugarcane yields would reach 78 tonnes per ha. As both area and yields would increase, it is projected that the total sugarcane production would reach 3.1 million tonnes by 2005. As an alternative scenario, it is projected that yields would be 82 tonnes per ha by 2005 if the fertilizer price would be reduced by 5 percent annually stimulating greater use by farmers. As a result, the total sugar output will reach 3.9 million tonnes by 2005, about 62 percent higher than the 1996 level.

**Japan.** Both the decline in demand for sugar and the deterioration of the relative prices of sugar crops compared to alternative crops have contributed to the area reduction of sugar crops in the past decade. It is projected that the downward trend, particularly for sugarcane production, would continue if the current policy regime remained unchanged. The forecast sugarcane area would be 17 000 ha by 2005 which is about 29 percent less than 24 000 ha in 1996. The sugarbeet area would remain at the current level, 72 000 ha by 2005. Yields are projected to decline for sugarcane but increase for sugarbeet by 2005. Consequently, the total sugar production is projected to be about 0.9

million tonnes by 2005 which is roughly the same as in 1996. However, if the prices of substitute crops declined by 5 percent annually, it is projected that the sugarcane area would only be slightly lower than the current level by 2005, while the sugarbeet area would increase by about 7 percent to reach 76 000 ha. Consequently, total sugar production would reach about 1 million tonnes, about 2 percent higher than the current level.

**Pakistan.** It is projected that the steady expansion in sugarcane area and the increase in yields experienced over past decades would continue, but at a slower rate given agronomic constraints. It is projected that sugarcane areas would be slightly higher, about 4 percent, than the 1996 level by 2005, to reach 1 million ha, while yields would be 19 percent higher than current levels, at 56 tonnes per ha by 2005. The sugarbeet area and yields are projected to be 9 400 ha and 31 tonnes per ha by 2005, about 17 percent and 8 percent higher respectively than the 1996 level. Total sugar production is projected to reach 3.9 million tonnes by 2005, about 30 percent higher than the 1994 to 1996 average output level.

**Philippines.** Although both sugarcane yields and planted areas are still below their historical highs, the sugar industry has recovered somewhat in recent years. It is projected that this recovery would continue, although at a slower rate. The sugarcane area would reach 430 000 ha by 2005, about 17 percent more than in 1996. Meanwhile, compared to 1996, yields would increase by 21 percent to 86 tonnes per ha by 2005. Total sugar production, therefore, would amount to 2.4 million tonnes by 2005 which is 36 percent higher than in 1996 but almost the same as the level of the early-eighties.

**Thailand.** Production is expected to continue to increase, although less rapidly than in the past. It is projected that the total sugarcane areas would reach 1.25 million ha by 2005, about 24 percent more than in 1996. Compared with the increase in the last decade, which witnessed the doubling of sugarcane areas, this growth rate would be relatively low. The slower growth in the next decade would largely be attributed to the increasing competition from alternative crops, and lower productivity of marginal land used for sugarcane production. It is projected that yields would increase at a slower rate, from 59 tonnes in 1996 to 66 tonnes per ha by 2005 because of some of the reasons mentioned above. Although both planted areas and yields would increase at a slower pace, sugar production would reach some 9 million tonnes by 2005, more than 40 percent higher than in 1996.

## IMPLICATIONS FOR CONSUMPTION AND TRADE

### The future growth prospects of sugar consumption

It is widely believed that the growth in income would be the major driving force to the increase in sugar consumption in developing countries. Since most developing countries in the Asia and Pacific region are experiencing dynamic and rapid economic growths, demand for sugar is expected to increase substantially in these countries. Moreover, given the huge population base (accounting for more than half of the world's population), any significant increase in consumption in these countries would have important implications for the world sugar market. However, the analyses suggest that, for most of these countries, sugar consumption is largely driven by habit rather than by income alone. Therefore, even if income increases substantially in these countries, sugar consumption may not experience significant increases in the short run.

### Trade

If no changes to stocks is assumed, the net trade in sugar for these countries can be estimated based on our production and consumption projections.

**Australia.** Given its competitive edge in the world market, Australia would continue to be probably the world's leading exporter. Since no significant increase in domestic consumption is expected, the increase in production would result in the increase in export availabilities. It is projected that its total export availability could reach 6.5 million tonnes by 2005, about 60 percent more than in 1995.

**China.** The simulation suggests that China would continue to be a sugar importer in the next decade. However, the magnitude of its imports, ranging from 4 million tonnes to 9 million tonnes by 2005, would depend significantly on government policies to both sugar and other crops. For instance, if the current policy regime remains unchanged, sugar imports could increase from about 1.2 million tonnes in 1997 to 4.4 million tonnes by 2005 because supplies would not rise while the demand increases. If the government decides to reduce the use of artificial sweeteners, in particular saccharin, this would result in a substantial increase in the industrial use of sugar. As a result, total sugar imports could then reach about 9 million tonnes by 2005. The only way that China could achieve self-sufficiency would be if the government implements a favourable pricing policy for sugar crops vis-à-vis grain. It is projected that China could have a small surplus, about 0.3 million tonnes by 2005 if the government policy stimulated a significant expansion of both sugarcane and sugarbeet production at the expense of other crops.

**Fiji.** Given its stable consumption level, Fiji would continue to be a medium-sized exporter in the world sugar market in the next decade. Total exports could reach 580 000 tonnes by 2005, about 12 percent higher than the current level.

**India.** Although it is the world largest sugar producing country, India has only occasionally been a significant sugar exporter over the past decades as most its output has been consumed domestically. This situation would continue into the next decade. Domestic demand for sugar would increase substantially because of its population growth and the increase in per caput consumption. If additional efforts were made to increase production from now, India would meet its domestic sugar demand. However, if it did not, then it would need to import sugar by the year 2000, and total shipments would reach 1.7 million tonnes by 2005.

**Indonesia.** Although production is expected to increase, Indonesia would continue to be an importer in the next decade because the growth in population would continue to drive up national sugar consumption. It is estimated that Indonesia would import around 500 000 tonnes annually by 2005. If its per caput consumption increased at a slightly faster pace, imports could reach more than 1 million tonnes by 2005.

**Japan.** It is projected that as the decline in consumption would outweigh the slight decline in production, the import level would decline marginally over time to about 1.4 million tonnes by 2005.

**Pakistan.** It is expected that Pakistan would continue to be a sugar importing country. It is projected that imports would reach 1.4 million tonnes by 2005 if the growth in consumption continued at its current pace.

**Philippines.** The future position of the Philippines in the world sugar market depends largely on government policies toward the sugar industry. If the current policy regime remained unchanged, it is projected that the Philippines could become a net sugar importing country. The quantity imported could increase gradually to reach about 600 000 tonnes by 2005.

**Thailand.** With the continued expansion in area under sugarcane and improvement in yields, Thailand would continue to be one of the largest sugar exporting countries in the world. It is projected that Thailand would export about 6.6 million tonnes of sugar even though its own per caput consumption could reach 35 kg by 2005. Favourable agronomic conditions and lower production costs would enhance its position as a large exporter.

## CONCLUSIONS

This study estimates the demand and supply functions using the theoretically consistent models for selected Asia and Pacific countries. The empirical evidence from this study suggest that in addition to the prices and various factors, the habit of consumers has significant impact on sugar consumption. Indeed, income was identified to have a rather weak effect on the change in sugar consumption in the short run if the habit formation impact were ignored.

However, it should be noted that in preparing projections, some assumptions, such as the same policy regimes and normal weather conditions, had to be made. Therefore, if there were substantial changes in policies or variations in the weather, production and consumption from these projections would deviate.

## IMPACTS OF TRADE LIBERALIZATION ON THE WORLD SUGAR MARKET

*This document was prepared by the Economic Research Service (ERS) of USDA for the Sugar and Beverages Group, Commodities and Trade Division. Tables have been left out due to space limitation.*

## INTRODUCTION

Sugar is an important commodity in the world agricultural market with a annual average production of 120.1 million tons, consumption of 118.1 million tons, and a world trade equal to 28 percent of production for the period from 1994 through 1996 (USDA, 1997). Sugar is produced under a broad range of climatic conditions in some 120 countries and is one of the most heavily traded agricultural commodities. Like the international trade of other major agricultural commodities, sugar trade has several distinguished characteristics that include heavy government intervention, large price fluctuation, widespread production in many parts of the world, and a growing market for sugar substitutes. These features make the world sugar market a vital target for policy analysis, although they also pose considerable modelling difficulties.

Sugar is produced from sugarcane and sugarbeet. Sugarcane is mostly grown in tropical and sub-tropical regions and sugarbeet predominantly grown in temperate regions. So that sugar is produced in many parts of the world. However, sugarcane accounts for approximately 60 percent of total production of centrifugal sugar which contributes basically all of international trade. In general, many sugar producing countries, except the United States and Australia, are developing countries and cost of sugar production appears to be relatively lower in the low-income than in the high-income countries (Devadoss and Kropf, 1996). More importantly, those developing countries export and compete directly in the world sugar market. As a result, the developed countries such as the United States, Japan, Canada, and European Union (EU) heavily subsidized sugar crop producers, often at the expense of domestic consumers. The total costs to consumers, according to previous studies (Borrell and Duncan 1993, Roberts and

Whish-Wilson 1991, and Sturgiss, Tobler, and Connell, 1988), surpassed 2 billions of dollars annually in those countries.

Sugar policies, for instance government intervention by developed countries, induced significant loss on low-income sugar exporting countries as they exporters experienced lower world prices and likely lower production and reduction in employment opportunities (Devadoss and Kropf, 1996). Several previous research studies also concluded that developed countries' sugar policies have made sugar markets among the most distorted of all agricultural commodity markets and have caused significant global economic welfare losses (Marks and Maskus, 1993). However, the trade liberalization called by the Uruguay Round (UR) of the General Agreement on Tariffs and Trade (GATT)/the World Trade Organization (WTO) should lead to an improved world resource allocation by shifting sugar production to more efficient areas. Other regional trade liberalization agreements currently under discussions among APEC and ASEAN member countries of which many are important sugar traders also will provide significant impacts on world sugar production, consumption and trade. As UR policy provisions are implemented and APEC and ASEAN trade liberalization policies are carried out, it is important to sugar exporting and importing countries to assess the effects of these trade reforms on their sugar markets.

The objective of this study is to use a Computable General Equilibrium (CGE) framework that includes a majority of the sugar producing and trading countries to quantify the effects of the trade liberalization agreements negotiated under the UR on sugar production, consumption, trade, and prices of the major sugar exporting and importing countries. This study further assumes that if only APEC or ASEAN member countries liberalize their sugar related policies, or even a complete world trade liberalization, how each of the changes would affect the world sugar production, consumption, and trade. This study is different from other studies, because the CGE framework employed in this analysis allows us to evaluate the impacts not only among different countries, but also intra-sectoral effects among different sectors, including non-agricultural, or industrial and service sectors. The results of these trade liberalization analyses will be useful to sugar producers, consumers, trading companies, and government policymakers.

#### MODEL SPECIFICATION

The CGE model used in this analysis is constructed around a 13-region, 13-sector Social Accounting Matrix (SAM) estimated for 1992 based on the Global Trade Analysis Project (GTAP) database (Hertel, 1997). Details of this type of multi-region SAM and its construction from the GTAP Database are described in Wang (1994). The 13 regions are: (1) the United States and Canada (USA/CAN), (2) European Union (EU) (15 member countries), (3) Australia and New Zealand (AUS/NZL), (4) Japan, (5) China (including China, Hong Kong Special Administrative Region), (6) India, (7) Indonesia, (8) the Philippines, (9) Thailand, (10) Malaysia and Singapore (MYS/SGP), (11) Brazil, (12) Former USSR and Central Europe Associates (Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia, and Slovenia) (ESU), and (13) Rest of the World (ROW). The 13 sectors include 4 agricultural sectors: (1) grain, (2) sugarcane and sugarbeet, (3) other non-grain crops, and (4) rest of agriculture; 3 food processing sectors: (5) sugar processing, (6) beverage and tobacco, and (7) other processed food; 1 natural resource sector: (8) minerals and energy; 4 manufacturing sectors: (9) textiles and wearing apparel, (10) other light manufactures, (11) manufactured intermediates, and (12) machinery and transportation equipment; and, finally, (13) transportation, construction, and services, a portion of which is allocated to international shipping. There are no sugar crops sector and sugar processing sector in the version 3 of the GTAP database. The two sectors are aggregated in the "non-grain crops" and "other food processing" in the GTAP database. So, detailed data on sugar crops and sugar processing sectors have been collected to split the two GTAP

sectors. The separation work and the correspondence between the model and GTAP sectors are given in appendix and appendix tables.

#### Factor Endowments and Comparative Advantage Across Regions

i) Production Resources Unevenly Distributed Across the World -- The four high income regions (USA/CAN, Japan, EU, and AUS/NZL) account for only 16 percent of the global labor force, but possess more than 75 percent of the world capital stock. In contrast, around half of the global labor force with less than 4 percent of the world's capital resides in the five low-income Asian developing regions (China, India, Indonesia, the Philippines, and Thailand). The four high-income regions are also relatively abundant in skilled-labor and arable land, while the skilled-labor share of the total labor force and arable land as a percent of total land mass are much smaller in China, ASEAN, and India.

ii) Wide Differences in Factor Intensities and Costs Among Regions -- Because of the uneven distribution of factor endowments, low-income developing countries have the lowest capital intensity (capital stock per worker), the largest shares of unskilled labor in their total labor force, and the highest rental-wage ratios. The reverse is true for the four high-income regions. In terms of natural resources, Japan and China are poorly endowed with arable land relative to labor. Therefore, they have the lowest land/labor intensities (arable land per worker) and relatively higher land returns (relative to labor and capital) compared with other regions. This condition is just the opposite in North America and AUS/NZL, where land as an abundant factor earns a relatively lower return there. These endowment differences are quite important for understanding net trade flows across regions based on conventional trade theory.

iii) Different Net Trade Patterns -- Sectoral net trade by region in the 1992 base year show that among the industrial countries, labor-intensive manufactured goods and mineral products are the major net imports, while capital and skill-intensive manufactured are the major net export sectors (except for machinery and equipment in the U.S. and Canada because of its deficit with Japan).

iv) Domestic Tax Policy and Import Protection -- Most general equilibrium analysis of regional economic liberalization focuses on the removal of ad valorem tariff equivalents on imports. The pattern and level of protection are very important in determining the impacts of trade liberalization. The larger the initial distortion, the greater the induced impact from an assumed policy change. For this analysis, the impact of APEC and ASEAN trade liberalization depends on the structure of the trade barriers in the estimated multi-regional SAM. The initial sectoral import protection rates as percentage of f.o.b. value, along with sectoral tax rates include the tariff equivalents of non-tariff barriers for agricultural and food products, quota rent of the Multi Fiber Arrangement (MFA) on textiles and apparel in most developing regions, and anti-dumping duties for the United States, Canada, and the EU (Hertel, 1997).

The domestic protection and export tax equivalent rates indicate that most regions in the model subsidize agriculture. Only MYS/SGP, the Philippines, China, and ESU still tax agricultural production.

#### Global Sugar Market - Production, Trade, and Government Intervention

**Production** --Climate and geographic conditions are determining factors for production of sugarcane and sugarbeet. ROW, EU, India, and Brazil are important producers of sugarcane and sugarbeet. The four countries and regions produces 68 percent of sugarcane and sugarbeet of the world. Their regional output shares of sugar crops sector and sugar processing sector are quite similar. ROW, EU, India, Brazil, and ESU are also important producers of sugar processing goods.

**Trade** -- It is apparent that MYS/SGP is the typical outward, while India is the typical inward economy in sugar processing sector. Thailand and AUS/NZL are more export oriented, and Japan, ESU, North America and EU are highly dependent on the supply of the world sugar market.

In the world sugar market (referring to sugar processing sector only), Thailand, EU, Brazil, and AUS/NZL are main net exporters, while ESU, North America, Japan, MYS/SGP, Indonesia, and China are net importers. The Philippines, India, and ROW are also net exporters but their size of net exports is very small. ROW and ESU are two largest importers in the world sugar market, their shares of imports in the world market are 34 percent and 21 percent, respectively. EU and North America are also significant importers. On the other hand, ROW is the largest exporter, providing 38 percent of world exports of sugar processing goods. Although Thailand accounts for only 2.4 percent of world sugar processing goods, its share in world sugar exports is 9.2 percent. In addition, Brazil and EU also play important roles in world sugar export market.

EU, ESU, and North America are the main destinations for sugar exports from ROW. ROW and ESU import most of their sugar from EU, Brazil, China, and India. APEC area is a major market of the sugar exports of AUS/NZL and the Philippines. As to the sugar imports, 95 percent of imports in EU, 60 percent in North America are from ROW. EU and ROW are main exporters of sugar to ESU market and APEC area is the supplier for Indonesia and MYS/SGP.

**Government Intervention** -- There is substantial government intervention in world sugar markets. Almost all the developed and developing countries protect their domestic sugar production. Typically, the import protection rate (tariff equivalent) in Japan is 372 percent. The import protection rates are around 100 percent in developing countries. There are also government subsidies on production and exports of sugar in some regions. All these policies heavily distorts the global sugar market.

All the structural information discussed above will have important implications for understanding the impact of regional trade arrangements on the world sugar market and Asian economies. However, this information cannot be considered in isolation, since changes in trade policies and protection levels in any of the regions and sectors will have impacts on other regions and sectors. It is on this point that application of a CGE model which includes all major regions in the world can make a significant contribution to understanding the possible impacts of regional trade arrangements on the world sugar market and Asian economies. The purposes of the above SAM-based analysis is to provide insights to facilitate understanding of simulation results reported later in this paper.

#### **Structure of the Model**

The model used in this paper is developed by Wang (1997) and is an extension of de Melo and David Tarr's basic general equilibrium trade model (1992) to a multi-country setting. In the extension, Wang followed John Whalley's tradition (1985) to endogenize all regions including the rest of the world, and incorporated the macro economic specifications from Devarrjan, Lewis, and Robinson (1990), as well as the international shipping sector similar to the GTAP model (Hertel, 1997). Moreover, the up-level Leontief technology in de Melo and Tarr's model was replaced by CES function, which allows substitution

between value-added and aggregate inputs in the upper-level of the production tree, and their ELS demand system has been extended to ELES system, thus household saving decisions become endogenous in the model. Because duality approaches are used throughout the specification, the model is relatively simple and transparent in structure. A detailed algebraic description and a complete equation list of the model can be found in Wang and Schuh (forthcoming article entitled "The Impact of Economic Integration Among Taiwan Province of China, China, Hong Kong Special Administrative Region, and China: A CGE Analysis"). The model is implemented by General Algebraic Modelling System (GAMS, Brooke, et.al. 1988).

In this study, 13 region and 13 production sectors in each region are specified in the model to represent the world economy. Each region is assumed to have basically the same structure. Four primary factors of production are modelled: agricultural land, capital, unskilled labor, and skilled labor. The division between skilled and unskilled labor is a distinction between professional workers and production workers. Primary factors are assumed to be mobile across sectors, but immobile across regions.

**Economic Agents and Factor Endowments** -- Three demand-side agents are assumed for each region: a private household, a public household (government), and an investor. Factor endowments are assumed to be owned by households and are set exogenously. Private households are assumed to sell the two categories of labor and to rent capital to firms, and to allocate their income from factor returns to savings and expenditures, which buy final consumption goods from the firms. The investor simply collects savings from households, government, and firms, accounting for foreign capital inflows or outflows. Total regional savings is available to the investor as his budget to buy capital goods, which are assumed to consist of fixed proportion of the 13 composite goods for gross investment.

**Production** -- There is a competitive firm in each sector for every region. The production is characterized by two-level nesting of constant elasticity of substitution (CES) functions. At the first level, firms are assumed to use two types of inputs: a composite primary factor and an aggregate intermediate input according to a CES cost function. At the second level, the split of intermediate demand is assumed to follow Leontief specification, therefore, there is no substitution among intermediate inputs. The four primary factors also substitute smoothly through a CES cost function. The degree of substitutability between the composite primary factor and the aggregate intermediate as well as among the four primary factors depends on their base year share in production and on the elasticity of substitution that is assumed to be constant. Technology in all sectors exhibit constant return to scale implying constant average and marginal cost. Firm's output is sold on the domestic market or exported to other regions through a constant elasticity of transformation (CET) function. The structure of production are illustrated in Figure 1. The CET function can be partially or entirely turned off in the model, in such case, exports and domestic sales become perfect substitutes.

**Demands** -- Agents in each region value products from different regions as imperfect substitutes (the Armington assumption). The private household in each region maximizes a Stone-Geary utility function over the 13 composite goods, subject to their budget constraint, which leads to the Extended Linear Expenditure System (ELES) of household demand

functions. Household savings are treated as demand for future consumption goods with zero subsistence quantity (Howe, 1975). An economy-wide consumer price index is specified as the price of savings. It represents the opportunity cost of giving up current consumption in exchange for future consumption (Wang and Kinsey, 1994). Government spending and investment decisions in each region are based on Cobb-Douglas utility functions, which generate constant expenditure shares for each composite commodity. In each region, firm intermediate inputs, household consumption, government spending and investment demand constitute total demand for the same Armington composite of domestic products and imported goods from different sources. A two-level nested CES aggregation function is specified for each composite commodity in each region. The total demand is first divided according to geographical origin under the assumption of cost minimization. Sectoral import demand functions for each region are derived from the corresponding cost function according to Shephard's lemma. Complete trade flow matrices for all trade partners are part of the model solution.

There is an international shipping industry in the model to transport products from one region to another. Each region is assumed to allocate a fraction of the output of its transportation and service sector to satisfy the demand for shipping which is generated by interregional trade. The global shipping industry is assumed to have a unitary elasticity of substitution among supplier sources. This means the margins associated with this activity are commodity/route specific. In equilibrium, the total value of international transportation services at the world price equals the sum of the export proportions of the service sector's output from each region.

**Trade-Distorting Policy** -- The government in each region is assumed to impose import tariffs, export subsidies, and indirect taxes, all in ad *valorem* terms. Tariff and tax (subsidy) rates vary by sector and by destination.

**Price System** -- There are 10 types of prices for the good with same sector classification in each region. They are value-added prices, aggregate intermediate prices, average output prices, composite good prices, consumer prices, producer prices, export prices, import prices, f.o.b. prices, and c.i.f. prices. The value-added price equals the unit cost of primary factor inputs. The aggregate intermediate price is a fixed proportion (IO coefficients) weighted average of composite good prices. A CES aggregation of the two equals the average output prices. Adding to it the production taxes yields the producer prices which are tax inclusive CET aggregation of domestic and export prices. Sellers receive this price. The composite good price is a tax inclusive CES aggregation of domestic and import price, which in turn is an aggregation of tariff inclusive import prices from different sources. The consumer price is the composite good price plus sales tax. Buyers pay this price. The f.o.b. price of each Armington good is the firm's export price plus the export taxes or minus export subsidies. Adding to it the international transportation margins yield the c.i.f. price. An exchange rate, as a conversion factor, translates world market prices into domestic prices. An adjustable exchange rate in the model implies a change in domestic price index is sufficient to sustain a constant current-account balance measured at world prices.

**Equilibrium** -- Equilibrium is defined as a set of prices and quantities for good and factors in all regions such that (i) demand equals supply for all goods and factors; (ii) each industry earn zero profit; and (iii) gross investment equals aggregate savings in each region.

**Choice of Numeraire** -- In common with other CGE models, only relative price matters. The absolute price level must be set exogenously. The aggregate consumer price index in each region is used as numeraire. The advantage of this normalization choice is that factor returns and household income in model solution are in real terms. Moreover, the equilibrium exchange rates defined in the model are also

in real terms, and can be seen as equilibrium price-level-deflated (PLD) exchange rates, using the country's consumer price indices as deflators (Lewis, Robinson, and Wang, 1995).

**Macro Closure** -- Macro closure of a CGE model has two aspects: macro accounting balances and assumption about macro adjustment behavior. There are three major macro balances in each region: (i) the government deficit (surplus); (ii) aggregate saving and investment; and (iii) the balance of trade. Although each agent has a balanced budget in equilibrium, there is no presumption that bilateral trade flows between any two regions are balanced. They are determined endogenously. The government deficit or surplus is the difference between revenues and expenditures, one of which has to be fixed exogenously.

In the benchmark equilibrium, all three macro balances hold. The behavioral specification of macro closure in a CGE model involves choice of a mechanism by which macro balances are brought back to equilibrium when exogenous shocks disrupt the benchmark equilibrium during an experiment. Thus, a macro scenario is imposed on the CGE model, which then traces out the sectoral implications of the assumed macro behavior (Devarajan, Lewis, and Robinson, 1990). Because the macro behavior is not based on optimizing behavior by rational agents in the model, different assumptions about the macro adjustment process may lead to different results.

Since the major purpose of this study is to estimate the impact of differential trade liberalization, the savings-investment gap is held constant in each region for all the simulations conducted by the model. This is achieved by keeping fixed balance of trade, total real government expenditures, and aggregate real investment in each region. Thus, the government deficit (saving) is endogenous and the model is investment driven. If government revenue changes because of a reduction in tariffs, the macro economic effect will be either a change in the exchange rate or a change in household savings, or both, since the induced government deficit is financed by foreign capital inflows or domestic borrowing.

By a macroeconomic identity, the fixed balance of trade implies that a constant sum of domestic savings and taxes in real terms is needed to finance fixed investment plus real government expenditures. Thus, any changes in real GDP in the model will go exclusively to changes in real consumption, making it easy to compare the results from different simulations.

The model is neoclassical in spirit. Prices in each region's product markets are assumed to be flexible to clear the markets. Each region is assumed to have a fixed amount of arable land specific to agriculture.

**Static and Medium Term Accumulation Effects**- There are usually two types of gains from trade liberalization: the gains from more efficient utilization of resources, which lead to a one-time permanent increase in GDP and social welfare, and the gains from a "medium-run growth bonus", which compound the initial efficiency gain and lead to higher savings and investment. The static efficiency gains induce higher income and lower prices for capital goods, accelerate capital accumulation, and lead to more capital stock available in the economy. This, in turn, yields more output, leading to further savings and investment. As Francois et al. (1995) have pointed out, this type of mid-term accumulation effect is different from any long-run, permanent growth effect induced by human

capital and technology improvements, since it will ultimately decline to zero over time.

To quantify these two types of gains, two alternative capital market closures can be chosen in the model: one static, and one steady-state. Under the static capital market closure, the aggregate productive capital stock is fixed in each region, and the region-specific average rental rate adjusts to ensure that regional capital is fully utilized. It is the empirical analogue of the comparative-static analysis that is common in theoretical work. Under the steady-state capital market closure, the return of capital is held constant while the capital stock in each region is endogenously determined. This closure assumes that since each region's aggregate capital stock is at its steady-state level in the benchmark equilibrium, liberalized trade will increase capital returns due to more efficient allocation of resources. In a dynamic sense, this will lead to a higher savings and investment rate. More capital stock in the economy will drive down the marginal productivity of capital, thus decreasing the return of capital until its initial level. Although this simulation cannot provide information about the transition path of how the capital price in each region returns to its steady-state equilibrium after an external shock, it can shed some light on the approximate size of the accumulation effect from trade liberalization-induced investment growth in a classical Solow-type growth model at almost no additional implementation cost. The theoretical underpinnings of this approach are based on the concept of invariant capital stock equilibrium proposed by Hansen and Koopmans (1972), and it was introduced into CGE analysis to estimate the accumulation effects of trade liberalization by Harrison, et al. (1995).

## THE RESULTS: IMPACT OF REGIONAL TRADE LIBERALIZATION

### Alternative Scenarios

There are 4 sets of counterfactual experiments carried out by this study:

- Scenario I -- The impact of Uruguay Round trade liberalization,
- Scenario II -- The impact of AEFA trade liberalization,
- Scenario III -- The impact of APEC trade liberalization, and
- Scenario IV -- The impact of global trade liberalization.

For the last 3 scenarios, experiments are repeated for each scenario with two simulations: one with trade liberalization only taking place in the two sugar sectors (EXP 1) and the second trade liberalization taking place in all sectors (EXP 2). Therefore, all together 7 simulations were conducted. In each simulation, the steady state capital market closures were adopted.

For scenario I, the percentage reduction in import protection rates by sector and by region agreed to in the Uruguay Round is presented in table 6. The data for non-sugar are aggregated from version 3 GTAP database, which is based on World Bank estimates, covering 31 GTAP sectors (except 6 service sectors) and 28 regions (except China and Taiwan Province of China). The average reduction in domestic agricultural support is 20 percent for developed countries, 13.3 percent for developing countries (but except the sugar crops sector). The reduction of agricultural export subsidies is 36 percent for developed countries and 24 percent for developing countries, based on estimates by Francois et al. (1995). To simulate the termination of Multi Fiber Arrangement (MFA) quota system, the quota rent equivalent export taxes are eliminated for all developing countries.

For the other 3 scenarios, APEC trade liberalization means reducing all bilateral protection to zero among North America, Japan, AUS/NZL, China, Indonesia, the Philippines, Thailand, MYS/SGP. AEFA trade liberalization means reducing all bilateral protection to zero among Indonesia, the Philippines, Thailand, and MYS/SGP. Global trade liberalization means reducing bilateral protection rates to zero for all regions. In the experiments of trade liberalization in all sectors for all 3 scenarios, the termination of MFA quota system is also incorporated.

We assume that the quota rent equivalent export taxes are eliminated among the trade liberalization regions.

For each of those experiments, the CGE model generates results regarding the effects on social welfare, terms of trade, the volume of trade, output, the wages paid for each factor, and changes in prices and resource allocation. The difference between the assumed scenarios and the base case is our estimates of the impact of regional trade liberalization. However, our estimates should be regarded as results from controlled experiments rather than as forecast. In reality, actual and output patterns are affected by many more factors than just trade liberalization, such as domestic macroeconomic and income policy changes.

### Aggregate Effects

*Tables have been omitted due to space limitation.*

#### Uruguay Round

**Macro results** -- The social welfare measured by the Hicksian equivalent variation would increase in all regions except China, because China is excluded from the Uruguay Round trade liberalization. ESU (East Europe and Former Soviet Union) gains little because FSU is also excluded in the Uruguay Round trade liberalization. The developing countries' gains are large because of the small size of their economies, relatively high trade orientation, and low capital return rate.

The termination of MFA quota system and trade liberalization in agriculture and food are two important outcomes of the Uruguay Round, they would result in higher prices for agricultural products and lower price for textile. Consequently, the terms of trade of developing countries, which export textiles to developed countries, improves. The terms of trade of EU, AUS/NZL, and USA/CAN would also improve because they are important exporters of agricultural products. But Japan is an important importer of agricultural products, this explains why its terms of trade would decline

The trade liberalization of Uruguay Round expands global trade. India and ASEAN countries exports would increase rapidly because of the elimination of MFA quota system and their comparative advantage in labor-intensive textiles products. There would be little changes in the trade of China and ESU, even the exports of China would decline slightly.

**Sugar** -- The sugar production of importers would decline and sugar production of exporters would increase, except for EU and MYS/SGP. The production of sugar in EU would decline because of its high protection in sugar sector and the reduction of export tax. Since the production of sugar in MYS/SGP were almost all exported, the increase of sugar prices in world market after UR trade liberalization would result in increase of export and production of sugar of MYS/SGP. Japan has one of the most heavily protected sugar sectors in the world sugar sector before UR, so its production of sugar would suffer the largest decline.

The gains in UR trade liberalization would promote the increase of demand for sugar. The demand for sugar in Thailand would increase 6 percent, because it gains most relative to the size of its economy.

The increase of net exports is mainly provided by Thailand, Brazil and ROW. Although AUS/NZL is an important exporter of sugar, UR trade liberalization would not result in its rapid increase of export, because much of its resources is reallocated in the grain sector.

### **AEFA**

**Macro results** -- AEFA trade liberalization of the sugar sectors would increase the social welfare of all the ASEAN countries, although the improvement is very limited. Thailand's terms of trade would improve, while the other three ASEAN countries decrease, because of the increase in Indonesia, MYS/SGP, and Philippine's demand for Thai sugar.

AEFA trade liberalization in all sectors would improve the ASEAN's social welfare, and the trade diversion would slightly decrease the social welfare of Japan, AUS/NZL and India. But the distribution of gains is uneven in ASEAN regions. MYS/SGP gains much more than the other three countries, because there is a strong trade connection between MYS/SGP and the other three countries, but the trade among the three countries is relatively small.

**Sugar** -- In ASEAN countries, Thailand is a net exporter of sugar and its imports of sugar are almost zero. The Philippines is also a net exporter, but most of its sugar exports are shipped to the United States, and the Philippines has a heavy import protection on domestic sugar market. Indonesia is a net importer of sugar, it also has heavy protection for its own sugar sector. When all the import protection in sugar sector among ASEAN region are eliminated, sugar production and sugar exports of Thailand would increase, and, on the contrary, imports of Indonesia, MYS/SGP, and Philippine would increase. In the experiment of trade liberalization in all sectors, the pattern of change in sugar trade is largely the same as the experiment of sugar-sector-only liberalization.

### **APEC**

**Macro Results** -- All the APEC members would gain in the APEC trade liberalization, while non-APEC members would lose. In the experiment of trade liberalization for sugar sector, the terms of trade of the main exporters of sugar, Thailand and AUS/NZL, increase. In the experiment of trade liberalization in all sectors, the increase in demand for agricultural products among USA/CAN, AUS/NZL, China, and Indonesia would improve their terms of trade.

Because of the trade diversion, the trade of non-APEC members would decrease, while the trade of APEC countries would increase. The trade of ASEAN and China would increase the most because of the elimination of MFA quota in textile exports to USA/CAN.

**Sugar** -- AUS/NZL and Thailand are the main exporters of sugar in the APEC area. Their production would increase significantly in the APEC trade liberalization. USA/CAN, Japan, China, and Indonesia would decrease their production because their high import protection to APEC regions is eliminated. The production in ROW and Brazil would also decrease because of the trade diversion.

The pattern of changing in the experiment of trade liberalization in all sectors is similar to the sugar sector trade liberalization experiment. But the trade liberalization in other sectors would affect the resource allocation, and thus affect the sugar sector. The production and exports of sugar of AUS/NZL in EXP 2 (all sectors) is smaller than EXP 1 (only sugar sector), while production and export of Thailand in EXP 1 is larger than EXP-2. This is because the trade liberalization in agriculture results in the booming demand for agricultural products of AUS/NZL, promotes the growth of production and exports of AUS/NZL's grain sector, and results in the contraction of sugar crops sector and sugar processing sector. While Thailand has more comparative advantage in the sugar crops sector than other agricultural sector, therefore, it would import more other grain products and produce more sugar products. For similar reasons sugar exports of USA/CAN would decrease.

### **Global Trade Liberalization**

**Macro Results** -- Global trade liberalization promotes the social welfare increases in all the regions. Similar to the previous scenarios, developing countries gain more relative to the size of their economies. The pattern of change in terms of trade is also similar to the previous scenarios.

**Sugar** -- In the global trade liberalization scenario, AUS/NZL, Thailand, Brazil and ROW would increase their production of sugar, while EU would decrease much of its production (table 8-C). The increase of production and exports of AUS/NZL and Thailand would be less than that in the APEC trade liberalization scenario, because some trade opportunities would transfer to Brazil and ROW.

## **CONCLUSIONS**

### **Summary**

Sugar is an important commodity in world agricultural commodity market, which is characterized by heavy government intervention, large price fluctuation, growing market for sugar substitutes, and widespread production in many parts of the world. As Uruguay Round policy provisions are implemented and APEC and ASEAN trade liberalization policies are carried out, it is critical for sugar exporting and importing countries to assess the effects of these trade reforms on their sugar markets.

The objective of this study is to use a CGE framework that includes majority of the sugar producing and trading countries to quantify the effect of the trade liberalization agreements negotiated under the UR on sugar production, consumption, trade, and prices of the major sugar exporting and importing countries. A 13-region and 13-production-sector model is constructed for this study and we found the following results.

## **CONCLUSIONS**

In general, the conclusions can be summarize as follows:

1. The trade liberalization of the Uruguay Round will expand global trade and social welfare would increase in all regions or countries, except China (China is excluded from the UR trade liberalization). The developing countries gains are large relative to their smaller size of economies and high trade orientation. The gains in UR trade liberalization promote the increase of demand for sugar. Sugar production of importers would decline and sugar production of exporters would increase, except EU and MYS/SGP.

2. AEFA trade liberalization in all sectors would improve the ASEAN's social welfare, but the distribution of gains is uneven in ASEAN regions. AEFA trade liberalization in sugar sector would increase the social welfare of all ASEAN countries, although the improvement is rather limited. The terms of trade improve for Thailand, while the other three ASEAN countries, Indonesia, MYS/SGP, and the Philippines, decrease because of their demand for Thailand's sugar. When all the import protection in sugar sector among ASEAN regions are eliminated, sugar exports of Thailand would increase and imports of Indonesia, MYS/SGP, and Philippine would increase.

3. All APEC members would gain in the APEC trade liberalization, however non-APEC members would lose. In the experiment of trade liberalization in sugar sector, the terms of trade of the main exporters of sugar, Thailand and AUS/NZL, increase. In the case of trade liberalization in all sectors, the increase in demand for agricultural products among USA/CAN, AUS/NZL, China and Indonesia would improve their terms of trade. In the APEC sugar trade liberalization, sugar production in AUS/NZL and Thailand would increase the most. USA/CAN, Japan, China, and Indonesia would decrease their sugar



production, because of high import protection to APEC regions is eliminated. The production of ROW and Brazil would also decrease because of trade diversion. The pattern of changes in the experiment of trade liberalization in all sectors is similar to the sugar trade liberalization experiment.

4. Finally, global trade liberalization would promote welfare increases in all regions. Similar to the UR scenario, developing countries' gains are large relative to the size of their economies. The pattern of change in terms of trade is also the same as previous scenarios. In the global trade liberalization scenario, AUS/NZL, Thailand, Brazil and ROW would increase their production of sugar, while EU would decrease much of its production. The increase of production and exports of AUS/NZL and Thailand would be less than APEC trade liberalization scenario, because some trade opportunities would transfer to Brazil and ROW.

## IS SUGAR "PURE WHITE AND DEADLY?"

*Prepared by the Nutrition Programmes Service, Food and Nutrition Division of the FAO.*

### INTRODUCTION

The presentation of a nutrition paper in a conference of economists, commodity specialists and traders aiming to discuss sugar production and trade issues is a rare, but laudable event. It is, of course, fully in line with FAO's broad mandate to assure food availability and nutritional well being for all people and to introduce nutritional considerations in all aspects of economic development.

Sugar in the diet is popular primarily because of its sweetening properties. It also has many other unique properties that make it valuable in a variety of applications in food preservation, processing and preparation. However, its primary nutritional characteristic is that it simply provides a ready source of dietary energy.

Not surprisingly, sugar is highly appreciated and sought after by most people as it has a unique capacity to make foods appealing and desirable. As more and more people over the years have acquired easy access to a variety of sweetened foods, the question of overconsumption has arisen among some in the medical and health communities and, accordingly, in the public at large. Enormous amounts of effort and resources – often applied with a Crusader's zeal - have gone into denouncing sugar and in trying to identify and quantify the detrimental effects of sugar consumption.

It was around 1850 when an exponential rise in sugar consumption was first observed in the United Kingdom, where at the time, consumption per person per year was similar to that of developing countries today. This major increase in consumption of a substance that appeared to appeal to people's hedonistic tendencies by virtue of its sweet taste, made it a natural target for society's ills. The continuing rise in consumption after World War II led researchers to query whether, in fact, high levels of sugar intake could be responsible for a range of health problems. Unfortunately, many were all too quick to supply answers before the results were in. Statements like "white, pure and deadly" and "empty calories" were subsequently picked up by some nutritionists, health professionals and the press, and the still widely believed myths about sugar were created. Sugar was regularly being condemned well before its "scientific" trial was over.

Years of research have now gone into trying to determine if sugar undermines health, and I am pleased to report that the evidence consistently tends to point in the opposite direction. The conclusion today: sugar as generally consumed is a safe and valuable food source. The problem remaining: many people still do not believe it.

Like all commodities, sugar, which is generally refined before being consumed, has a price. It is, therefore, not unexpected that generally more is consumed in industrialised countries than in developing ones.

Total consumption figures, including its use outside the household, is around 41 kg per person per year in high sugar-consuming countries while only around 15 kg in low-income countries. Globally, sugars and other sweeteners contribute approximately 9% of the total energy supply of the world's population with very high variation in national and individual consumption patterns.

Considering the overall world food and nutrition situation, the 1996 Rome World Food Summit showed that, in spite of a decline in chronic undernutrition, there are still over 800 million undernourished people living in developing countries. It is noteworthy that these are generally countries in which large amounts of sugar are not regularly consumed. It is also important to note that much of the world's sugar is produced in developing countries, and that the issue of whether sugar is good or bad has important implications for its supply and demand. Unwarranted attacks on sugar that affect its production and trade in both domestic and international markets can have far-reaching social and economic consequences. The purpose of this paper is to look at current scientific knowledge about the role of sugar in health and disease.

### NEW SCIENTIFIC KNOWLEDGE

The past thirty-plus years of intensive research into sugars, carbohydrates and dietary fibres has led to significant strides in our understanding of the metabolism and physiological effects of these dietary components. Epidemiological studies have delved into the relationships between food consumption, including that of sugars, and health status, and earlier concerns have been clarified. Our understanding of dietary behaviours in different food situations and among different populations and age groups has also increased dramatically during this time. To bring these new findings together and make use of them for nutrition improvement and maintaining health, FAO and WHO convened the joint Expert Consultation on Carbohydrates in Human Nutrition in Rome in April 1997.

In preparation for this consultation extensive literature reviews on non-communicable diseases and all aspects of carbohydrate digestion, absorption, metabolism, and behaviour were examined by a group of experts from thirteen countries. These examinations included sucrose (table sugar) and the different sugars contained in the myriad of foods in world diets. In brief, the results, based on solid scientific grounds, dispelled the generally negative myths about the consequences of sugar consumption. The Report of the Consultation and its Recommendations were given world-wide dissemination through the Nutrition site of the FAO Homepage on the Internet ([www.fao.org](http://www.fao.org)). They will be circulated through other channels once the Report is published.

Selected findings from this and other sources are discussed as follows:

#### **Sugar does not make people fat**

In high-income countries there is great public health concern about the rising percentage of obesity as expressed in high body fat accumulation. In the richest countries, more than 25% of the population can be considered obese, but its prevalence is also rising in the developing countries, even among the poor income instances. Since obesity is a key factor in the aetiology of several degenerative diseases, the understanding of the role of sugar as a food energy source is therefore of great importance.

Maintaining stable body weight requires that total energy consumed be balanced against total energy spent. Therefore, excess energy consumption in any form will promote body fat accumulation. When it is realised that dietary fats and oils have over twice the food energy value of sugars, it becomes clear that the major risk factor for obesity is excess dietary fat, not carbohydrates or sugar. Coupled with this unequal energy contribution is the fact that carbohydrate, including sugar, is the preferential energy source for the body. That is, carbohydrates are oxidised first and leave the more easily accumulated fat as the excess energy source.

Interestingly, findings generally show an inverse association between the intake of sugars (total sugars) and obesity and fat intake. Indeed, epidemiological data from a number of countries show that people with higher sugar intakes are less likely to be obese than those with lower sugar intakes. Also, there is no conclusive evidence indicating that the sweetness of sugar contributes to increased appetite. In fact, the opposite is generally true: the body tends to have a much better appetite-reduction response to carbohydrates and sugar than it does to dietary fat.

In summary, the consultation found no evidence to implicate either sugar or starch in the promotion of obesity other than their contribution to total energy intakes.

#### **Sugar does not cause diabetes**

Table sugar, or sucrose, is made up of one molecule of glucose linked with one molecule of fructose. Once eaten, the chemical bond is split and both sugars follow different absorption paths: glucose is absorbed via a dynamic process whereas fructose enters through a passive mechanism. Following ingestion of carbohydrate, glucose increases blood glucose and stimulates the release of insulin. The latter hormone signals to the cells of the body to absorb glucose, thus reducing its concentration in blood. In diabetes patients this control mechanism is impaired, and historically much attention had been given to helping such patients regulate their sugar intake.

Many factors influence the rate of serum glucose increase following consumption of carbohydrate, ranging from the type of carbohydrate and other nutrients consumed to physical activity levels. Among the more important discoveries about carbohydrate over the past twenty years has been that some of it is not absorbed at all in the small intestine and becomes fermented in the colon. This carbohydrate that goes to the colon contributes little energy and is not glycaemic.

A system, called the glycaemic index (GI), has been devised to rank foods empirically on the basis of their ability to contribute to increased blood glucose levels. It is particularly interesting to note that while pure glucose is the most glycaemic food, sucrose is not highly glycaemic. In fact, it is often surprising to learn that sucrose is rated below maize, rice, wheat and potatoes. This is due to the high amount of fructose, which has a very low GI, present in sucrose. The use of the GI has totally transformed dietary advice for many diabetics who are generally encouraged to consume foods with a low glycaemic index. As a result, diabetics are allowed to consume even sugar, generally up to 50 grams per day.

The cause for non-insulin-dependent diabetes (NIDDM) is insulin resistance at the cellular level, also referred to as glucose intolerance. Sugar intake is not the cause of the development of this clinical state. In fact, the most important contributing factor towards the development of NIDDM is obesity.

Epidemiological studies show that high percentages of non-insulin dependent diabetes (NIDDM) are found in all population groups undergoing rapid cultural changes and changes from traditional diets. There is no doubt that genetic factors are involved even though the precise mode of inheritance has not yet been established. Diet and

lifestyle-related conditions, which lead to obesity, will clearly influence the risk of non-insulin deficient diabetes.

The main disease management feature for this condition focuses on reduction of weight, avoidance of obesity and, strengthening low fat diets including a wide range of cereals, vegetables and fruits with emphasis on low glycaemic index. Sucrose and other sugars have not been directly involved in the aetiology of non-insulin dependent diabetes and key dietary advice for diabetics has been to distribute the intake of carbohydrates throughout the day.

#### **Sugar does not cause cardiovascular diseases**

Understanding the results of early studies on the metabolism of sugar resulted in the concern that glucose was not being used for the production of glycogen, i.e. energy storage in the body, but rather for the production of fatty acids and triglycerides. It appears, however, that carbohydrate is not readily transformed to fat by the body but contributes to obesity through a fat-sparing mechanism. In other words, carbohydrate is the first choice of the body as a source of energy and is preferentially oxidised. Fat tends to be oxidised only when available carbohydrate has been oxidised first. Ingested fat also directly contributes to fat stores, by contrast to carbohydrate.

The expert consultation reported that genetic factors are involved in the aetiology of coronary heart diseases and influence both the atherosclerotic and thrombotic processes underlying clinical manifestations of this disease. Dietary factors may influence these processes directly or via a range of cardiovascular disease risk factors. Obesity, particularly when centrally distributed in the body, is associated with an appreciable increase in the risk of coronary heart disease. There is also evidence implicating specific nutrients and, in particular, the high intake of some saturated fatty acids, which appear to be promoters of coronary heart disease. On the other hand, there is increasing evidence that a range of antioxidant nutrients provide strong, protective effects. Increasing carbohydrate intake can assist in the reduction of saturated fat, and many fruits and vegetables, rich in carbohydrates, are also rich in several antioxidants. Cereal foods rich in non-starch polysaccharides have been shown to be protective against coronary heart disease in a series of prospective studies. There is no evidence that sucrose plays a causal role in the aetiology of coronary heart disease.

The cornerstone of dietary advice aimed at reducing the risk of coronary heart disease is to increase the intake of carbohydrate-rich foods, especially cereals, vegetables and fruits rich in non-starch polysaccharide, while reducing the intake of fat. Among the overweight and obese, it is important to reduce total fat intake while encouraging the consumption of appropriate carbohydrate-containing foods. There has been concern that a substantial increase in carbohydrate-containing foods at the expense of fat might result in a decrease in high-density lipoprotein and an increase in very low-density lipoprotein and triglycerides in the blood. There is, however, no evidence that this occurs when the increase in carbohydrate results from increased consumption of vegetables, fruits and appropriately processed cereals, over prolonged periods.

#### **Sugar intake does not lead to micronutrient deficiencies**

Table sugar, i.e. sucrose, has been labelled a food or a nutrient consisting of only "empty calories". It is believed that, if used in substantial quantities, it might replace other nutrients in the food or diet. While it is, of course, true that refined sugar does not contain micronutrients, examination of data looking at nutrient intake data, for example, men of different ages in the

United States, consuming widely differing amounts of sugar (less than 26g, up to more than 60 g/1000 kcal/day), show that there is no risk of becoming mineral or vitamin deficient even when higher intakes are recorded. Only fibre intake was reduced slightly in high sugar diets. In fact, high sugar consumers are more likely to reach at least two-thirds of their recommended dietary allowance of essential vitamins and minerals than are low sugar consumers.

As to fat intake, the data showed a marked decrease in the higher intake group. The supposition that sugar automatically replaces foods rich in micronutrients, adversely altering micronutrient intake, therefore, is without foundation. Common sense would indicate this since there appears to be a limit to total daily sugar intake, and sugar intake has to be seen as an integral part of the whole diet.

#### **Sugar does not cause hyperactivity in children**

The notion that sugar adversely affects human behaviour has circulated since the 1920s. By mid-century sugar was associated with the condition called “tension fatigue syndrome”. Twenty-five years ago sugar consumption was related to a condition called “functional reactive hypoglycaemia”. The strong belief in the relationship between sugar and anti-social behaviour has resulted in studies to demonstrate a correlation between sugar intake in children and hyperactive behaviour. Double blind studies followed earlier less rigidly controlled ones, and a meta-analysis was undertaken including a look at the claim that sugar intake improves cognitive performance.

The experts of the consultation, however, after discussing this extensive review of the scientific literature on sugar and behaviour produced for the meeting, declared that there was no evidence to support the claim that refined sugar intake has any significant influence on either behaviour or cognitive performance in children.

#### **Sugar consumption can lead to dental caries**

Dental caries affect the hard tissues of the teeth. Bacteria-producing plaque (the accumulation of sugar and other carbohydrate foods in a dense mass on the teeth) are responsible for the formation of acids which demineralise the hard tissue of the teeth.

The expert consultation confirmed that the incidence of dental caries is influenced by a number of factors. Foods containing sugars or starches may be easily broken down by alpha-amylase and bacteria in the mouth and can produce acid, which increases the risk of caries. Foods with a high glycemic index produce more pronounced changes in plaque pH than low glycemic index carbohydrate foods. However, the impact of these carbohydrates on caries is dependent on the type of food, frequency of consumption, degree of oral hygiene performed, availability of fluoride, salivary function and genetic factors.

Regarding dental health, the most important observations emerging from the recent epidemiological studies and reviews is “that more and more populations are characterised by a decreasing caries prevalence in the young generations, mostly independent from intake of sugars and other carbohydrates”. All these findings call for a less biased and more rational approach to the relationship between sugar, carbohydrates and dental caries and clearly confirm that prevention programmes to control and eliminate dental caries should focus on fluoridation and adequate oral hygiene, rather than on sucrose intake alone.

#### **THE MYTH REMAINS**

The Joint FAO/WHO Expert Consultation brought to light strong evidence that a new and dispassionate voice is needed when speaking about sugar, its production, processing and consumption. Yet, it is difficult to translate the results of scientific endeavours into easily understood messages for the public. It is obvious that one expert consultation and continued scientific research, even with convincing results, will not immediately alter some people’s firmly held opinions about specific foods or the consequences of certain dietary intakes. For many, among both the public and some nutritionists, the myth

regarding the dire consequences of sugar remains and will need time before it can be corrected.

This has significance for policymakers dealing with production and trade of food items, for the food industry attempting to expand their offered products, and for nutritionists and health professionals setting national dietary goals, establishing dietary guidelines and preparing nutrition education and information programmes for the public. The interesting difference of projections of sugar demand when based on general economic models or on habit formation models is only one example of how an equation can change when the human factor is included.

General food habits often change slowly, although rapid changes can also take place due to external and internal forces in the family. In Norway, for example, in spite of a concerted nutrition education programme, it took twenty-seven years (nearly a generation) to reduce energy intake from animal fat from 29% to 23% (1961-1988). It also took fourteen years to reduce total fat intake from 41% in 1975 to 35% in 1988.

Therefore, in order to dispel the widely-held “sugar is deadly” myth and to allow sugar to be recognised as a valuable component of people’s diets, creative and sustained nutrition education campaigns will be needed. At the heart of the matter is the simple notion that sugar is an inexpensive source of energy that helps make a variety of foods taste better. This can be of particular significance, for example, in regard to child feeding where energy density and taste are of paramount concern. Sugar can play an important role in improving child-feeding practices, but often concerted nutrition education programmes will be needed to overcome outmoded or prejudiced views about its appropriateness. Developing such nutrition education programmes will be challenging as they cannot, both for nutritional reasons and cost effectiveness, focus on only one food item. In fact, for all people of all cultures, it is the whole diet that must be addressed.

In line with this, FAO has developed a simple set of nutritional guidelines that are intended to stimulate the development of local nutrition education initiatives. This FAO initiative, entitled “Get the Best from Your Food,” is based on the realisation that a variety of diets and dietary patterns are consistent with good health, and that there are no good or bad foods, *per se*, only good and bad diets and lifestyles. What this means is that there is no global, ideal diet or dietary pattern appropriate for all people, everywhere. It also means that the appropriateness of a given diet to meet one’s nutritional needs must be judged in light of a variety of individual requirements and local conditions.

The general messages promoted in the “Get the Best from Your Food” materials are: “Enjoy a variety of foods,” “Eat to meet your needs,” “Protect the quality and safety of your food,” and “Keep active and stay fit.” These simple messages can be the key building blocks for national nutrition education campaigns designed to meet local needs and conditions.

FAO has actively been promoting the development of collaborative nutrition education campaigns involving governments and private sector partners. In fact, various elements of the food industry have generously supported the translation, adaptation, printing and introduction of local versions of the “Get the Best from Your Food” materials. There is considerable scope for increasing such co-operative arrangements, and we call upon both the food industry and those in government responsible for nutrition education to

explore how they could best work together to develop appropriate education programmes for the public. Only in this way can new knowledge that will ultimately dispel the myth that sugar is deadly be disseminated consistently.

## CONCLUSION

In recent years, the science of sugars and their metabolic and physiological effects has become better understood. Similarly, much of the public has become better informed as to the positive effects that sugar can have in their diets, after years of unnecessary fear and suspicion.

Simply stated: eating sugar is not deadly. It does not cause obesity, diabetes, cardiovascular disease, hypoglycaemia, hyperactivity, cancer or lead to micronutrient deficiencies. On a positive note, sugar is a tasty, low-cost energy source that helps make a variety of foods more palatable and desirable. Given the wide-spread prevalence of undernutrition (chronic energy deficiency) throughout the world, the positive contribution that sugar can make to increasing energy intakes among the poor should be stressed. Concurrently, the role that sugar can play in combating obesity by lowering the energy density of high-fat diets should also be noted.

It is unrealistic to expect that the results of a scientific review of carbohydrates and sugar, even one undertaken and reported by a Joint FAO/WHO Expert Consultation, can do much on its own to change the public's misconceptions about sugar and health. To the contrary, correcting the years of misguided dietary advice will require concerted and consistent efforts in nutrition education. To be most effective, co-operative efforts among producers, food industry technologists, nutritionists, and health professionals will be needed.

The ultimate aim of nutrition education programmes is to promote adequate access to and consumption by all people of the food they need for an active and healthy life. Obviously, sugar can make a valuable contribution to meeting the energy needs of the population. However, it is also important to recognise that in many countries the sugar industry, itself, can make a valuable contribution to improved nutrition. This happens through the sugar industry's impact on economic development and income generation which are necessary to alleviate poverty and provide the social services needed to promote better nutrition for all.

In general, moderate levels of sugar intake are fully consistent with healthful dietary intakes. Efforts to limit sugar to low levels of intake (<10% energy) are, generally, unnecessary and wasteful of time and energy and, ultimately, consumer goodwill.

## PART II – POLICY ISSUES

### THE IMPORTANCE OF SPECIAL TRADING ARRANGEMENTS IN THE PROMOTION OF GROWTH AND STABILITY IN DEVELOPING COUNTRIES

*Address of Dr the Hon. Arvid Boolell, ACP Ministerial Spokesman on Sugar and Minister of Agriculture, Fisheries and Cooperatives*

Excellencies,  
Ladies and Gentlemen,

It is indeed a great pleasure for me to have this opportunity to address this conference on an issue which is so vital not only for my country but also for a significant number of ACP countries signatory to the ACP Sugar Protocol.

Allow me, however, before proceeding further to express my sincere thanks to the Government and People of Fiji for their warm welcome and the excellent facilities put at our disposal to conduct deliberations. My thanks also go to the FAO who has agreed to co-sponsor this

important reflection on the importance of sugar in the World economy.

Before I focus on the ACP-EU Sugar Protocol, I shall like to preface my presentation on the complexities of the emerging international environment that is shaping the new global trading system. We are by now all too familiar with the two concurrent processes that have taken place since the late eighties and which have provoked a complete paradigm-shift in our appreciation of the new international order.

The first one is, of course, a political phenomenon. I am referring here to the decline of Communism, the end of the East/West rivalry, the end of the Cold War and henceforth the declining importance of geostrategic considerations as the prime determinant of foreign policy. The histrionics of this process are of no concern to us here but for the corollary benefits we were made to believe would result therefrom. More particularly, this revolution was supposed to usher in an era of greater international security in terms of stalling the arms struggle and yielding a peace dividend whereby liberated resources would go towards development efforts. Likewise, the retreat of the ideological differences led to the convergence of political values in regard to respect for human rights, democracy, good governance and the rule of law. Almost all of us acquiesce to the virtues of such a vision and have repeated our attachment to such principles. But when we proclaim the need to sustain such a vision for the whole world but note simultaneously strong contradictory undercurrents in the world economy that work against such a vision, we have cause for concern on the coherence of such a discourse. We shall come later on to the importance of special trading arrangements and more particularly the Sugar Protocol in enhancing such principles and objectives.

The second process relates to globalisation and liberalisation which has been raised to the status of a new religion which holds the promise of salvation.

It is undeniable that liberalisation of trade and capital, technological innovations, the internationalisation of production along with the unprecedented revolution in information and communications technology have led to a more rapid integration of the economies of the developed world. Unfortunately, developing countries are faced with serious risks of marginalisation and social disruption. The WTO itself has acknowledged this dimension and the Singapore Ministerial Declaration has indeed adopted provisions to address this issue (and we are awaiting the implementation thereof). Likewise the conclusion of the Uruguay Round of Multilateral Trade Negotiations and the advent of the WTO on the world scene are engineering a new global economic system that is driven more by economic than political and socio-cultural considerations.

It would be pointless not to realise and take cognizance of such fundamental changes in the international economic system. It would also be pointless to deny the need for a rule-based trading order where unilateral and discriminatory actions could not hold sway. However, may I point out that rules are established by Governments and can, if they generate poverty and frustration, be modified by Governments. But this is only where agreement ends. When one tries to erect globalisation and liberalisation as universal absolutes independent of field realities at the level of countries and economies, we feel that such an approach is pregnant with intractable dangers that could compromise equity and fairness in the field of economic development.

Thus it is argued in some quarters that the forces of globalisation and liberalisation would create new opportunities which would benefit the entire human community in developed and developing countries alike. But the problems facing developing countries are so immense that, I am afraid, one can only view the so-called long-term universal gains as a "mirage".

The international community must therefore appreciate that a uniform approach cannot be in the interest of one and all. Timely words of caution were echoed in the recent declaration of the Director-General of UNCTAD in the recent plenary of the ECOSOC meeting in Geneva when he argued that the world economy was polarising rather than converging, that the resulting inequality could trigger a backlash, thus jeopardising the benefits of recent economic reforms and further marginalising the poor.

It is therefore, important to acknowledge, as I have emphasised time and again in my addresses to different audiences, that unbridled trade liberalization and the absolute reign of free market precepts are not a panacea to the problems of underdevelopment nor a solution to the disjunctures of the global trading system but would result in serious disruptions of the socio-economic fabric of our societies. Even more so, if one agrees that international security is contingent upon economic security, it is crucial to stall the disturbing trend towards the marginalisation of a large fraction of humanity.

It is crystal clear, therefore, that a novel approach is needed that takes account of the fact that there is no level playing field and that an indiscriminate application of global trading rules will be counter-productive. We, therefore, argue for a more realistic approach that will avoid the perversion for free trade absolutism. In this regard any examination of preferential trade accords should take into account the following elements:

- (a) the fragility and vulnerability of small economies, particularly of small island states and landlocked countries;
- (b) the development status of developing economies;
- (c) the historical facts regarding the genesis of commodity and sometimes single-commodity dependent countries;
- (d) the fact that numerous attempts to cultivate crops other than sugarcane on a commercial basis have failed and thus prevented effective agricultural diversification;
- (e) the exigencies of local markets and the constraints of distance that increase freight costs; and
- (f) the technological gap that has been sustained over time by an unfair international division of labour.

In such circumstances our request for special and differential treatment in the form of preferential trade accords vital for sustaining growth and stability in or countries is justified and warranted.

It is not my intention here to make a detailed plea for all special trading arrangements nor it is within my competence to attempt such a discourse. I shall therefore leave my call on that score to the general philosophical principles I have elaborated above. Instead, I shall now draw your attention to one such special arrangement which is of special importance to my county and to other ACP States, namely the ACP-EU Sugar Protocol which is of indefinite duration i.e. of a permanent nature.

Ladies and Gentlemen,

Let me now turn more specifically to the ACP-EU Sugar Protocol. The Sugar Protocol has been hailed as a unique instrument that combines developmental and commercial concerns between countries of the North, the EU on one side and the ACP countries signatory to the Protocol on the other. The Sugar Protocol was negotiated in distinct historical circumstances.

First, the accession of Great Britain to the European Economic Community included the need to devise a mechanism to take on board the interests of the developing countries of the Commonwealth sugar exporters. The Commonwealth states that were parties to the Commonwealth Sugar Agreement had guarantee of access to the UK market to supply the UK raw cane sugar refineries that on their part needed stable supplies. The Protocol also encompassed other ACP States which were not colonies of the UK and were supplying sugar to France.

Second, at the time of negotiating the Sugar Protocol, the prices of sugar had shot up to reach around 425 a tonne. When we were signing the Protocol, the world price had increased to some 625 a tonne. The Community and Commonwealth prices were much below that level and the prices negotiated on an annual basis were also below that level.

Indeed, the sugar market is of a highly speculative nature. It should be recalled that the world sugar market is a residual one. Only 20 percent of production is open to world market transactions and subject to very frequent fluctuations. Indeed numerous studies have demonstrated that sugar is by far the most volatile commodity.

Nonetheless, despite a favourable international conjecture the ACP states decided to take definite commitments to supply agreed quantities, more precisely 1.3 million tonnes. The Community convened to import from us those quantities at guaranteed prices but more importantly for an indefinite period. This guarantee of duration is vital to our countries which as I have explained earlier suffered from the hardship brought about by "free" trade. The ACP States agreed to forego lucrative export earnings because they thought of the long term perspective and the need for stability of earnings so important for the sustained and meaningful development of their economies.

It was in these circumstances that we signed in 1975 the Sugar Protocol which provided for a triple guarantee to ACP supplying states:

- Guarantee of access
- Guarantee of price
- Guarantee of an indefinite duration

It is imperative to note that the implementation of the Protocol has worked to the advantage of both parties and that there is no internal criticism against the Protocol as a mutually beneficial instrument. The Signatory ACP States have honoured their obligations at all times and even when there were shortfalls in supply from one country, the Protocol allows for complementing these shortfalls from the other supplying states. The Protocol has, therefore, never proved to be dysfunctional and has stood the test time.

Ladies and Gentlemen,

As you are aware, over the last ten years the EU has adopted in respect of sugar a restrictive price policy. You will appreciate that in our case the real take-home prices are further eroded by international inflation. According to the OECD, the index of producer prices for manufactured goods has increased by some 28.9 percent over the 1986-1994 period.

It must be borne in mind that the ACP Sugar Supplying States are not producers of chemical inputs; of fertilizers and pesticides; nor of agricultural and factory equipment and implements. These have to be imported. In comparison, many other sugar producing countries even in the developing

world are more or less self-sufficient in terms of such inputs and equipment. In addition, the size and scale of their industry enable them, whenever they effect a procurement exercise, to benefit from discounts associated with bulk purchases.

Compounded to the erosion of the real prices the ACP are burdened by every increasing ocean and inland freight costs which on an average represent 15 percent of the negotiated price.

When we are experiencing such problems, we are indeed concerned to note the pressures that seek to question the validity of such trading arrangements. No doubt this approach ignores historical circumstances that led to their genesis, the undeniable functionality of these arrangements and their vital importance for the sustainable development of their stakeholders. Allow me here to briefly comment on the difference between our case and that of some of the adepts of free trade dogmatism. Our countries are fragile economies relying heavily on sugar cane which in addition is best suited to our conditions. In others:

- (a) vast expanses of land exist where they can develop their cane industry and optimise economies of scale;
- (b) sugar is but one of the agricultural commodities produced and traded and is by no means the most important one; and
- (c) mineral resources, gas/oil are to be found.

Our countries are not endowed with such natural advantages; instead they have their own specificities which must be taken into account when any comparison is made.

It is vital for me to indicate the importance of the Sugar Protocol in the development and survival of the ACP Sugar Supplying States. For it is precisely of survival that we are talking here when we realise the stock of human suffering, the regression in development efforts and the social and political chaos that the absence of special arrangements like the Sugar Protocol may entail.

In the case of ACP countries, the Sugar Protocol has been distinctly instrumental to socio-economic development and has in no small measure not only contributed to social harmony but upheld the principles of democracy, good governance and the rule of law. The contribution of the sugar industry to the social dimension cannot be understated. In the first instance, it has through revenue derived by Government enabled the establishment of strengthening of the system of social benefits. It has also ensured that funds, though not to the required level, were available for the essential investments in education and health. In developing countries, social benefits are by no means a privilege but mainly a source of income to the vulnerable so as to enable them to break the shackles of dire private. Secondly, the sugar companies also participate in the social fields, through the provision of fringe benefits to the workers and the active amenities including housing estates and even in certain countries the establishment of educational institutions.

The vital role of the sugar industry in ACP Sugar Supplying States is evidence by its contribution to nation building and development. The following relevant data underpins the prime role of the industry in ACP economies:

- (i) **Employment:** About 250 000 people are directly employed in ACP sugar industries. For example, 35 percent of the active population in Swaziland, 23 percent in Mauritius and over 12 percent in Fiji. The indirect employment which results from the industries backward and forward linkages and which are spread throughout these countries, is considerable;
- (ii) **Export Earnings:** Earnings from sugar account for a major proportion of total agricultural exports in many ACP countries (for example 95 percent in the case of Barbados; 79 percent for Fiji and 74 percent for Swaziland);

- (iii) **Contribution to Gross Domestic Product:** Sugar revenue is a vital contributor to ACP economies. In St Kitts it represents 60 percent, in Guyana 30 percent and in Swaziland 23 percent.
- (iv) **Social Impact:** The ACP industries play an important role in the provision of education and health services. In addition, housing and essential training in engineering and agricultural skills are also provided to the rural population employed by the industry. In most ACP countries the sugar industry had helped fix the rural population in a productive activity and prevented mass migration to the cities.

The above facts unambiguously show the link between the Protocol and development efforts as well as its importance in fostering the values of good international citizenship. While making our case, we, however, would like to dispel immediately any doubts that the ACP Sugar Supplying States want to bask in the comfortable complacency of immobilism and conservatism. We are the first to recognise that we would be doing a disservice to ourselves if that would be the case.

All of us have embarked on modernisation programmes which would enable:

- (i) cost reduction;
- (ii) the installation of modern, more efficient and larger-sized equipment which are geared towards energy saving and energy generation;
- (iii) the enhancement of the environment friendliness of the cane plant and of the sugar industry;
- (iv) the improvement of health and safety conditions through the installation or use of "worker friendly" equipment.

You would note our concern regarding the social and environmental aspects. In our factory modernisation programme the emphasis is on the optimal use of bagasse of energy generation so as to avoid the use of fossil fuels and more importantly to avoid the emission of greenhouse gases. In 2001, in Mauritius, use of bagasse will reduce coal imports by 250 000 tonnes and imply the avoidance of emission of some 675 000 tonnes of carbon dioxide. In this regard, I would like to refer you to the very first preambular paragraph of the Marrakech Agreement establishing the WTO:

*"Recognizing that their relations in the field of trade and economic endeavour should be conducted with a view to raising standards of living, ensuring full employment and a large and steadily going volume of real income and effective demand, and expanding the production of and trade in goods and services, while allowing for the optimal use of the world's resources in accordance with the objective of sustainable development, seeking both to protect and preserve the environment and to enhance the means for doing so in a manner consistent with their respective needs and concerns at different levels of economic development,"*

The aim of the WTO is to improve the well being of people and not to pursue economic objectives for their own sake. This concern for standard of living and the environment is at the centre of our development strategy for the sugar industry. The fulfilment of such a strategy rests on the guarantee of stable levels of export earnings which only our preferential trade accords in sugar provide.

The emphasis on stable and sustained export earnings is precisely related to the efforts we have already undertaken to modernise our industries, to improve efficiency and

competitiveness on the one hand and to enable genuine diversification to the extent possible on the other. The maintenance of such special arrangements will provide the necessary resources to enhance our global competitiveness and ensure our smooth integration in the world economy. Our economies are in a transitional stage that will need a longer lead time to enable them to compete on the level playing field. Many of our economies are presently under the grips of painful structural adjustment programmes while yet others are in the process of undertaking radical political and constitutional reforms to restructure their political systems. It would not be in the interests of the international community to compromise such efforts and jeopardise the results obtained so far.

In conclusion, therefore, I should stress that the ACP-EU Sugar Protocol should be understood in the context of the historical and economic realities which justified its existence more than twenty years ago. From the sixteenth century to the nineteenth century, millions of slaves and indentured labourers were brought from Africa, India and China to turn rock into white gold sugar. In some countries cotton was grown, in ours sugar best adapted to our ecosystem was developed.

Let us not forget the misery we endured in the 19<sup>th</sup> century when trade was made "free." Small countries best by frequent cyclones and burdened by freight had to compete with giants with huge internal markets. Let alone education and social amenities, we were not even able to cope with regular epidemics which decimated our population by thousands. This is our experience of free trade, it meant for us the bondage of poverty and misery. Similarly, we bore the full brunt of the depression of the thirties. Light came at the end of the tunnel in 1951 when the Commonwealth Sugar Agreement was concluded. We should avoid the facile view that looks at this preferential trading arrangement from the narrow lenses of newly coined and superimposed concepts.

I thank you for your attention.

### THE WORLD SUGAR MARKET AND REFORM

*Prepared by Mr A.C. Hannah, Chief Economist, ISO for the for the Sugar and Beverages Group, Commodities and Trade Division.  
Tables and charts have been left out due to space limitation.*

#### INTRODUCTION - THE MARKETS

While it is commonly perceived that the current world sugar market is more stable than it was the extent to which it has changed is not always appreciated. *Chart 1* shows the world raw sugar price from 1970 to 1996. It is clear that from 1988 the annual variation has been much less than the previous two decades, although the averages are rather similar: 11.22 cents/lb. for 1988 - 1996; 10.45 cents/lb. from 1979 to 1986; and 11.37 cents from 1970 to 1978. But if we look at deviations from the mean, the turnaround is even more dramatic. *Chart 2* shows deviations from the mean; expressed in percentages of the average, from 1922 to 1996. The percentage deviation from the mean from 1988 to 1996 was only 13.1 percent. Contrast this with 1979-86 at 52.3 percent, 1970-78 at 53.7 percent and 1961-69 at 47.8 percent. The deviations are less in the latest decade by a factor of 4. You have to go back 40 years to the immediate post-war period, 1952-1960, when there were two effective back-to-back ISAs (1953 and 1958) to find a comparable period of stability (13.2 percent) but it was also a special case - from the depression up to the war raw sugar prices were uniformly depressed, averaging just 1 cent/lb. from 1931 to 1939. But the decade 1922-30 also exhibited the "traditional" high variation at 29 percent. So, except for two decades of special circumstances - effective ISAs and depressed prices - sugar prices were, up to 1987, exceptionally volatile since 1922.

What has happened to change the characteristics of the sugar price formation process so dramatically? The answer lies in the change in the average price elasticity facing the market. In the 1970s and up to

the early 1980s the import market was dominated by developed countries - largely US, Japan and Canada - which characteristically have very low or even zero price elasticities - that is, a change in the price does not produce a concomitant change in imports or consumption. In practical terms, when prices rose sharply in 1974 and 1980 these countries did not reduce the level of their imports, providing further impetus to the price rises and explaining why prices reached such unprecedented levels in those years. Why this lack of reaction? First and foremost, they are high income countries and sugar consumption represents only a tiny proportion of disposable income. Secondly, in both US and Japan 85 percent of sugar is used in products (dominated at that time by soft drinks) and the corporate buyers were more concerned about preserving market share for their products than they were about the price they paid for the raw material. In the 1970s the high income developed countries accounted for more than two thirds of the import market (*Chart 3*). By 1996 this situation had become almost reversed: the relative share of developing countries was almost 60 percent of the market (*Chart 3*).

Two reasons can be cited for this reversal: 1) The exceptionally high prices of 1974/75 led to the development of the HFCS industry in the US and to a lesser extent, Japan. This process was reinforced by the 1980 sugar price boom. US and Japan sugar consumption and imports were displaced by the growth in HFCS consumption. US net imports fell from 5 million tonnes in 1974 to 3 million tonnes in 1980 and to only 690 thousand tonnes in 1987. Japanese imports fell from 3.34 million tonnes in 1974 to 1.78 million tonnes by 1987. In absolute terms developed country imports fell from 14.229 million tonnes in 1974 to 12.788 million tonnes in 1980 and to 9.577 million tonnes in 1987. 2) At the same time developing country imports grew, triggered by the first oil price shock in 1973 and led by oil exporting sugar importing countries. The second oil price shock of 1980 reinforced this trend, and after 1981 sugar prices fell and developed country imports also fell so that the proportion of the market taken up by developing countries continued to grow (*Chart 3*).

The consequence of this gradual but inexorable change in the structure of the import market was that by the late 1980s the market was dominated by developing countries with, on average, higher price elasticities. Consequently, when prices rose, less was purchased, and vice versa, so that prices became, as we have seen, much more stable; in the average range of 9 to 13 cents/lb.

It might be wondered why I place so much importance on the achievement of reasonable price stability by the sugar market. The reason is simple: the massive price instability so characteristic of the sugar market in the past made rational planning in the industry impossible and further contributed to instability. Sugar is a special agricultural product. It is highly capital intensive because it requires mills and factories for final processing. The capital intensity means that long-term planning is essential. This situation is exacerbated because sugar cane (accounting currently for 70 percent of world sugar production) is a multi-year crop, typically 5 to 7 years. It is therefore extremely difficult to match production with price conditions and there is an in-built tendency to overproduce, driving prices downwards in surplus years.

Therefore the attainment of stability, from 1988, has been a very important and historic development, making forward planning and coordination of supply and demand much easier,

and contributing further to stability. This new found stability should not be compromised in any way.

There is another cogent reason why the new found stability of the sugar market should be maintained. Since the price booms of 1974 and 1980 sugar has had to live with a direct competitor - HFCS. And, HFCS substitutes for sugar directly in its most dynamic use sector, soft drinks. In the US, where HFCS has developed most, the cost of production of HFCS is currently estimated at between 8 and 12 cents/lb., depending on the age of the capital stock. So the present "cap" on world sugar prices at around 15 cents/lb. is vitally important. If prices were sustained above 15 cents/lb. for a long period, the scale of investment seen in HFCS after 1974 and 1980 would be in danger of being repeated, on a world scale, leading to a shrinking of the market for sugar at the same time as sugar production increased in response to the higher prices; leading inevitably to very low prices and a return to the historical instability sugar suffered before the established itself in 1988.

#### REFORM - ITS EFFECTS AND ITS LIMITS

When the Uruguay Round began in 1987 some arguments were made to show that the sugar sector, in particular, was in need of reform. I will discuss three of them.

- a) **The sugar sector is distorted by protection, causing price instability and leading to dumping.** According to this argument, the removal of protection would induce stability into the sugar market. It is universally agreed that the Uruguay Round did practically nothing to change the sugar market. Although tariffication was achieved, the initial levels were set too high to achieve any meaningful reduction in protection. Yet, as I have argued in the first section of this article, the market has become radically more stable since 1988, irrespective of the GATT process. Furthermore, the process of stabilization was greatly aided by protectionism!

The imposition of import quotas by the US in 1981 was pure protectionism, making sure that the adjustment required by the rise of HFCS consumption and the fall in sugar consumption fell entirely on imports and not on domestic production. But, as we have seen, the decline in US imports was important in the attainment of the "new" stability seen since 1988. This is not an argument in favour of protection. It would have been much better for sugar had the 1974 and 1980 price booms not occurred, HFCS consumption not grown and US import quotas not been deemed necessary. But I am suggesting that arguments for reform should be well based and logical, taking into account the facts of the evolution of, and the complexity of, the sugar market.

- b) **Since the world sugar market is a dumping market, the removal of protection would significantly raise prices.** Price rises of 15 to 20 percent were promised by academic studies supporting the reform process. These studies betrayed an ignorance of the mechanics of the world sugar economy. Significant price rises would have two effects: (i) production and exports would rise (ii) investment in HFCS would be encouraged. The result, after 2 or 3 years, would be a shrinking market, oversupply, and prices lower than before the reform process started.
- c) **The consumer pays for protection and does not like it.** The first point is undoubtedly true in the US, EU and Japan. But for the final consumer of sugar, consumption is such a tiny part of disposable income that he or she is completely indifferent. It is the user, the big corporate buyers, that do not like it. And the public is cynical enough to know that they will not see 1 cent off a Mars bar or a can of coke if the users get their raw material at a lower price. The public is just not exercised about the cost of protection for sugar, which takes a lot of force out of the argument.

As mentioned before, it is universally agreed that the Uruguay Round did nothing to change the situation for sugar. I believe that this is a rather harsh judgement. It is true that the US avoided reform through a semantic trick (operating the quota system through very high and very low tariffs) and that Japan set very high initial tariffs, but it seems to me that the replacement of the variable levy of the EU by a reducible tariff was an immense breakthrough for the long term future. Over a **suitably lengthy** period of time it could lead to the removal of the EU from the export market.

The second round of GATT/WTO will begin in 1999 and it is said that sugar, having achieved little in the first round, will be targeted. This worries me greatly, since when politics and dogma take over a complex and delicate market, its stability can be compromised. We are all aware of the cautionary tale of BSE in the UK.

In the early 1980s politicians in the UK decided that regulations governing animal feeds were unnecessary and swept them away. Unscrupulous feed manufacturers introduced diseased animals into the food chain and the result was an upsurge of mad cow disease. Now the UK beef industry is in chaos. I don't of course suggest an exact parallel in the case of sugar, only that the consequences of reform should be studied and thought carefully about and nothing done to upset the balance of the market. Completely free markets sometimes have perverse consequences.

There are good arguments for maintaining **diversity of supply** for the world sugar market. A market which moves in the direction of being supplied mainly by three or four exporters is in danger of becoming too dependent. Sugar is particularly vulnerable to weather conditions - hurricanes and drought and now El Niño - and if a major supplier is affected and other suppliers have been suppressed by reform, there is the possibility that prices will be forced up into the danger zone above 15 cents/lb. where further substitution by HFCS could occur. Inevitably, a broad spectrum of suppliers will have a wide range of costs of production and some will be more dependent on preferential markets, like the ACP countries which also have legitimate socio-economic factors to take into consideration. But that is the market mechanism we have inherited, and it works, and it would be foolish to sacrifice stability to the good of low cost of production.

Currently, as well, there is room for all in the market. From 1982 until 1994 the market stagnated, averaging around 24 million tonnes. Then in 1995 the market rose by 4 million tonnes (17 percent) to 28 million tonnes. Preliminary figures for 1996 show that this improvement has been maintained. The growth has occurred largely through declines in production in some Asian countries, notably Indonesia and Philippines, and their situation is unlikely to improve dramatically in the next few years, so that there is every likelihood that a market of 28 million tonnes will be maintained. While remembering to thank India for not exporting its surplus,<sup>1</sup> exporters should

<sup>1</sup> Exporter critics of market regulation should note that India operated a de facto buffer stocks scheme after their massive 1995/96 surplus. The fact the surplus was essentially locked up in India meant that world prices did not fall below 10 cents/lb. (9 cents/lb. in real, 1990 terms) in spite of a world surplus in 1995/96 in excess of 5 mln tonnes. It may be noted that this is the third time in the last decade that exporters have had occasion to be grateful to the Indian sugar cycle. In the period 1984-87 India imported at total 4.165 million tonnes of sugar, not only absorbing a large part of the surplus stocks of the time but also helping to raise the world price from the average of 4.06 cents/lb. in 1985 to 10.20 cents/lb. in 1988. And, again, in 1994, after a world surplus production year, India imported 2.65 million tonnes at a time when the



note that the current market is adequately but not over supplied, and that prices are reasonable for efficient producers. A stable market is a well supplied market. World net exports from 1982 to 1996 are shown in Chart 4.

There is another area that should not be neglected in the next WTO Round - the interests of developing importing countries. Sugar, because it has an industrial as well as an agricultural aspect, is a very useful engine of development, and sugar industries have been developed in many developing countries precisely to aid in development. In most cases these industries have a higher cost of production than the efficient exporters, and use border protection to allow their industries to survive in the face of cheaper imports. In many cases these countries have, under the current WTO Agreement, reduced the tariff on sugar to the minimum required to protect their industries. An example in Egypt. Egypt, has a well developed sugar industry producing about 1.1 million tonnes of sugar, mostly cane. The rest of its consumption requirements, around 750-800,000 tonnes are imported. Egypt has entered at Marrakech a bound tariff rate of 20 percent *ad valorem*, the absolute minimum required to protect the domestic industry. Any reduction would jeopardise the future of the domestic industry. The question has to be asked, do Egyptian farmers have to be bankrupted in order to make Australian, Brazilian and Thai farmers richer? Arguments for reform based purely on efficiency and consumer welfare suggest they do. But surely governments have a sovereign and a legitimate right to protect an industry that has an important role in their development and, if that industry fails, for which they would have to bear the social costs. Table 1 shows that many developing importing countries have substantial sugar industries, and in some cases policies aiming at self-sufficiency in order to save on valuable foreign exchange. In 1995, developing importing countries produced 19 million tonnes of sugar (16.2 percent of world production). If a substantial part of this production was put at risk by radical reform the efficient exporters would not be able to respond quickly with higher production, world prices would rise substantially and the world sugar market would be in the danger zone for HFCS substitution.<sup>2</sup>

There is another, overlapping, area where radical reform could have counterproductive consequences. According to Landell Mills, the average world cost of production for beet is 70 percent higher than for cane (Chart 5). If these figures are accurate, and they come from an authoritative source, little or no beet production could survive without protection. In 1995 world beet production was 35.9 million tonnes, 30.7 percent of total world production. Again, and obviously, it would be beyond the limits of exporters to replace this quantity of production.

**So the question becomes, not that protection could or should be removed, but by how much and how fast, without damaging the structure of the world sugar economy.**

#### CONCLUSION

To sum up the arguments of the previous section:

1) Protection is an integral part of the world sugar economy affecting a substantial part of world sugar production:

beet production	30.9	
preferential exports	2.275	
cane production in importers		15.675
	-----	
	48.85	
share of world production	41.75%	

market was shrinking from the effects of the break up of the Soviet Union, helping significantly in maintaining an average price in excess of 12 cents/lb.

<sup>2</sup> Realistically, there are limits to further expansion in the "efficient" exporters (Australia, Brazil, Thailand). Without a major investment programme, the limit for the 3 countries taken together is around 5 million tonnes, and this would take some years to come on stream. During this period sugar would be in short supply and prices high, and HFCS substitution would occur.

(million tonnes raw value - 1995)

- 2) Further expansion in efficient exporters is limited, perhaps to 5 million tonnes.
- 3) Developing importing countries have sugar industries which contribute to development, but which require protection. If social costs are taken into account, these countries have good arguments to preserve and even expand their industries.
- 4) The level and pace of reform should take account of the above 3 qualifications.

The impression may have been given that I am against reform. Far from it; I support the reform process as long as it does not prejudice the "new" stability of the market and so long as all costs, including social costs, are taken into account. The world sugar economy is very delicately balanced, and it would be counterproductive to make reforms which in the medium term diminish the size of the market for sugar and depress prices.

My suggestion is that the breakthrough of the tariffication of the first round is built upon in further phased reductions, where feasible and justified, leaving adequate time for adjustments by the producing countries whose protection will be reduced and adequate time for suppliers to take compensating steps to fill the gap. The limits for expansion in exporting countries should be examined and this would represent a guide to the overall limit on the timing and end result of the reform.

#### A TRADE VIEW OF THE FUTURE OF SUGAR IN THE REGION

*Prepared by Mr Geoff Mitchell, Tate & Lyle Bundaberg Ltd  
Australia for the Sugar and Beverages Group, Commodities  
and Trade Division.*

Mr Chairman, Delegates

Before addressing my topic today, I must firstly seek your indulgence in a matter of definition. I have been asked to give a "trade" view but I make no claim to be a trader in the usual sense of the word.

This has been particularly so since I once heard a "trader" defined as someone who would sell you out in just one heartbeat. I am sure that was quite unfair but anyway, in other respects at least, I am not qualified to present a trade house view.

Rather my experience has been in the operational management of cane growing, milling, refining and distilling enterprises. This has been extended to include some direct knowledge of the global sweetener business as a result of being part of the Tate & Lyle Group. I have also been fortunate to have held Board positions in Australia with responsibilities in the areas of sugar industry marketing, regulation and organisation.

Thus by definition I guess I could be described as a sugar businessman and the "Trade View" I have is from that business perspective.

What then is the future for the business of sugar in this Asia Pacific region?

Business and trade is about creating productive wealth and the potential for growth must feature largely in that. From that

perspective then I can turn the question around into the statement that even global sugar's future is, in fact, this Asia Pacific region.

Clearly that observation derives from demographics. Asia has the people and the population growth. It also, in general, is building from a low per capita sugar consumption base as its economies develop. Together these factors add up to demand potential in the region - and a demand potential that is unique in a global sense.

This would seem to be an attractive scenario for those in the sugar business in Asia Pacific. At the very least it is a scenario which should be conducive to investment, development and expansion.

And indeed there is recent evidence of this. The two large regional producer/exporters Australia and Thailand have shown remarkable growth. Both have been increasing production and exports at rates of the order of five percent per annum.

But this situation is not characteristic of other sugar producing countries in Asia Pacific. For the most part production is either static or declining. We can observe this in the semi circle around the Pacific from Hawaii through Japan, China, Taiwan Province of China, Philippines, Malaysia, New Guinea and ultimately to this conference venue of Fiji. Even in that cradle of the cane sugar industry, Indonesia, production has been under pressure although it should increase with new investment outside Java.

There is a conundrum here. The expanders, Thailand and Australia, are also the industries most exposed to low world market prices. The other regional producers are static despite receiving income from a complex mix of domestic and international support mechanisms.

This is also the business conundrum in seeking to form a view of the future of sugar in this region .

Is there a factor "X" in sugar which can make it distinctively a different business?

By any trade definition sugar, raw or white, is clearly a commodity. But it is a commodity which has quite dramatically different values in different markets.

In the international free market which functions as a residual market a tonne of sugar commands about US\$ 300. It has a similar value in Australia.

But in the USA and throughout much of Asia Pacific it has a value around US\$ 500. In Europe the price is incongruously higher again at US\$ 700 and in Japan up yet another order of magnitude to US\$ 1000.

The factor "X" in the sugar business is agricultural politics. Further there are arguments which I will canvas later, why the commodity sugar is the most susceptible to government intervention and has the greatest immunity to reform.

Given that sugar remains the most political of all agricultural commodities, intervention factors outside supply, demand and cost can dictate a future which defies normal business analysis. However I will try to develop a trade view by considering these factors in turn and as they inter-relate.

Firstly, supply. Statistical data and low market prices in recent years have demonstrated that overall there has been adequate supply. This is due to increased production from Brazil, Thailand and Australia more than offsetting reduced output from Cuba. Production on the subcontinent India has also been high and increasing.

Secondly, demand - measured as consumption. In the past 30 years world consumption of sugar has doubled to reach about 120 million tonnes. Annual growth rates during the past two decades have slowed a little to the order of 1.5 to 2.0 percent. When compounded this still amounts to a lot of sugar - equivalent to Australia's total exports every two years.

But actual trade in sugar has not grown to anywhere near the same extent. Since 1980 the volume traded annually has remained relatively static at about 30 million tonnes.

Thus we have yet another business conundrum - growth in demand, low world prices and yet most of that new demand satisfied by domestic production.

However there is some evidence of the impact of real market forces. What has changed is that

- there is now a concentration of exports in the hands of the efficient exporters
- "free" market trade has increased from about 40% to 90% of exports

The question is will this be the end of the matter? Will increased demand continue to be met by more expensive domestic production while efficient exporters compete for a static world trade volume?

In seeking an answer to that question, I have looked for evidence of change in the pattern of world trade

- There is clear evidence of domestic market deregulation in many countries. Since 1980 some 25 nations of all economic persuasions and size, ranging from Singapore through the Russian Federation to Brazil have set out to systematically reduce or eliminate domestic sugar price support.
- There is also a growth in customs unions such as NAFTA, MERCOSUR and ASEAN. This will eventually promote freer trade and competition; at least within the union of countries which otherwise have not yet deregulated their sugar regimes.
- Further there is the important fact that the growth in sugar consumption is in manufactured food - often linked to global food companies. Such organisations are becoming increasingly interested in sourcing product at real world as opposed to domestic regulated prices.

Thus we have a clear pattern of "deregulation" of production support in various forms and a strengthening of global purchasing knowledge on the consumption side.

To form a trade or business view of whether these factors will overcome that factor "X" -agricultural politics - and lead to a liberalisation and growth of sugar trade I need to analyse the reason why sugar is so political.

In my view sugar is the most political of all agricultural commodities, not directly as a result of international politics in the sense that oil is political, but due to a concentration effect in local politics.

What happens in economic terms when someone builds a sugar mill is that all land holders within a short radius obtain - usually at no cost - one more option for use of that land. As the

factory expands more and more of the local land is attracted to cane. The cane growers band together to negotiate with the mill. It is then a good negotiating tactic to accuse the mill of having monopoly power and demand of the local politician that there be regulation.

The local organisation of cane growers become a relatively large and effective lobby organisation in the small local area politics. It can influence (even direct) the local politician. Grower organisations then link at state and national level. The end effect is that a relatively small percentage of the population can have a disproportionate political power through high concentration in specific areas.

This pattern is evident in all sugar producing areas regardless of political persuasions. It derives from the fact that a mill and its cane supply are inextricably linked. The local concentration leads to national cane grower political power and the outcome is predictable - agricultural politics dictating international trade.

In the face of all this, does the pattern of change suggest a new future for the sugar trade in the Asia Pacific region?

I think it does. I suspect that while sugar politics will remain real everywhere, and even dominant in some countries, its influence will decline.

The fact is that it has already happened in many countries. Further, price support schemes are under real pressure even in those countries which can afford them e.g. EU, USA and Japan.

But the real factor which will open up trade will be the third factor in that supply/demand/cost trinity - cost.

Cost of production data is notoriously difficult to obtain and interpret. The Oxford based LMC International has undertaken a number of cost competitiveness studies and published trend data.

That data suggests that Australia, Thailand, Brazil, India and a group of Southern African units are the low cost sugar producers. All are continuing to improve their competitiveness *vis à vis* the rest of the world - albeit at a slowing rate of improvement.

It is important to note here in the Asia Pacific context that it is not overall industry size alone that dictates cost competitiveness. LMC has identified some small southern African nations as low cost producers. I can independently confirm that from other data.

What seems to be most important in the long run is the business framework in which the individual sugar producing enterprise is allowed to operate. Apart from the obvious natural advantages / constraints of geography, cost competitiveness of a sugar business seems to be most determined by its independence from what could be described as imposed social constraints.

There is ample statistical evidence that the "Real" world sugar price, in common with other agricultural commodities, has been trending down throughout the twentieth century. People like me who are in the business hope that trend will reverse. However we also know only too well that those who don't pay attention to history lessons get to do all the practical classes.

Dr James Fry of LMC has stated that

*"There is no doubt that the closeness of the production cost curve and the long run price trend is uncanny. At the least, it suggests that in the very long run, there IS feedback from production costs to world prices".*

This is the key factor.

I think it will become the slow tide that the "King Canute" price support regulatory systems cannot hold back.

Therefore, in summary, it is my view that there will be real opportunities for growth in the sugar business and for trade in sugar in the Asia Pacific region, because of the obvious facts that:

- consumption will grow,
  - supply will be available from efficient producers,
- and the less obvious:
- decline in relative political power of producers as economies grow and industrialise,
  - increasing domestic market deregulation,
  - manufacturing requirement and increasing interest in sourcing world priced sugar,
- and, most importantly:
- there is feedback from (efficient) producer costs to world prices.

However I am not going to predict when those opportunities will be realised. Experience has taught me that anything involving agricultural politics takes longer than a rational person would predict and is invariably preceded by a foul up. Nevertheless, as I said in my introduction, global sugar's future is, in fact, this Asia Pacific region.

In developing policy for the next round of Multilateral Negotiations, it will be important that there is due recognition of the evolutionary change occurring in the sugar trade pattern. The driving factor will not be regulatory price support mechanisms; rather it will be the cost competitiveness of efficient producers.

## THE JAPANESE SUGAR MARKET

*Prepared by Messrs. Takamasa Akiyama and Michael Corbin, The World Bank Group for the Sugar and Beverages Group, Commodities and Trade Division, FAO. Tables have been left out due to space limitation.*

### OVERVIEW

Japan produces two types of sugar - beet sugar and cane sugar. Beet sugar production is centered in Hokkaido while cane sugar production is located in Okinawa and the islands of Kagoshima. Domestically produced sugar meets about one quarter of domestic demand and the rest is imported. Although not significant in terms of exports or production, Japan is a highly visible country in the world sugar market because of its traditionally high demand for imported sugar.

**Production.** Japanese sugar production increased sharply in the 1970s, stagnated during the 1980s and declined in the 1990s (see Figure 1). In 1996, Japan produced 1 282 000 metric tonnes of cane sugar (see Table 2). This marked a decrease of approximately 20 percent from both 1995 and 1994 figures, which were slightly over 1.6 million tonnes respectively, and represents the lowest figure during the nineties. Specifically, Okinawa produced sugar decreased by 25 percent from 1995 to 1996 as compared to a 3.7 percent increase from 1994 to 1995. Since 1989, Okinawa's production has decreased by 7.6 percent p.a. Kagoshima produced sugar declined 13.3 percent from 1995 to 1996 following a 2.6 percent drop from 1994 to 1995. Since 1989, Kagoshima production has dropped 5.9 percent p.a.

Kagoshima accounted for 41 percent of all cane sugar production, while Okinawa cane comprised 59 percent. The

share for Okinawa produced cane comprised about 60 percent in recent years; this figure is significantly lower than the 66.3 percent share it held in 1989.

In terms of Japan's total sugar production, Hokkaido's production has constituted between 75 and 80 percent. Hokkaido beet production has also decreased in recent years. It decreased 1.45 percent p.a. from 1989 to 1996. In 1996, Hokkaido recorded its lowest beet production over the period, down by about 25 percent in comparison with the most recent high established in 1991.

As Table 3 shows, Japanese production represents only a minor portion of total world production.

While Japanese production has steadily declined over the last eight years (-7.72 percent p.a.), total world production has increased at the rate of 3.29 percent p.a. during the corresponding period. In the short term, world production rose 7.1 percent from 1994 to 1995 and 2.1 percent from 1995 to 1996.

Two countries, Brazil and India, constitute nearly half of the world's cane sugar production. Total production between these two countries grew at an aggregate rate of 2.9 percent between 1995 and 1996 and 8.5 percent between 1994 and 1995. Over the longer term, 1989-96 period, they grew at 3.62 and 4.18 percent p.a., respectively. In contrast, aggregate growth among the bottom three producing countries has been erratic - up 18.0 percent from 1994 to 1995 and down 7.0 percent from 1995 to 1996. From 1989 to 1996 Thailand, China and Pakistan grew 6.98, 2.16 and 2.22 percent p.a., respectively.

Table 4 depicts the five leading producers of beet sugar along with figures for the world and Japan. The Table indicates that growth has been declining or sluggish for every country, including Japan. Japan's production decreased at a 1.54 percent p.a. rate from 1989 to 1996. Declines were also recorded for the world (-2.71 percent p.a.), Germany (-1.37 percent p.a.) and Ukraine (-5.60 percent p.a.). Although the remaining three countries in the Table show increases, their growth has been sluggish at less than one percent p.a.

**Imports.** Japan's total sugar imports have followed a gradual yet fluctuating decline since 1991 (see Table 5). Total imports for Japan from 1991 through 1996 declined 2.1 percent p.a. For the period 1995/96 imports decreased 5 percent year by year.

Both Tables 5 and 6 demonstrate the change in partner countries exporting to Japan. In 1991, South Africa and Cuba accounted for an aggregate 38.8 percent of Japanese sugar imports. By 1996, they accounted for only 16.1 percent of total Japanese imports. The trade with these two countries has been replaced by increased shares from other Asian countries, particularly Australia and Thailand. This shift has increased the dominance of these two countries already held in 1991. In 1996, Australia and Thailand represented an aggregate 79.2 percent of all Japanese sugar imports. Fiji and the Philippines export small amounts of sugar to Japan; this amount varies indirectly with Australian and Thai supplies during a given year. Australian and Thai sugar imports have slowly increased by approximately two percent during the period, while Cuban imports decreased by over 17 percent p.a.

Japan was the world's third leading importer of sugar in 1995 (see Table 7). In 1994 and 1995 it accounted for 6.1 percent of total world imports. This marks a slight decline from the 6.5 percent it held in 1993. Japanese imports from 1989 to 1995 decreased at a slower annual rate than those for the world (-2.06 percent p.a.). The quickest rate of growth over the period (7.61 percent p.a.) was in China and ranks a close second behind the Russian Federation in terms of total imports.

**Consumption.** Figure 3 and Table 8 present consumption figures for sugar and sugar substitutes in Japan over a twenty year period. The first column shows that sugar consumption has steadily declined over the twenty year period. It is evident from Figure 2 that very high world sugar prices in 1980 caused a sharp decline in sugar consumption in Japan and the subsequent decline in world prices was not able to recover the demand. Also, demand for sugar substitutes has increased significantly since 1980. The lowest per capita consumption of sugar in the twenty years was recorded in 1995. These declining consumption levels correspond with similarly declining levels of both imports and domestic production.

In contrast, the demand for sugar substitutes has steadily increased over the period of discussion - rising 6.93 percent p.a. from 1975 to 1995 and 1.55 percent p.a. from 1985-95. The data in the third column show that aggregate demand for sugar and sugar substitutes has virtually remained constant over the twenty year period increasing by 0.35 percent p.a. and decreasing by 0.46 percent p.a. over the last ten years. Also, demand for sugar and sugar substitutes was higher in 1995 than in 1975, although not at the peaks attained during the late eighties and early nineties.

Likewise, per capita consumption of sugar and sugar substitutes has remained virtually the same as the level in 1975 (declining only 0.19 percent p.a.). Despite this fact, it is at its lowest level during the twenty year period and has been decreasing at a faster rate over the most recent decade (-0.79 percent p.a.).

**Prices.** Figure 4, Tables 9 and 10 show wholesale and retail sugar prices for Japan. Average annual wholesale prices have consistently declined since 1988 - from 186 ¥/kg to 153 ¥/kg. This represents a 2.32 percent p.a. decrease. Average annual retail prices, on the other hand, have decreased at a lower rate (1.42 percent p.a.) from 254 ¥/kg in 1988 to 220 ¥/kg in 1996.

Though both wholesale and retail prices have been declining over the last decade, the ratio of retail to wholesale prices has slowly been increasing. This indicates that Japanese consumers of retail sugar are not capturing the full effects of the decrease in retail prices, relative to wholesale prices. The cause probably is increased domestic marketing costs.

#### **SUGAR POLICIES**

After liberalizing the import of sugar in 1963, Japanese domestic prices fluctuated widely with international prices. To protect domestic producers and consumers from wide price fluctuations, a policy measure aimed at stabilizing sugar prices was introduced in 1965. Under this measure, a government agency would buy and sell imported and domestically produced sugar to keep domestic wholesale prices in a range between the low limit and high limit prices and to provide subsidies to domestic sugar producers.

This policy, which is still in effect, hinges on several administered prices which are determined annually by the government. The low and high limit prices define the price range the government considers appropriate within which to stabilize sugar prices. The domestic producer target price indicates whether adjustments on imported sugar price are necessary and also indicates the price at which producers should aim to produce. Producer prices of beets and cane are determined by the parity method. Under this method, cost of living in rural areas and farm input prices are taken into account.

The main focus of the policy is the establishment of minimum producer prices for beets and cane. Also the agency keeps the price of sugar it sells between the low and high limit through purchases and sales. Subsidies to domestic producers are financed by an adjustment charge on imported sugar and funds from the government. The adjustment charge collected by the agency is the difference between the target and import prices adjusted by a factor. The amount charged is according to the following formula:

(Target price - average import price) \* adjustment factor  
Adjustment factor is the share of domestic production to consumption.

Four situations of government intervention are possible, depending on the levels of the average sugar import price compared with the low and high limit and target prices (see Figure 5). These situations are: (i) the average import price is below the low limit price, (ii) the average import price is above the low limit price but below the target price, (iii) the average import price is below the high limit price, but above the target price and (iv) the average import price is above the high limit price.

In situation (i), the difference between the average import price and the low limit price will be collected and will be contributed to the sugar price stabilization fund. In addition, the adjustment charge will be imposed. Hence, the agency sale price will be the low limit price plus the adjustment levy, i.e.

Agency sale price = i.e., low limit price + adjustment levy.

In situation (ii), only the adjustment charge will be imposed and the domestic price will be the average import price plus the adjustment. In this case, the agency sale price will be higher than that under situation (i).

Agency sale price = average import price + adjustment levy.

There is no intervention by the government when the import price falls between the target price and the high limit price. Hence,

Agency sale price = import price

In situation (iv), the sugar price stabilization fund will be used to reduce the domestic price to the high limit price. Hence,

Agency sale price = high limit price

Prices paid to domestic producers are considerably higher than the agency sale price. The difference is adjusted by two elements: The adjustment charge fund for the difference between the agency sale price and the target price and the government pays the difference between the producer price and the target price.

As a result of government intervention, prices paid to domestic producers are considerably higher than import prices. This government protection is much higher for cane sugar producers in the prefectures of Kagoshima and Okinawa than for beet sugar producers in Hokkaido (see Table 11). This is probably because the cane producers are much more dependent on income from sugar than are the beet producers. Income from sugar constituted about 19 percent and 28 percent of the total income from agriculture in Okinawa and the southwestern islands of Kagoshima, respectively, in 1994 while the corresponding figure for Hokkaido is only about 5 percent. As Table 11 shows, domestic producer prices of cane and beet have been kept constant or have been reduced at nominal prices in recent years to reduce the differences between sugar prices that correspond to the beet and cane producer

prices and international sugar prices and to encourage domestic producers to increase productivity.

The government intervention system described above is affected by the Uruguay Round Agreement, under which sum of the adjustment charge and the contribution to the stabilization fund was bound at 82.4 ¥/kg in 1995 is to decline to 71.8 ¥/kg by 2000. The figure in 2000 is 15 percent lower than the base rate of 84.5 ¥/kg. This change is likely to reduce domestic producer prices and domestic sale prices slightly.

Japan's sugar consumption is projected to decline by 1.2 percent p.a. for the period 1995-2010. Although income elasticity is positive (about 0.3 percent), declining population beyond 2005 and taste change work to depress the demand.

Japanese sugar imports are projected as the difference between the demand and domestic production. This is projected to decline at the rate of 1.2 percent p.a.

## FACTORS INFLUENCING DEVELOPMENT OF SUGAR EXPORTS AND POTENTIAL FOR GROWTH IN AUSTRALIA

*Prepared by Mr Kerry Mulherin for the Sugar and Beverages Group of the Commodities and Trade Division. Tables and charts have been removed due to space limitation.*

### INTRODUCTION:

This background paper attempts to provide a brief overview of the evolution of the Australian sugar industry, concentrating on the export sector and in particular, on the pronounced growth during the current decade. It attempts to give some indication of the factors which have influenced that growth and to make some assessment of potential for further expansion.

### GLOBAL PERSPECTIVE:

Australia currently ranks seventh among world sugar producers. It is well behind the European Union, China, India and Brazil and closely behind the United States and Thailand. Among exporters, Australia sells less than the EU and Brazil, competing with Thailand for third place. Since 1990 Australian production of sugar has risen by 44 percent a figure exceeded only by Brazil (70 percent). In the same period Australian exports have risen by over 60 percent, a growth rate also exceeded only by Brazil. At present Australia holds about 16 percent of world trade. Australia is highly dependent on the free market export sector, and currently about 85 percent of production is exported, a figure likely to rise to about 90 percent by 2000.

Australia, Cuba and Thailand are by far the most export dependant among major sugar exporters and Australia is the only developed country where survival of the industry is linked overwhelmingly to the export sector.

### National Perspective

The sugar industry ranks fifth among the major primary industries of Australia after beef, wheat, wool and dairy and fourth in export value generating more than A\$2.0 billion of income mainly from exports.

Sugar cane is grown along the coastal strip of North Eastern Australia from Mossman and the Atherton Tablelands in North Queensland to Grafton in Northern New South Wales a distance of more than 2,000 kilometres. A new small-scale industry has now been established in the Ord River district of

North-Western Australia. In Queensland and New South Wales, some 19,000 people are fully employed in cane-growing, harvesting, milling, storage and marketing and a further 26,000 in related and supporting industries. Sugar has played an important developmental role in North-Eastern Australia and its presence and infrastructure have provided the incentive and spring-board for many other industries and enterprises.

### History

Sugar was first cultivated experimentally as early as 1820 but was not cultivated commercially until the 1860's, when it spread rapidly from Northern NSW up the Queensland Coast. Originally a plantation industry relying upon indentured labour, it became a family based industry from the late 1890's. By the end of the nineteenth century, there were over 70 small sugar and juice mills operating in Queensland and New South Wales. Today there are 29 including the recently established small mills in the Ord River.

In its formative years the industry supplied the Australian domestic market, along with imports, but during the first world war, shortages encouraged stimulation of the industry by the state and federal governments and Australia became a net exporter of sugar in 1923. At the same time, an embargo was introduced on sugar imports into Australia which remained in effect until 1989..

In 1915 the Queensland government of Mr TJ Ryan introduced the Sugar Acquisition Act and regulation of Sugar Prices Act and these Acts effectively regulated sugar production in Queensland until 1991 when a new Sugar Industry Bill was introduced. NSW sugar was produced and marketed within this general framework arrangement and a Commonwealth/State agreement allowed the domestic price of refined sugar to be regulated.

From 1923, when Australia became a net exporter of sugar until 1990, there were only three planned substantial increases in the area assigned for cane growing. These took place in 1953-54 in response to new export market opportunities provided by the recently negotiated Commonwealth and International Sugar Agreements; in 1964/65 after a period of high world market prices and in 1990/91. There were smaller increases approved in 1975/76 and 1981/82, again in response to dramatically improved ( but not sustained) world market prices. Under the then prevailing regulatory arrangements, cane could only be grown on assigned areas and only on a fixed proportion (net) of the gross assignment. Mill peaks had been established in 1929 in order to ensure that production was kept in line with domestic consumption requirements plus anticipated export outlets and were only increased in line with market growth. There were also corresponding farm peaks . There was a strong sentiment among sections of the industry which prevailed well into the seventies that regulation provided some assurance of security and this position was broadly supported by governments.

As long as a significant proportion of Australian exports was guaranteed under Commonwealth (CSA) and International (ISA) Agreement quotas, this position could be justified, particularly since a sizeable share of the CSA quota received a very favourable negotiated price. There were also long term price agreements with some countries, notably Japan and of course after 1960, the US Sugar quota. But these advantages collapsed, first with the entry of the United Kingdom into the EU and the subsequent ending of the ISA, and in the early eighties, with the cessation of ISAs with economic provisions, Australia was isolated. The industry then had to stagnate or re-position itself to compete essentially without preferences, in a highly volatile market against both low-cost developing country exporters as well as high cost, but highly protected supplies from developed countries. This has been the position which the Australian sugar industry has had to face since the early eighties and which is likely to prevail in the foreseeable future.

### Industry Structure

Queensland produces 95 percent of Australian sugar and NSW the remaining 5 percent excluding the 50,000 tons currently being produced in Western Australia.

### Cane Growing

At present there are 6,400 cane growers in Qld with an assigned area of 484,000 hectares and an average farm size of 77 hectares. The number of Qld growers declined from 7507 in 1970 to 5784 in 1990 but thereafter, in line with gradual market de-regulation, rose again to the present level. In the same time period average farm size increased from 40 hectares in 1970 to 77 in 1996.

NSW has 600 canegrowers with an average farm size of about 33 hectares. Farm sizes are smaller than in Qld , although there is a nucleus of larger farms. Area harvested and production has more than doubled since 1970.

The West Australian Industry which commenced operations only in 1995 has a target of 560,000 tons of cane from 22 farms covering 4,000 hectares.

### Harvesting

All sugar cane grown in Australia is harvested mechanically, usually by independent operators or groups under contract. Australia pioneered mechanical harvesting and achieved 100 percent conversion to mechanical harvesting in 1979. Australia is a world leader in the manufacture and export of mechanical harvesters.

In areas of North Queensland and Northern New South Wales where heavy rainfall frequently interferes with harvesting, special wet-weather harvesting equipment has been developed including tracked harvesters and high flotation field transportation.

There are two methods of harvesting currently practised in Australia - burnt and green. Traditionally cane has been burnt before harvesting to remove weeds, leaves and other matters which can impede harvesting and milling operations. In the twenties, cane was also burnt as protection against Weil's disease spread by rats and other vermin residing in the canefields.

In the past decade or so green cane harvesting has spread, a process which allows the leafy stalks to fall to the ground and act as a protective trash blanket. This blanket, as an organic mulch, considerably reduces the level of soil erosion and preserves soil nutrition for crop growth. It also helps to prevent weed germination. Fifty percent of the Australian crop is now harvested green and in the Herbert River district, near Ingham in North Queensland, the figure reaches 100 percent. However, green cane harvesting is not always possible or practical in all sugar growing areas, notably in cases where the mulch-like layer or residue can contribute to the water-logging of fields. In southern producing regions, the trash blanket has also been found to lower soil temperatures which can impede early plant growth.

Harvest-contractors are paid at a piece work (per ton rate) and large scale operations permit economics of scale in most regions, thus helping to achieve lower unit costs.

### Milling

There were more than 70 sugar and juice mills in operation throughout Qld alone in 1892. By 1920 the number had increased to 34 and currently there are 25 plus 3 in NSW and

one on the Ord River. The Ord River mill was the first new sugar mill built in Australia since Tully mill in North Queensland commenced operations in 1925. A new juice mill will also soon be operating on the Atherton Tableland.

Mill ownership became more concentrated during the 1980's and 1990's. In 1980, 19 companies operated 33 sugar mills. Currently 12 companies operate Australia's 29 mills and one of the 12, Bundaberg Sugar, will operate the new mill on the Atherton Tableland. The state-wide rationalisation of Queensland's sugar milling and transport operations in recent years resulted in the closure of 5 mills, QNABA ( Bundaberg), Goondi and Hambleton (North Queensland ) and North Eton and Cattle Creek ( Mackay ) The cane lands assigned to these mills were re-assigned to adjoining mills.

Of the current 29 mills, 15 are owned by public companies, one by a private company and 13 are grower owned co-operatives. Co-operatives account for about 45 percent of Australian sugar production and public/private corporations 55 percent. The Colonial Sugar Refining Company (CSR) owns mills accounting for 38 percent of Australian raw sugar output, followed by Mackay Sugar Co-operative (20 percent) and Bundaberg Sugar (Tait and Lyle ) 15 percent. The four northern co-operative mills Mossman, Mulgrave, South Johnstone and Tully formed "Sugar North Ltd" in 1993 as a network organisation to help to ensure the long-term viability of co-operative production in North Queensland. Together, their share of sugar output is 13 percent.

#### **Bulk-Handling**

Australian raw sugar has been handled entirely in bulk since 1964 with the Qld Sugar Corporation. (formerly the Qld Sugar Board) responsible for all storage and handling of Qld sugar. The Qld bulk-terminal capacity in excess of 2 million tons, is the largest integrated bulk sugar storage system in the world, with an annual output of more than 4.5 million tons. The system operates 7 terminals along the Qld coast from Cairns to Brisbane.

#### **Sugar Refining**

Sugar refineries produce a range of products for direct use by end-users and as ingredients in other manufactured food and drink products. All raw sugar used by refineries is obtained from Australian sources. Raw sugar is bought from the Qld Sugar Corporation (QSC) and the NSW Sugar Milling Co-op Ltd and potentially will be bought from the recently established West-Australian industry. Approximately two-thirds of the raw sugar used by the refineries is purchased from QSC.

There are currently six refineries operating in Australia with a combined refining capacity of 1,300,000 tons. Australia's consumption of refined sugar is only about 900,000 tons with a very slow growth rate. New refineries were built in 1989 by NSW Sugar/Manildra Harwood NSW, and by Mackay Sugar/EDF Man at Mackay in 1993. These new ventures have dramatically affected the Australian market for refined sugar.

#### **Marketing**

Under the 1915-1991 Sugar Acquisition Act all raw sugar was acquired by the Qld Sugar Board which was responsible for its sale and for raw sugar storage at ports. As will be explained in the next section, changes in 1991 led to replacement of the Sugar Board by the Qld Sugar Corporation (QSC) which assumed responsibility for the sale of all raw sugar produced in Queensland and for the management of the operations and maintenance of the 7 bulk-sugar terminals. Its activities cover four broad areas:

- Marketing and sale of raw sugar
- Storage and logistics
- Provision of industry services
- Financial management

The sale of raw sugar within Australia and New Zealand is handled directly by QSC. Outside, Australia and New Zealand, CSR Raw Sugar Marketing (as in the days of the Sugar Board) acts as an agent for the QSC in the sale of raw sugar to export customers. C Czarnickow & Co (London), in which CSR has a major interest, acts as the QSC's principal sugar broker, while shipping services are chartered by Austral Chartering. In recent years ED&F Man has also brokered Australian sugar.

As the single seller of Queensland raw sugar output, the QSC is responsible for administering the net proceeds to mill owners and to also ensure equitable distribution of proceeds between growers and millers.

The New South Wales sugar industry markets its production of refined sugar from the Herwood refinery and under present arrangements would also market any surplus raw or refined , it may have to place on the export market. Ord-River raw sugar is sold on the domestic market though the Perth Refinery.

#### **Industry Entities**

A range of industry bodies exists to represent the interests of various industry participants. V1Z

The Australian Sugar Milling Council (ASMC), membership of which is voluntary, represents the interests of 28 mills (i.e. all except Ord-River).

Canegrowers is a Qld Statutory Organisation representing the interests of cane growers in Qld and NSW. For Qld growers, membership is compulsory.

The Australian Cane Farmers Association also represents interests of canegrowers from both Qld and NSW and membership is voluntary.

#### **Research and Development (R&D)**

The Australian sugar industry has traditionally relied heavily on research and development and maintains an on-going commitment to support through funding the research and development sector, as a crucial element of overall industry development strategy. In combination with governments, over \$40 million is spent annually on sugar related research, development and extension. Five major R and D organisations are involved:

**Sugar Research Institute (SRI)** concentrates on mill owner needs. (Funded by mill owners).

**The Bureau of Sugar Experiment Stations (BSES)** serves mainly the agricultural sector (Funding approx 50% industry, 50% government).

**Sugar Industry Research and Development Corporation (SRDC)** is a statutory body established under the initiative of the Australian Federal Government to involve industry more closely in the determination of the objectives of R&D. The SRDC manages the distribution of funds for projects across a wide range of programme areas.

**The Co-operative Research Centre for Sustainable Sugar Productions (CRC)** is recently established with three themes- to protect the environment, to sustain soil and water resources and to enhance crop productivity in terms of bulk cane yields and commercial sugar content (CCS).

#### **Industry De-Regulation**

As indicated in the historical overview , the Australian industry has been made to face the fact that it is overwhelmingly

dependent on exports and on world market prices. The restrictive regulatory framework of the Qld industry made it very difficult to introduce changes, particularly economies of scale and there was a high degree of rigidity regarding assignments, mill peaks, new entry, acquisitions, and the embargo on imports, which appeared to act as a severe brake on effective rationalisation. Since the late 1970's, there have been pressures to de-regulate the industry; from 1977 until 1996, 11 major reviews of the sugar industry have been carried out, as well as several internal reviews. As far back as 1983, an Industries Assistance Commission Report recommended the abolition of the import embargo on sugar, the removal of assignment, the removal of the formula for setting prices and the removal of controls on acquisition. These findings were not accepted by the federal government although they indicated a new trend and an emerging consensus that the rigid regulatory arrangements had to be loosened to allow market forces to operate.

In 1988, the federal government decided to lift the embargo on sugar imported from July 1, 1989. The government decided the embargo should be replaced by first an *ad-valorem* tariff then a tariff of \$115 per ton reducing to \$55 by 1992 and that the Industry Commission should undertake a further review in 1991 to consider the need for import protection beyond 1992.

In June 1989 a report of a Qld government appointed Committee of Enquiry into sugar industry pooling systems recommended that the traditional formula for calculating No 1 and No 2 pool price differential should be discarded and substituted by a fixed differential of 12 percent. (No 1 pool covers up to Mill Peak and No 2 above-peak sugar produced from assigned land). This recommendation was adopted.

In 1991 after much consultation with the industry, the Qld government effectively repealed the 1915 Sugar Acquisition and Sugar Cane Prices Acts and introduced the Sugar Industry Act of 1991. This Act abolished the Cane Prices Board and the Sugar Board. Marketing and administrative functions were amalgamated and transferred to the Qld Sugar Corporation. The Act also established local boards and a streamlined appeals process through a Sugar Industry Tribunal. It approved area expansion over a five-year period of at least 2.5 percent per year, (approximately 10,000 hectares per mill area) and allowed a simplified and more flexible assignment system. The abolition of the Central Cane Prices Board permitted decisions to be made at a local level, from ground-level up, rather than centrally from above.

Two further major industry inquiries were carried out in 1992 and 1993, first another Federal Industry Commission, and secondly a Sugar Industry Task Force.

The basic objective of the latter was to identify impediments to the sustainable growth and competitiveness of the Australian sugar industry and to recommend means of overcoming them. The second was to determine the appropriate level of future government funding for the industry, including the appropriate level of sugar tariffs.

In February 1993, as a result of the task force findings an "agreed sugar package" was announced by the Commonwealth and Qld governments which included:

- 40 million of infrastructure funding for approved industry projects
- Maintenance of the sugar tariff at \$55 per ton until 30 June, 1997
- A reduction of the Queensland raw sugar price differential between No1 and No2 Pools from 12 percent to 6 percent by 1996.
- An "in principle" agreement to the transfer of ownership of the bulk sugar terminals from government to Sugar Industry.
- The retention of unitary or "single-desk" selling arrangements, subject to review in 1996.

- Industry expansion decisions to be made at local levels.

The package also stated that while assignments would remain the basis for local agreements it would not be used as a constraint to growth.

#### **Vision 2000**

Representatives of the cane-growing and sugar milling sections have been closely associated with the evolving de-regulation process and during 1995 developed a concept of how they would wish the industry to develop over the next decade. They considered that as the industry's major stockholders they were best placed to advise on which arrangements best suit the practical needs of their industry in terms of productivity, efficiency and sustainability.

Their joint approach, called "Vision 2000" which was determined at joint sessions of the full Canegrowers' and Australian Sugar Milling Councils, is for the industry to be a sustainable competitive raw sugar industry, which is environmentally responsible, focused on improving productivity and the preferred supplier to all outlets.

#### **National Competition Policy and 1996 Sugar Industry Review Working Party**

The 1974 Commonwealth Trade Practices Act on the need for a national competition policy was based on the recognition that Australia had become a single market. Improvements in transport and communications meant that state boundaries were no longer impediments to the trade of goods and services within Australia. This agreement subsequently came to focus on the Commonwealth Government's micro-economic reform process introduced during the 1980's to focus on the internationalisation of the Australian economy. In October 1992, the Prime Minister set up a National Competition Policy Review Committee subsequently known as the Hilmer Committee (after its Chairman, Prof. Fred Hilmer) to conduct a thorough review of the scope and operations of the Trade Practices Act of 1974, in particular where the provisions of the Act needed to be extended to ensure competitive conduct was adhered to by all Australian corporations and individuals. In addition the Committee was requested to identify alternative means of ensuring competitive conduct outside the scope of the Trade Practices Act

The Hilmer Committee in effect drew up a blueprint for National Competition Policy (NCP) which was endorsed by all Australian governments during 1994 with implementation from July 1995. The guiding principle under NCP is that legislation should not restrict competition unless it can be demonstrated that:

- i. the benefits of the restriction to the community as a whole outweigh the costs; and
- ii. the objectives of the legislation can only be achieved by restricting competition.

#### **Review of Sugar Legislation and Tariff**

When the Qld Sugar Industry Act was introduced in 1991, it was publicly stated that the legislation would be subject to review within five years. Additionally when the Commonwealth and Qld governments adopted an "Agreed Sugar Package" in February 1993, it was specified that some elements of the package pooling price differentials and tariffs on sugar imports would be subject to review in 1996.

Accordingly, in 1996 the two governments announced a joint review of the Qld sugar industry regulatory arrangements and the sugar tariff.



A sugar Industry Review Working Party (SIRWP) which included representatives of Commonwealth and Qld governments, growers, millers, QSC and users commenced operations in October 1995.

After submissions by interested parties and public hearings the Working Party presented its final report in November, 1996 to the two governments who at time of writing (April 1997) were due to make their decisions on which recommendations to adopt.

The key terms of reference were two-fold:

- a) To review the need for a tariff on raw and refined sugar. In its assessment the Working Party was asked to focus primarily on benefits and costs to the general community of such actions.
- b) To review current legislative arrangements for the promotion and regulation of the sugar industry in Queensland and to investigate alternative arrangements. The objective of any new legislation should be to facilitate the sustainable development of an internationally competitive, export oriented industry, which benefits both the industry's participation and the wider community.

### Major Recommendations of SIRWP

#### Tariffs

- 1) Removal of sugar tariff combined with strengthening of anti-dumping laws to provide protection for industry producers. Removal of the tariff would ensure domestic refineries and industrial users access to sugar at world market prices. This would result in a decline of Qld raw sugar revenues of the order of \$26.7 m annually (and by implication to NSW of about \$8.0 million). On the other hand, other sectors of the economy would receive corresponding benefits.
- 2) Marketing and related arrangements:
  - a) Retention of current single-desk selling arrangements for Qld raw sugar. The Working party could not identify any significant monetary benefits which would accrue to the community through de-regulation and any alternate arrangements which would be more efficient.
  - b) QSC should continue to be the statutory body responsible for domestic marketing of Qld raw sugar but in relation to domestic pricing, raw sugar prices should be set at export party levels.
  - c) Pool differentials should be phased out. The current 6 percent differential should be maintained for the 1997 season, reduced to 4 percent for the 1998 season and then abolished.
- 3) Cane supply and processing arrangements. Increased local determination of cane supply and processing matters.

A local area negotiating process is proposed to provide more flexible, contractually oriented cane supply and processing arrangements. Matters impacting on season length and expansion will continue to be determined locally (i.e. mill area level).

Cane growers will retain the right to negotiate collectively with mill-owners, while also enabling the negotiation of individual agreements. Additionally through these agreements, mill owners should be assured of supplies. Individual agreements between growers and mill-owners should not disadvantage collectively negotiated agreements (assuming the latter will remain predominant).

#### 4) Ownership and Management of Bulk Terminals

The Working Party recommends these be owned and operated as a single entity and ownership be vested in QSC on behalf of the sugar industry.

#### 5) Production and marketing institutional arrangements

The Working Party supports the NCP principle that regulations functions be separated from commercial functions. Consequently the

QSC should be divested of any regulatory functions, except those which are clearly ancillary to its marketing role. Its marketing regulatory functions should be maintained but production regulatory administrative functions be separated.

The Working Party recommends that these limited remaining centralised non-marketing regulatory arrangements be overseen by a newly created part-time "Sugar Industry Commissioner".

#### 6) Research development and extension arrangements

These would remain basically unchanged. The Working Party recognises the sugar industry's long term commitment to research and development and its critical contribution to the Australian sugar industry's international competitive edge.

### NSW Industry

The NSW industry was not covered or consulted in the SIRWP Review, a factor which appears, quite naturally to have caused some resentment. It has operated independently since 1989 - marketing virtually all its sugar domestically through its Harwood refinery. In 1996 it exported small exports of raw sugar to Singapore. It has however, under the import party domestic pricing arrangements had the benefit of the \$55 per ton tariff.

### General reaction to SIRWP Report

At time of writing, it seemed that most recommendations were widely accepted with the exception of the tariff removal which many growers (particularly in NSW) and country regions opposed. These groups emphasised that Australia was already more than meeting its GATT obligations. The current tariff is only about 15 percent while other major producers including EU, Thailand, US and Japan have tariffs well in excess of 100 percent. In fact the effective Australian tariff is only about 8 percent because of a 5 percent developing country preference. Perhaps more important, they are concerned about the impact on their own industries particularly in NSW of a loss of some \$35 m in revenue.

### Impact of de-regulation

Since the planned expansion of area began in Qld from 1988 onwards, there has been a growth in assignment for cane growing of 40 percent, an increase of over 143,000 hectares. In New South Wales, area harvested has also risen from 14,000 hectares to 18,500 an increase of 33 percent. There are also the 4,000 hectare plantings coming into full production in the Ord River. The decline in numbers of growers in Qld from 1980 to 1990 was reversed in 1991 and has since continued to rise. At the same time, average farm size has increased from 50 to 75 hectares. The natural attrition of growers had revealed some rationalisation in farm sizes and the average farm size is still increasing with the entry of new growers. The average tons of cane produced per farm has also risen from 3,500 tons in 1980 to 5,500 tons in 1995. Interestingly, despite the rise in numbers and scale, structurally there has been little change with the family farm still the dominant form of ownership.

### Harvesting

Harvesting of cane has also been further rationalised over the past 5-10 years with average harvester group size rising from 16,000 tons to 32,000 tons and numbers of harvesters declining. The expansion in the growing sector has been exceeded by increases in capacity of Queensland sugar mills. Average tons of cane crushed per mill have increased from 750,000 tons in 1980 to over 1.4 million tons in 1995. Average crushing rates have also risen from 350 tons per hour (TCPH) to over 500 tons in 1995. Raw sugar produced in Qld

mills rose from 3 million tons in 1980 to more than 5 million tons in 1995 and in NSW from 180,000 tons to 248,000 (285,000 tons in 1996).

Australian cane yields have risen from 83 tons per hectare in 1990 to 98 tons per hectare in 1996 and sugar yields from 11.4 tons per hectare to 13.4 tons per hectare in 1996.

As indicated in the historical review, there has been significant rationalisation of mill groupings with Mackay Sugar emerging as Qld's largest private company and Australia's second largest sugar miller behind CSR. A major international sugar company Tait and Lyle has entered the scene with its take-over of Bundaberg Sugar.

Among the various regions the greatest expansion in area has occurred in Herbert River-Burdekin and in cane and sugar output in Herbert-Burdekin and Central. The average growth rates in NSW have compared very closely with those of Qld.

The above increases have come about as a result of massive investment in new area, land preparation, irrigation, farm improvements, cane transport and milling capacity, increased yields improved extraction rates in mills reflecting also in part, return on industry investment in R&D.

#### **Raw sugar exports**

Raw sugar exports have risen by 42 percent from 1989-1996. In 1995 exports exceeded 4 million tons for the first time compared with 2.5 to 3.0 million tons during the eighties. This reflected the success of the industry expansion programmes which resulted in increased export availabilities, but also in the successful implementation by the Qld Sugar Corporation and its marketing agents of their marketing programmes. In 1996, some 64 percent of exports went to Asian markets followed in importance by Canada and New Zealand. However QSC has been remarkably successful in opening diverse new outlets in the Middle East and in Eastern Europe and countries of the former USSR.

The single desk selling arrangement allows QSC to co-ordinate the management of production, quality, storage and shipping to offer an 'integrated marketing package' on behalf of raw sugar producers. QSC also undertakes risk management for the industry and has successfully implemented sugar price, foreign exchange and interest rate risk management programmes.

With its widely dispersed bulk terminals along the Queensland coast, QSC is able to meet supply commitments even if some producing regions might be experiencing production short falls, since it is unusual for the whole state to be effected in any given period. The Corporation is virtually able to supply its customers a guaranteed package of quantity, quality and type of sugar required on a regular basis.

Similarly it is able to place sugar on the most profitable markets concentrating on those areas where Australian sugar has a particular advantage, be it freight, season, or other. QSC and its principle marketing agent, CSR, continue to express confidence that there will be sufficient consumption growth to enable all available raw sugar supplies to be exported remuneratively in the foreseeable future.

#### **Market for refined sugar**

Changes in the domestic refined sugar industry have been dramatic in recent years. In 1989, when NSW Co-operative broke its connection with the Qld Sugar Board it, in equal partnership the Manildra Company built the Harwood/Mildara Refinery with a capacity of 280,000 tons. With a modern, efficient refinery, well placed to supply metropolitan markets, the operation was successful and profitable. However in 1992, Mackay Sugar announced its intention to build a

refinery in joint partnership with ED&F Man with a capacity of 350,000 tons. CSR partly rationalised its refinery base by closing down its operations in Adelaide and Sydney but still retains a refinery capacity of 520,000 tons. Bundaberg sugar also developed further its refinery capacity to 150,000 tons.

As previously indicated this has resulted in an Australian domestic refining capacity of 1,300,000 tons compared with domestic consumption of 900,000 tons and the results have been disastrous for all parties.

In 1993 when the difficulties of entering the export market profitably on a large scale became apparent, Mackay Sugar/ED&F Man and CSR applied to merge their operations, which would have resulted in a significant reduction of CSR's older refining capacity and a rationalisation of the market. However this arrangement was rejected by the Trade Practices Committee on the grounds that it would be at variance with National Competition Policy. Consequently the price war continues and Mackay Refined Sugars actually commenced legal action in December 1994 against CSR alleging various contractual breaches, including misuse of market power.

The position has been at least theoretically aggravated by the SIRWP recommendation that cane sugar for domestic refining be priced at export or world parity rather than the existing import parity. This would remove the margin equivalent to the tariff, currently enjoyed by the Australian industry. In practice however, the margin has probably been discounted in the ongoing price war.

In its 1995 report, Mackay Refined Sugars indicate that gains have been made in market share in Australia and New Zealand and that exports are also growing with the company now being seen as a major player in regional white markets with BIBO (Bulk in Bagged Out) sales to the Islamic Republic of Iran, China, Sri Lanka and Indonesia and container exports to India, Philippines, Fiji, China, Republic of Korea, Vietnam and China, Hong Kong Special Administrative Region.

Nevertheless Mackay Refined Sugars is still losing money, and under present conditions stands little chance of recuperating capital cost. It remains to be seen how long either partner in the venture will be willing or able to sustain such losses. The same problem, though perhaps less severe, applies to the other refineries although they may not be in the position of having to recoup capital cost.

New South Wales Sugar Co-operative has indicated that if it loses its tariff protection, it will have to enter the export market on a regular basis and may even put pressure on state and federal governments to obtain a share of the US raw sugar quota.

The perilous state of the domestic refining industry is causing very considerable concern in sugar industry and government circles and at time of writing, there were firm reports that consideration might be given to re-considering the question of an amalgamation between Mackay Refined Sugars and CSR refineries. Similarly there have been statements in state and federal parliaments that the SIRWC recommendation on tariff removal should be held over.

#### **FUTURE OUTLOOK**

The raw sugar industry is united in its objective of continuing to expand to meet export market opportunities and is confident that it can continue to compete effectively with other low cost and protected suppliers.

It expects that over the next 5 years world sugar prices will remain under pressure. QSC will continue to refine its risk management techniques aimed at protecting producers against price falls.

The question is to what extent the high growth rates from 1990-1996 can continue. The industry modestly forecasts that with present capacity, production in 2000 would be about 6 million tons compared with the current 5 million tons.

### Constraints

#### Queensland

The SIRWP looked at possibilities for growth over the period up to 2005 for Queensland and came out with the following "possible" expansion in land area:

Region	Possible Increase Hectares	Production Increase per 1 000 tons
Northern	27 000 - 53 500	297-580
Hobart-Burdekin	23 000 - 125 000	358-1950
Mackay-Proserpine	31 000 - 50 000	393-635
Southern	10 300 - 14 700	117-170
<b>Total Qld</b>	<b>91 300 - 243 200</b>	<b>1 165-3 335</b>

The figures for Mackay-Proserpine region have been raised to take account of a study by "Mackay Sugar" and "Canegrowers Mackay" which included likely production from areas external to traditional Mackay Sugar boundaries. That study indicated Mackay Sugar could be processing 8.3 million tons of cane from 97,000 hectares in the 2000 season and 9 million tons of cane from 100,000 hectares five years later.

These very rough indicative figures give some idea of land availability which if brought into production and assuming present yields (i.e. no productivity gains) would result in increased sugar output ranging from 1 to 3 million tons up to 2005. This would result in total Qld output of about 6-8 million tons. Actual output would be higher since further productivity gains could be anticipated.

Over the past few seasons Qld sugar mills have consistently demonstrated transport and crushing capacities in advance of rising cane supply. Capital investment by sugar mills in plant and equipment as well as transport infrastructure has been enormous. CSR has invested particularly intensely at Victoria, Macknade and Inkerman in new plant and at Plane Creek in transport, but co-operative and other mills have also invested heavily. Twenty of the twenty five Qld mills operate a continuous crushing mode.

In 1996/97 there is a reluctance among mills, particularly company mills to enter into a further round of new capital expenditure. Prevailing low world market prices and high loan capital interest do not provide a sufficiently attractive rate of return to shareholders on their investment. Farmers on the other hand are generally keen to continue expansion and to bring new land into production.

Co-operative mills are in an essentially different position since their shareholders are also their suppliers and there is less conflict of interest. Some such as Proserpine, are reported to be prepared to commit substantial funds for new investment. The same also applies to Mackay Sugar, although the co-operative's 50 percent share of refinery losses would have significantly reduced funds available for further investment in milling capacity.

Therefore unless some understanding can be reached between millers and growers re financing, there may be a significant slowing down in expansion of crushing capacity. There is of course a new Juice Mill

(Tait & Lyle) coming into production on the Atherton Tableland which will handle about 800,000 tons of cane over the next five years in addition to the 400,000 tons currently produced in the region and supplied to existing mills. Furthermore there are reports that growers in the Burdekin region are beginning to urge the establishment of a new growers co-operative mill in that region. The Sugar Industry Act was amended to enable the granting of assignment to the Atherton Tableland mill, so that there are no longer any regulatory restrictions to the setting up of new mills. They are however an extremely expensive operation.

In the present climate, Qld millers are strong proponents of vertical integration at field and mill level to raise productivity through field improvement and higher milling extraction rates. Mills are particularly keen to extend the crushing season to use existing capacity more fully, but many growers oppose such an extension because sugar content of cane is low early in the season and falls off sharply late in the season so that unit returns to growers (based on commercial sugar content of cane, CCS) would decline. Average Qld crushing season is about 20-22 weeks and studies indicate an extended season of about 25 weeks would be optimum. This matter was examined at some length by SIRWP and it would appear that a compromise would need to be reached in each area between millers and growers, which would extend the season but provide adequate protection to growers for the associated decline in CCS.

#### NSW

Canegrowers in NSW are as committed to sugar cane cultivation as their Qld counterparts. Alternatives are limited, less remunerative and less reliable. Despite a nucleus of large holdings farms are smaller but growers are resilient and often earn off-farm additional income. The growers Co-operative is efficient and attuned to efficiency and innovation and the joint Sugar Co-op/ Manilda refinery seems to run smoothly.

NSW has certain advantages in proximity to domestic markets, abundant water which virtually eliminates the need for irrigation and low fertiliser usage. The smaller NSW mills are of course at a disadvantage but they operate as an integrated operation. The co-operative is confident it can face the future and compete if necessary against its northern neighbour. The NSW crushing season currently operates up to 26 weeks and given its southern latitude, sugar content of cane does not fall off sharply late in the season as it does in Queensland.

The three NSW mills expect to process 2.4 million tons of cane in 1997 and there is moderate room for expansion. Management estimates that under current technology and farming methods and varieties, NSW sugar output could rise to 350,000 tons over the next five years, that is an increase of more than 20 percent over 1996 output.

#### Western Australia - Ord River

The new Ord River sugar mill crushed its first cane in November 1995 and it is planned for the region to grow about 500,000 tons of cane manufacturing about 75,000 tons of raw sugar. Production in 1996/97 was reportedly about 50,000 tons. The mill, owned by CSR, is reported to have struck problems. Planned costs of some \$30m are believed to have risen sharply as major modifications have had to be made and more conventional machinery installed. Also, yields have been lower than expected.

Furthermore, unlike Qld and NSW, there are alternatives to cane in the Ord, particularly cotton. The 22 registered growers are entrepreneurs, some with canegrowing experience obtained in Qld. Sceptics say that Ord growers are not family farmers committed for life to cane as most Qld and NSW growers appear to be, but rather, sizeable entrepreneurs who could move into other areas if deemed more profitable.

The writer is not in a position to assess this situation objectively. However, given the known problems regarding milling and yields, it would seem realistic to assume any expansion beyond the present phase would be fairly slow. For the present it is therefore assumed that Ord River sugar output would not exceed the planned 75,000 tons over the next five years or so.

In summary Australian sugar output could be of the order of 6 million tons by 2000 and 6.5 to possibly more than 8.0 million tons by 2005 which would leave an exportable surplus of 5.5 to 7 million tons, depending of course on domestic and world market developments in the interim..

### SUMMARY AND CONCLUSIONS

The recommendations of the Sugar Industry Review Working Party seem likely to provide the framework in which the Queensland, and by implication, the Australian sugar industry will function over the next five years or so and certainly into the new century.

As a result of the de-regulation of the past decade, the regulatory system based on mill area assignments can no longer be regarded as hampering the industry's ability to expand, or to rationalize, as may be necessary to deal with changing market circumstances and opportunities. Nevertheless, it seems likely that the industry will continue to operate within an overall broadly integrated framework and continue to be overwhelmingly export-oriented. Indeed, it is expected that the present export dependency ratio of 85 percent will rise to 90 percent by 2000.

Indications are that Australian sugar output will continue to expand. ABARE has projected a figure of 6.4 million tonnes by 2001-2; indeed a figure of the order of 9 to 10 million tonnes implying an export surplus of 8 to 9 million tonnes would be technically feasible if market conditions and economic returns justified the expansion in acreage and milling and hand-milling capacity.

Land is not a serious constraint and growers are keen to expand. In most sugar growing areas, especially Queensland and Northern New South Wales, sugarcane is still farmers' preferred option and there are few equivalent alternatives. Productivity is high and further gains are predicted as a greater proportion of cane is grown under irrigation and superior varieties of cane are developed. There will be further technological improvements at farm level and no doubt further application of economies of scale, although the family-farm unit is likely to remain dominant.

Factory capacity could be a constraint given the reluctance to contemplate a new round of expansion so soon after the dramatic capital investment undertaken in the past five years. The constraints imposed on capital borrowing by high interest rates and low prices received for sugar have been mentioned. Much will therefore depend on future developments in world market prices and ability to reduce further growing, milling and marketing costs. In the short-term every effort will be made to increase throughput and reduce costs with existing capacity through rationalization, application of improved technology and extended crushing seasons. Opportunities for season extension will be enhanced by allowing millers and growers to negotiate bonus payments to growers to offset increased risks and lower c.c.s.

In the longer-term, however, it will probably be necessary to enter into further investment in new capacity. Further rationalization may occur

with re-grouping and ownership changes. Competition for ownership of mills and for supply of cane will undoubtedly intensify among the major players, namely CSR, Mackay Sugar and Bundaberg Sugar, which could lead to further mergers or take-over bids and the smaller cooperatives will need to remain vigilant to consolidate their position. But such developments are inevitable in any dynamic industry.

On the marketing side, the integrated packages of the Queensland Sugar Corporation have been successful in placing sugar on the most profitable markets where Australian sugar has a particular advantage and in enhancing its reputation for competitiveness, quality and reliability. Efforts will continue to provide an element of stability through price, foreign exchange and risk management programmes. There may in the future be some attempts to relax single-desk selling arrangements and accommodation may need to be made for New South Wales and the Ord River, should they become significant exporters. But this will involve tinkering rather than fundamental structural changes.

Detailed cost data are not published but Australian sugar industry spokesmen indicate that the industry would be sensitive towards investment if sugar prices fell below 10 US cents per lb for a sustained period, but could survive for some time at lower prices. Much depends therefore on future demand growth and demand/supply balance and on whether Australia can maintain and enhance its competitive position - also of course general economic developments, interest rates, etc.

In summary, it might be said that growers and millers are confident. The same can be said for the export-marketing sector. Indeed, both the Queensland Sugar Corporation and its principal marketing agent express confidence that there will be sufficient consumption growth to enable available supplies of Australian sugar to be exported remuneratively in the foreseeable future. I might add that latest reports also indicate that rationalization measures are being taken which may help to resolve the current hiatus in the refined sugar sector.

Australia has many natural advantages, not least that the location and spread of the industry from high tropics to temperate zone provide insurance against the impact of weather on production and enhance reliability of supply.

The family-based farming sector is knowledgeable, dedicated, self-reliant and confident, as indeed is the general work force on farm, factory and in the bulk-handling terminals. Productivity is high and all segments of the industry, including research, are geared towards furthering efforts to maintain and enhance Australia's competitive position.

The constructive programme of research, investment, growth and rationalization pursued over the last decade will be continued and given the confidence within the industry, which appears to be reflected also at government level, one must conclude that the Australian sugar industry seems to have established a sound platform to advance into the Twenty-first Century. If I may quote the sentiments of one industry official, any industry is as strong as its weakest link and the Australian sugar industry appears to have few weak links.

### IS THE PLANNED EXPORT POTENTIAL SUSTAINABLE IN THAILAND?

*Prepared by Mr Pichai Kanivichaporn for the Sugar and Beverages Group, Commodities and Trade Division . Tables*

have been omitted due to space limitations and could be made available upon request.

## INTRODUCTION

Thailand is a tropical country situated between latitude 5-21 N and longitude 97-106 E covering about 51.20 million hectares. The kingdom has total agricultural areas of 21.6 million hectares and cane occupies approximately 1.0 million hectares or 4.6% share. In the 1996/97 season, the Thai sugar industry produces 5.816 million tonnes of sugar from 56.192 million tonnes of cane. After put aside 1.670 million tonnes for domestic requirement, the exportable surplus is 4.146 million tonnes. The industry is expected to earn total gross proceeds of 49,000 million Baht, which consists of 18,700 million Baht from domestic sales and 30,300 million Baht from exports.

Sugar production in Thailand was first established as a cottage industry during the Sukhothai era (A.D. 1257-1350). The production was then gradually expanded and shifted to commercial scales. During 1930-1935, total sugar output was only 40,000 tonnes per year and approximately 25,000 tonnes of sugar was imported from Java, Indonesia. A new era began in 1937 when the first modern sugarmill with a milling capacity of 800 tonnes cane per day (tcpd) was launched. The initial objective was to develop an import substitution industry. Since then, sugar production has been increased as a consequence of growth, development and new technology. In 1960, Thailand became a net sugar exporter and the industry was found exporting white sugar for the first time in the following year. The exports during 1960-1974 were under 500,000 tonnes. The industry managed to export over one million tonnes for the first time in 1976.

Annual exports during 1976-1981 were slightly higher than one million tonnes except in 1980 when production and export surplus were badly hit by drought. However, due to bumper cane and sugar productions in the 1981/82 season, the 1982 exports leaped to almost two million tonnes.

## SUGAR EXPORTS

### Export growth

Beginning with a 1.535 million tonnes level in 1983, sugar exports slid down to 1.206 million tonnes in 1984 but rebounded to 1.697 million tonnes in 1985 and further increased to be almost two million tonnes in the 1986-1988 period. A dramatic surge was found in 1989 when it soared to a new record of almost 3.0 million tonnes in 1989. However, sugar exports of the next two years (1990-1991) turned out to be disappointingly low because they fell to 2.382 million tonnes in 1990 and slightly moved up to 2.715 million tonnes in the following year. Again, the industry managed to strike a new export record in 1992. The new record was 3.519 million tonnes, an enormous stride of a 0.804 million tonnes or about 30 % increase from the previous year's.

Sugar exports tumbled in 1993 to 2.297 million tonnes and slightly recovered in 1994 to 2.555 million tonnes. Export performances of the next two years were indeed spectacular. The export records have been successively broken in 1995 and 1996. First the new export record was registered in 1995 at 3.719 million tonnes. Then, the second new record was reported at 4.343 million tonnes in the following year. The 1997 export is forecast to be 4.146 million tonnes.

In sum, sugar exports during 1983-1996 have expanded from 1.5 million tonnes to 4.34 million tonnes, an average growth rate of 14.50% per year. As it is shown in Table 1, no one can deny that the industry has achieved remarkable export growth. However, that achievement is not all rosy because it goes by limps and leaps. Export falloffs were shown in 1984, 1990 and 1993. Drastic export surges were found in 1989, 1992, 1995 and 1996. The recent uptrend (1994-1997) seems to be enthusiastic until a pessimistic forecast of the 1997/98 cane production was released in July by the Office of the Cane and

Sugar Board. Up to now, the 1997/98 export is estimated to be not more than 3 million tonnes.

### Export composition

During 1983-1989, raw sugar occupied more than 85% of total exports. White sugar exports were marginal and accounted for less than 300,000 tonnes per year. During 1990-1992, the "white" volumes and relative shares have increased continuously, and it was more than one million tonnes in 1992, which were about 34 % of the total exports. Although white sugar exports in the following three years have declined to be less than one million tonnes, they rebounded in 1996 to be about 1.5 million tonnes and recaptured 34% of the total exports. It is forecast that the white sugar exports in 1997 would be about 1.3 million tonnes or 31.35 % of the total exports. All data are shown in Table 1. Traditionally, almost all of Thai sugar exports are raw sugar. The white sugar exports have recently emerged and likely to accelerate in the future. Unless production is undermined by unfavourable climate, white sugar exports would be increased in the future.

### Export market

All sugar exports from Thailand, raw and white alike, are sold under the standard f.o.b. terms. This in effect allows flexibility in second hand trading of Thai origin sugar. It is quite usual that a cargo of Thai raw sugar is sold and resold several times prior to its final receivers. The same pattern is also found in white sugar but with a shorter string. The industry consequently has no direct control over its export destinations.

From Table 2, it shows that stable export outlets for raw sugar are Japan, Republic of Korea, Malaysia and China. Erratic outlets are the Philippines, Africa and the former USSR. Major outlets for white sugar export are Indonesia, Sri Lanka and the Middle East. Again, the Philippines, India, China and the former USSR are occasionally turned up as destinations of white sugar exports. Major markets for sugar exports, raw and white, are in the Asia region where Thailand is enjoying a geographical advantage. The Middle East is our main customer of white sugar during 1990-1995 but its relative market shares are likely to decline in the future.

The Asia region, which includes the Middle East, is one of the most important regions in the world sugar map. The net sugar trade position of the region during 1982/83-1996/97 is shown in Table 3. Two conclusions can be drawn from this table. First, the Asia region is a net sugar importer both in raw and white sugar. The raw net import is generally larger than the white's. During 1994/95-1996/97, the region's raw net import is over 4 million tonnes per annum, while the white net import is declining to 3 million tonnes. Second, Thailand is fortunate to be situated at the proximity of this region and capable of reaping such advantage. The industry is enjoying its freight advantage over other sugar exporters.

Given the net import position of the region and the geographical advantage of Thailand, it is no wonder why almost all of the Thai sugar exports have been taken up by importers in the Asia region. It is also an indicator that all Thai exportable surplus are bound to be continuously bought up every year.

## FACTORS AFFECTING PRODUCTION AND CONSUMPTION

### The determinants of export availability

Given the Asia region's net import demand and Thailand's freight advantage, the Thai sugar export growth is basically determined by its export availability. Sugar is one of the

essential items in Thailand and it is under strict regulations. The industry is allowed to export only its annual surplus of production over domestic requirement. The export availability thus depends on how fast output grows compare to consumptions. Two important determinants of export availability are sugar production and domestic consumption.

The Cane and Sugar Act (1984) stipulates that the Cane and Sugar Board determines annual export quota by deducting domestic consumption figure from total production. Actual annual exports, however, include all sugar shipments in the January-December period. Hence it is possible that the actual figure is slightly deviated from the export quota which is based on the crop year (October-September). Two conclusions can be made from our comparison of sugar production to export figures during 1982/83-1996/97 in Table 4. First, differences between the export quota and annual export figures are very small. Second, export fluctuations are closely related to production changes. Sugar production is hence the most important determinant of export availability during the 1982/83-1995/96 period.

#### **The determinants of sugar production**

In general, sugar production is determined by cane production and its sugar yield, while changes in cane output is attributable to cane acreage and its yield per hectare. We compute percentage changes of basic production variables between the 1981/82 and 1995/96 seasons in Table 5. In the cane sector, cane yield's growth is only 11% while acreage and cane output grew about 71% and 91%, respectively. This means that during 1981/82-1995/96, acreage expansion accounted for 78% of cane output growth. When we compare growths in sugar production (125%) and sugar yield (18%) for the same period, cane production growth accounts for 73% of growth in sugar output and is the most important determinant. Such production growth can be ascribed to four important factors.

#### **The 70/30 revenue sharing system**

Prior to the 1982/83 season, cane prices were fixed by negotiations between growers' and millers' representatives under the state mediation. It was prolonged and difficult to reach agreement every year. Growers always claimed to be cheated by millers, while millers accused the government of taking sides. The most disputed variable was the expected proceed from exports. This lack of transparency had undermined confidence and trust between growers and millers. At times, this led to grower strike, delay of milling commencement and mill stoppage during the milling periods that cost the industry as a whole dearly.

Under the 70/30 revenue sharing system installed in the 1982/83 season, the Cane and Sugar Board divides annual sugar output into 3 quotas, namely quota A for domestic sales, quota B for exports under the industry long term contracts and quota C for exports under individual export contracts. The industry agreement stipulates the following steps for cane payment determination. First, the gross industry proceed is calculated by adding up all sugar proceeds from domestic sales (quota A) and exports (quota B+quota C). Second, the net industry proceed is then derived by deducting all industrial expenses from the gross industry proceed. Third, the net industry proceed is allocated to growers and millers at the ratio of 70 to 30. Fourth, cane price equals a division of growers' share by total cane tonnage. Fifth, in each season, the average price of the quota B export contracts is the standard export price in the calculation of export proceeds. Given annual sugar output and its allocation, the gross industry proceed is determined by prices of domestic sales and exports. Since price of domestic sales is rather predictable and industrial expenses are predetermined, the net industry proceed is basically depend on the standard export price.

Given the above-mentioned cane payment formula, it contributes three important stimuli to production growth. First, the determination of

export proceeds is much more transparent because the growers are responsible for the pricing of the quota B contract. The export proceed is in effect under the growers' decision. This installs more confidence and stability back to the industry. Second, the pricing term of the quota B contract is the seller executable order against the NY. No. 11 prices. The resulting export and cane prices are therefore truly reflecting the international sugar market's conditions. Third, the 70/30 system encourages competitions toward productivity upgrading among sugarmills. All variables are valued at the industry average levels. Hence, who ever manage to surpass the industry averages would be allowed to keep the margins as his windfall profits.

#### **The cane prices**

During 1982/83-1991/92, cane prices were determined by the formula under the 70/30 revenue sharing system. Prior to milling commencement of each season, a provisional cane price was calculated basing on estimated values of related variables and parameters. This is the price that sugarmills paid all cane deliveries during the milling period. In October, the cane price was recalculated by using actual values of relevant variables and parameters, i.e. domestic sales, export proceeds. The final cane price of the season was then officially announced by the Cane and Sugar Board and all sugarmills have to pay the difference to growers within 7 days.

Up to the 1991/92 season, cane price was determined and applicable to each and every tonne of cane regardless of its quality. A new system of cane payment based on cane quality was implemented in 1992 in order to stimulate productivity improvement. Cane quality is basically measured by its sugar content or c.c.s. unit. The standard cane price is referring to the price paid to cane with sugar content of 10 c.c.s. unit. Every additional c.c.s. unit will receive an extra payment at the rate of 6% of the standard price. Cane with sugar content less than 10 c.c.s. unit is penalized at the same rate as well. In practice, growers are always paid at minimum the standard cane price regardless of their cane quality. We list the provisional and final cane prices for the 1982/83-1996/97 seasons in Table 6 with the industry average c.c.s. data.

Cane production is strongly motivated by relatively profitable cane prices. The final cane price has been increased continuously from the 1990/91 season onwards. The 1992/93-1995/96 prices and the provisional price of the 1996/97 season are all exceeding the 550.00 Baht/tonne level. Hence, growers have received profitable returns since the 1992/93 season. This in effect leads to expansions in acreage. In addition, growers trust that scrambles among sugarmills for cane will continue in all regions. Consequently, growers would be offered an extra bonus of 50-100 Baht/tonne as it was done in the past. It should be noted that attractive cane price has also successfully converted land formerly cultivated other cash crops to canefield particularly those new acreage in the Northeastern region.

#### **The capacity expansion and relocation of sugarmills**

During 1982/83-1985/86 there were excess milling capacities in the Central and Eastern regions while milling periods in the Northeastern region were extraordinary long due to excess cane supplies. Several sugarmills in the Central and Eastern regions argued that existing policy of prohibiting new sugarmill and capacity expansion should be altered to realigned the imbalances. The government should allow sugarmill to relocate and expand capacity under certain criteria. The prerequisite is sugarmill must move out from the cane-deficient zone into the cane-surplus zone. Such a relocation would mitigate imbalances

both in the deficated and suplus zones. At the same time, small sugarmills had jointly requested capacity expansions to lower their cost disadvantages. Eventually the government decided to allow sugarmill relocation and capacity expansion started in the 19988/89 season. Since then, several sugarmills have been granted the privileges.

In the 1988/89 season, the industry's total milling capacity was 400,466 tonne cane per day (tcpd), and the first relocated mill was approved in this season with a capacity increase of 4,800 tcpd. Up to the 1997/98 season, there are 16 sugarmills that have been granted relocation with total capacity increases of 84,235 tcpd. And the government has also granted 19 sugarmills to expand capacity of 143,225 tcpd. Altogether, the industry's milling capacity has been increased about 227,460 tcpd, and making the 1997/98 season registered capacity to be about 627,926 tcpd.

All relocated sugarmills listed in Table 7 share two common factors. First, they moved out from the Central or Eastern regions into the Northern or Northeastern regions. Second, they increased their milling capacities. The four relocated sugarmills during the 1995/96-1997/98 has increased its capacity either before or after the relocation. When a sugarmill decides to relocate its site with an option of capacity expansion, the most crucial criterion for its survival is an adequate cane delivery up to its new milling capacity. Cane can be drawn from existing supplies and newly cultivated canefields. However, competing for the formerly existing cane is a no-win war, and hence a more practical approach is to encourage new acreages. All sugarmills, new and old alike, must devote all efforts to securing growers' commitments by offering favourable terms, mainly financial assistance with free or very low credit cost.

The Northern region's shares in cane and sugar productions started to climb up since the 1990/91 season and they managed to maintain at the level exceeding the 20 % mark throughout the 1990/91-1996/97 period. The Northeastern region has also registered higher shares of cane and sugar from the 1990/91 season onwards and they are continuously increased. The conclusion is the sugarmill relocation and capacity expansion policy has induced fast growing cane and sugar productions in the two regions.

#### **The climate**

Climate is one of the most important factors affecting cane and sugar productions in Thailand. This is due to the fact that less than 10 % of cane acreage are sufficiently irrigated and almost all of the cane has to depend on rain as the sole source of water supply. When there is bad climate, all cane just stands defencelessly in the field. The severe droughts in the 1989/90, 1992/93, 1993/94 and 1997/98 seasons have inflicted sharp setbacks in production growth. These disruptions are abundant evidences of the climate's influences. At the same time, perfectly favourable climate helped producing record bumper crops in the 1994/95 and 1995/96 seasons. The climate in the 1994/95 season was very favourable to cane production. At the beginning of the planting season, drought was expected to prolong from the previous season. However, there was adequate rain in the second quarter of 1994 and since then the climate was very friendly to cane. The rains in the second and third quarters were perfect in terms of quantity and timing. The industry would not be able to establish its new production record this season without strong support from the favourable climate. In addition, normal climate played a significant role in uplifting cane and sugar productions in the 1995/96 season.

Given the existing irrigation facilities and its future developments, climate is going to play an important role in determining actual cane and sugar productions at least in the next ten years.

#### **The domestic consumption**

The Cane and Sugar Board is responsible for assigning the annual quota A sugar for domestic sales. There is a tendency to overestimate the requirement in order to avoid panics and speculative hoards. This is

generally greeted with applause from the government agents, who always concern about sufficient supply for domestic needs, and growers who enjoy the higher cane price due to higher unit value of quota A compare to the exportable portions. The quota A sugar is sold under strict supervisions of the Sugar Committee to ensure adequate supply at all year round. The consumer welfare is further protected by a maximum price control for domestic sugar sales.

The annual domestic consumption of sugar in Thailand during 1982-1996 is shown in Table 10. Sugar consumption is determined by two important variables, namely population and national income. While a year-to-year comparison is showing a wide fluctuation of increase from more than 20% to as low as 0.3 %, the average growth rate is about 8.50 % per annum for the 1982-1996 period. This is a combined effect of growths in population (1-1.5 % per year) and general economic conditions (8-10 % per year). The average growth rate during 1988-1995 is more steady and higher (9.25 %). The additional growth is ascribed to strong demands from exporters who use sugar as raw materials. The industry started to grant price rebates to this buyer group in 1986. Since then the rebate programme has been expanding over the years.

It is anticipated that the recent currency woes in Thailand would eventually level off the country economic growth to a very un-tigerlike 2-4% a year in the next five years. The sluggish economic trend is attributable to high inflation caused by the Baht devaluation, a value added tax increase from 7% to 10%, an austere budget policy and tight credit conditions. This in turn will slowdown sugar consumption growth. Domestic sugar consumption is therefore expected to shudder to an average growth rate of 4% a year during 1998-2002. Given such a much lower growth rate and a 30% ratio of domestic consumption to total output, the impacts of domestic consumption in countering export availability is bound to be marginal. The most dominant factor in propelling export growth is the sugar production.

#### **EXPORT OUTLOOK**

The Thai sugar industry has done extremely well in the past decade, thanks to high cane prices, more stability and confidence in the industry, successful government initiatives in mill relocation and capacity expansion policy and good weather conditions. The industry is presently recognized as one of the five largest world sugar exporters and indeed a very dynamic one. The question is whether its recent export growth is sustainable.

#### **The 1998 export outlook**

The 1998 export outlook is definitely going to be much bleaker than the previous year's, because severe drought in 1997 has caused a sharp falloff in cane output and the 1997/98 sugar production is estimated to be as low as 4.60 million tonnes. Due to the on going economic slowdown, the 1998 domestic consumption is forecast to be 1.70 million tonnes. This finally brings the 1998 export availability to a dwindling 2.90 million tonnes.

#### **The 2002 export outlook**

The 2002 export outlook is projected under three basic assumptions. First, it is assumed that all sugar self-sufficiency campaigns in various Asia countries have yet to materialize. Second, domestic consumption grows at lower rates (3-5 %) due to sluggish economic conditions in Thailand. The last but most important assumption is that the climate is normal.

Judging from the industry's track records of surviving under stormy weathers during the past years, the industry outlook in

2002 is still encouraging. Although the sugar output and exports in 1997/98 are expected to be disappointingly low, the industry is looking forward to healthy recovery in the near future. By 2002, the cane production should be no less than 70 million tonnes and the sugar production should be about 7.70 million tonnes. Given an anticipated slowdown in domestic demand due to economic recession in the 1998-2000 period, the domestic consumption should be 2.10 million tonnes in 2002. The 2002 export thus is forecast to be 5.00-5.50 million tonnes.

Our optimistic projection is based on three major factors.

(a) The industry's total milling capacity is now about 628,000 tcpd, and presently is under-utilized. Given an average milling period of 120 days per season, the 70.00 million tonne cane should be processed with adequate capacity. Unless output is undermined by the abnormal climate, producing 7.7 million tonnes of sugar is viewed to be within reach for the next five years.

(b) The industry's export sector is well equipped to handle such tonnages of exportation both in terms of storage and loading facilities. Our preliminary survey shows that the industry now has 13 units of export terminal with 7 units in Bangkok, 2 units in Choburi and 4 in Anghong. All together they have storage capacity of 770,000 tonnes for bulk sugar and 920,000 tonnes for bag sugar. They are capable of loading at the rates of 400-500 tonnes per hour for bulk and 100-150 tonnes per hour for bag sugar. Given normal shipment distribution of 500,000-600,000 tonnes per month, such an existing capacity should be sufficient in handling the 5.0-5.5 million tonne export.

(c) The Asia region is a net sugar importer of at least 6 million tonnes during the last four years. The world sugar demand expands at the annual rate of 1-2% during 1984/85-1994/95, while Asia's consumption growth is more than 4% per year. Given rapid industrialisation in several Asian countries, the Asia region is bound to become the most fast growing sugar consumption region. Additional export availability from Thailand should be easily absorbed by Asia's import demand.

When an export of 5.5 million tonnes by 2002 is projected, this is much easier to say than to achieve. The immediate task is to rebound from its 1997/98 production slump which is not easy by all means. The industry then will have to make great strides to achieve the planned export by 2002. But much more needs to be done if it is aiming to surpass the 5.5 million tonne mark. The Thai sugar industry has to be a cost competitive producer by international standard. This is prerequisite because the industry must be able to effectively compete in the world market without any freight advantage. To achieve such an ambitious plan, the industry has to address and prescribe solutions to various problems related to cost ineffectiveness both in the canegrowing and sugarmilling sectors. The first and most crucial problem is how to uplift the cane yield per hectare which has been kept low by a host of factors. The next problem is that cane harvesting has to be mechanized with proper designs of machine and equipment. In addition, there is one more problems in the milling sector waiting to be genuinely tackled, that is the under-utilization of milling capacity. It generally worsens the scrambles among sugarmills for cane, and eventually costs the industry as a whole.

## CONCLUSION

When the first modern sugarmill was established in 1937, the initial aim was to develop an import substitution industry. At present, Thailand is one of the five largest world sugar exporters. Export growth is mainly propelled by canerecage expansions and climatic conditions via annual production changes. In spite of an expected sharp setback in export for 1998, the industry's export outlook is forecast to be promising during the next five years. Given normal climate, the industry should be able to make available about 5.0-5.5

million tonnes of exportable surplus in 2002. However, faster growth is extremely uphill. The industry has to overcome various hurdles in the cane and sugar sectors to achieve higher productivity and a cost competitive producer by international standard. Canecost improvement is vital in this ambitious mission. Again, climate is the most important and uncontrollable factor. To get through it all, the industry may not need a miracle, but a little luck would not hurt.

## THE DEVELOPMENT IN THE INDUSTRIAL USE OF SUGAR IN CHINA FROM 1970-1996 AND ITS FUTURE PROSPECTS

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### CURRENT SITUATION

Since the founding of the People's Republic of China, and especially since the reform and opening-up, the sugar industry in China has made rapid progress. The national sugar output (that of Taiwan Province of China province is not included) has developed from 260,000 tons at the early stage of her founding to 6,600,00 tons during 1996/97 campaign, the output had reached 7,910,000 tons in the highest year. China has entered the ranks of major sugar-producing countries. Through the development of over 40 years, the Chinese sugar industry has formed a fairly comprehensive sugar industrial complex from growing of sugar-bearing crops to sugar-producing and comprehensive utilization, from equipment manufacture, civil construction and equipment installation to production, education, scientific research, sales and marketing; the industry also has its completed specialized institutions and professional personnel with fairly high level.

Nowadays, China has 497 sugar factories, with processing capacity of 650,000 tons/day and sugar-producing capacity of 8,500,000 tons/year. Among them, cane sugar factories are 411 ones, with cane-pressing capacity of 560,000 tons/day and sugar-producing capacity of 7,000,000 tons/year; beet sugar factories are 86 ones, with beet processing capacity of 90,000 tons/day and sugar-producing capacity of 1,500,000 tons/year. The location of sugar industrial region nation-wide is as follows: there are 23 sugar-producing provinces and autonomous regions, in which cane sugar is distributed mainly over the 7 southern provinces and autonomous regions of Guangdong, Guangxi, Yunnan, Fujian, Hainan, Sichuan and Jiangxi, with the sugar output accounting for 98% of the national cane sugar output; beet sugar is dispersed over the 7 northern provinces and autonomous regions of Heilongjiang, Xinjiang, Inner Mongolia, Jilin, Gansu, Ningxia and Liaoning, with the sugar output amounting to 97% of the national beet sugar output.

The whole sector has 450,000 employees, in which technicians and engineers are more than 20,000 people, the farmers for growing sugar-bearing crops are over 3,000 people. At present, China has 25 scientific institutions of sugar-making and sugar-bearing crops, 9 designing institutes which set up sugar speciality, 15 universities and colleges and technical secondary schools putting up sugar-making speciality, 4 sugar beet seed companies, as well as 8 machinery plants manufacturing sugar machinery in addition to other machineries.

### PRODUCTION AND CONSUMPTION

Since 1970s, sugar production and consumption in China have undergone several different developing periods. Between 1970-1978, the sugar production all the time hesitated



between 1,350,000 ~ 2,267,000 tons, in the same period the sugar consumption between 1,604,000 ~ 2,768,000 tons, and consumption per person between 1.0 ~ 2.9 kg, the consumption per person only grew 1 kg during those eight years.

Since 1978, China has practised the policy of reform and opening-up, her economy has developed rapidly, and the people's living standard has improved quickly. During the same period, the Chinese government has carried out the policy of rewarding grain for growing sugar-bearing crops, thus solving the contradictory issue of contending for farmland between grains and sugar, the development of Chinese sugar industry had been puzzled by this issue for a long period of time. In addition, our state had increased the investment in the sugar industry during the Seventh Five-Year Plan, developing 4 new sugar-producing bases of Guangxi, Yunnan, Xinjiang and Zhanjiang in Guangdong and increasing sugar-producing capacity, all these had made a rapid development of sugar production. The sugar output had hiked to 8,289,000 tons in 1992 from 2,267,000 tons in 1978, with 266% output increase in 14 years and averaging 19% of annual increase. During the same period of time, the total sugar consumption had also jumped from 2,768,000 tons in 1978 to 7,589,000 tons in 1992, with an increase of 235% in the 14 years and averaging 17% of annual growth. The consumption per person upgraded from 2.9 kg to 6.5 kg.

However, since 1992, because the reform of the production and marketing of grains and sugar brought new contradictions and problems which were not solved properly, and because the readjustment of grains price which made the price ratios between grains and sugar-bearing materials lose their balance, and made the sugar-bearing crops decrease in production, resulting in the drop of the national sugar production for 3 years running, and by 1995, it went down to 5,310,000 tons. But it rose again to 6,337,000 tons in 1996, and it is estimated that it will pick up to 6,650,000 tons in 1997. Since 1992, the sugar consumption has fluctuated for a time, the main reason is the increased utilization of the substitutes.

Over a long period of time, the sugar output in China is not enough for the sales, China imports sugar every year to supplement her domestic insufficiency, and it's one of major net sugar import countries (but China once became a net export country in 1992 and 1993).

#### **THE DEVELOPMENT IN THE INDUSTRIAL USE OF SUGAR**

Before 1991, China carried out fairly strict planned management of sugar purchase and sales, and the sales flow direction was quite clear. Tables 3.1, 3.2 and 3.3 show the breakdown of sales of the industrial use of sugar. From the tables, it can be seen that the main fields in the industrial use of sugar in China are the sectors of confectionery, bakery products, cans and snacks etc. The percentage of industrial use of sugar makes up about 50% of the national sugar sales. In Table 3.2, this percentage was below 40% after 1983, but considering that sugar directly sold by the sugar factories besides the commercial sale was basically sold to the big sugar end user for industrial use, therefore the percentage of total consumption in the industrial use of sugar should be between 50% ~ 60%. Since 1991, the flow direction of sugar sales has been set free, so it is difficult to find the statistical figures of sales by breakdown, but the basic situation of the industrial use of sugar after 1991 can be calculated according to the development of sugar-use products. From Table 3.3, it can be seen that, at present, the industrial use of sugar in China still concentrates on the sectors of soft drinks, confectionery and bakery products etc., and the proportion of the industrial use of sugar in the total consumption escalated from 55% in 1991 to 66% in 1995. The biggest sugar-use provinces and municipalities are those fairly economy-developed ones along the southeastern coast, such as Guangdong, Shanghai, Jiangsu, Zhejiang, Beijing, Shandong and Fujian etc.

#### **Industrial use of sugar by sectors Confectionery industry**

The confectionery industry is a conventional sugar-consuming industry in China, and used to be the sector consuming most sugar in history, the percentage in the industrial use of sugar had once reached as high as 40%. From the beginning of 1970s to the end of 1980s, its sugar consumption increased simultaneously with the development of our national economy. At the end of 1980s and in early 1990s, the confectionery demand had changed with the improvement of the people's living standard. The output and consumption of conventional and popular candies decreased, while the output and consumption of high-grade sweets and chocolate rose: the total sugar consumption showed slow increase. In the recent years, the confectionery industry has developed in a rapid speed, and its sugar consumption grows fairly fast. In 1991, the sugar consumption in the confectionery industry was 628,000 tons, and in 1995 the sugar consumption in the industry was 801,000 tons, accounting for 17% and 16% of the total sugar consumption in the industry use in that year respectively. It is estimated that the confectionery industry will still be the major sector in the industrial use of sugar in the future 10 years. The Chinese confectionery industry mainly concentrates on the economy-developed provinces and municipalities, such as Shanghai, Guangdong and Beijing etc.

#### **Bakery industry**

The bakery industry is both an ancient and a rapid developing sector, its sugar consumption has surpassed that in the confectionery industry, only behind that in soft drinks industry. The ends of 1970s and 1980s were the golden age of the industry, when its sugar consumption jumped. In the bakery industry, the production of biscuits and moon cakes consumes more sugar than that of other bakery products. In 1991, the biscuit segment consumed 173,000 tons of sugar, and moon cake segment consumed 200,000 tons of sugar. The total sugar consumption in bakery industry was 693,000 tons in 1991, 785,000 tons in 1995, amounting to 19% and 18% of the total sugar consumption in the industrial use respectively. It is estimated that the sugar consumption in this sector will reach 1,085,000 tons by the year of 2000.

#### **Soft drinks industry**

The soft drinks industry is a developing sugar-using industry, and develops most rapidly among the sugar-using sectors. According to the statistics done by the Ministry of Light Industry, at the end of 1970s, the total production of the soft drinks industry was only 200,000 tons or so, with the sugar consumption of about 20,000 tons. Its output has shot up since entering 1980s, and up to 1996, its total production reached 6.5 million tons (the production having not counted up approximately made up 50%), with sugar consumption of about 1,050,000 tons. When breaking down into regions, the soft drinks production in Guangdong province reaches 2 million tons, accounting for 30% of the national total production; the production in the ten provinces of Liaoning, Zhejiang, Beijing, Shanghai, Fujian, Hubei, Jiangsu, Guangxi, Hainan and Sichuan, is between 100,000 ~ 400,000 tons respectively; the production in the 6 provinces of Shandong, Hebei, Tianjin, Heilongjiang, Henan and Jilin all surpasses 100,000 tons; the production of the above 17 provinces and municipalities amounts to over 93% of the total soft drinks production nation-wide.

The soft drinks output having not counted up is mostly produced by the small-sized enterprises in the small towns, with mainly using saccharin for their soft drinks production.

It is estimated that the future ten years will still be the highly developing 10 years of the soft drinks industry, and its annual

sugar consumption will reach 1,500,000 tons. The soft drinks industry is a sector which uses more of synthetic sweeteners such as saccharin etc. The percentage of sugar substitution with sweeteners such as saccharin depends on the attitude our country takes towards to the utilization of saccharin.

#### **Canning industry**

Among the canning industry, fruit cans and the convenience congee cans developed in the recent years are the main varieties using sugar. Since 1970s, the output of fruit cans has been steadily growing up to now, from 77,400 tons in 1970 to 1,050,000 tons in 1996, its sugar consumption has crept up from 10,000 tons to 160,000 tons in the same period of time. The main producing areas of fruit cans concentrate on the provinces and autonomous regions of Zhejiang, Sichuan, Hunan and Guangxi. The convenience Congee etc. are the new sugar-using segments suddenly coming to fore in the 1990s, their present consumption is about 50,000 ~ 60,000 tons/year.

#### **Preserved fruits industry**

It is a traditional, sugar-consuming industry, its sugar consumption makes up about 70% of its product output. The highest year of sugar consumption once reached 100,000 tons. In the recent years, its output and sugar consumption have no big changes. However, according to the insiders, with the development of fruit planting, the fruit processing industry is sure to have a big development. Besides the varieties of fruit juice and fruit cans etc., the traditional fruit product — preserved fruits will have a certain development. It is estimated that the sugar consumption of preserved fruits will exceed 170,000 tons in the year of 2000.

#### **Dairy products industry**

During the initial stage of the founding of the People's Republic of China, the output of dairy products in our country was only several hundred tons, it developed to 47,000 tons by 1978. Since 1978, it had been the most rapid developing period of the Chinese dairy products industry, the output had advanced from 47,000 tons in 1978 to 450,000 tons in 1995. Among the output of dairy products, 80% is milk powder, about 15% is condensed and evaporated milks and the others are yoghurt. Their total sugar consumption is 145,000 tons. The main producing areas of dairy products are: Heilongjiang (28.7%), Zhejiang (9.4%), Hebei (6.6%), Inner Mongolia (6.4%), and Shandong (6.0%). China is one of the countries the consumption per person is low, but at the same time China is one of the countries which develop dairy products fairly fast. With the improvement of the people's living standard, the dairy products will surely have a big development. The dairy products industry will be one of the sectors which sugar consumption grow fairly fast.

#### **Alcoholic drinks industry**

China is a big alcoholic drinks producing and consuming country, the production of fruit wine, wine, rice wine and some spirit all need sugar. At present, their total sugar consumption is at about 138,000 tons. For a period of time in the future, the developing trend of alcoholic drinks in China is towards the low alcohol drinks, with the emphasis on developing fruit wine and rice wine. The sugar consumption in alcoholic drinks industry will show the rising tendency, and it is estimated that by 2000 the sugar consumption in alcoholic drinks will surpass 352,000 tons.

#### **Ice cream industry**

Its main products are ice cream etc., its sugar consumption amounts to about 9% of the total sugar consumption in the industrial use. In the recent years, the ice cream industry witnesses rapid development, especially the establishment of large-sized joint ventures in Guangdong, Beijing and Shanghai etc. has promoted the development of ice cream industry.

#### **Pharmaceutical industry**

The sugar consumption in the pharmaceutical industry is one of the most difficult figures to collect. In the planned economic period, the breakdown of sales showed that its sugar consumption was approximately 100,000 tons, mainly used for the Chinese medicine of bolus and concentrated drugs (*chongji*), the sugar coating of the western medicine as well as some fermented products. All kinds of oral liquid drugs etc. emerged in the recent year are one of the new sugar-using varieties. It is estimated that the sugar consumption in the pharmaceutical industry surpasses 150,000 tons at present.

#### MAIN FACTORS INFLUENCING ON THE DEVELOPMENT IN THE INDUSTRIAL USE OF SUGAR

Generally speaking, the development in the industrial use of sugar in China follows the development of the Chinese national economy and the natural growth of the population. Before 1978, both sugar production and consumption were at a low level. The 20 years since the reform and opening-up have been the quickest developing period of the Chinese economy, and the quickest developing period of the industrial use of sugar, as well. Tables 5.1 and 5.2 show GNP and the population growth in China between 1978 ~ 1995, and Table 5.3 shows sugar price and consumer indices

##### The influence of substitutes

The main non-sugar sweeteners nowadays used in China are those several kinds: saccharin, stevioside, cyclamates, aspartame as well as polyhydric alcohols and starch sweeteners.

*Saccharin* is a kind of sweeteners with largest amount of and the longest history of use, its price is the lowest, too. In 1996, the market price of saccharin was RMB 35,000 yuan/t, or RMB 100 yuan/t.s.e., it is the biggest substitute for sugar. Since 1992, our government has taken measures to limit the production and use of saccharin: its production is limited within 12,000 tons, its use is limited within 6,000 tons. The measure had played its role for a time. However, because of a great disparity of price between saccharin and sugar and not effectively enforcing the measure by some departments, saccharin production and use have gained ground at the expense of sugar in the recent years. However, its production and use are often underground. It is very difficult to do the official statistics for those figures. It is estimated that in 1996 its production surpassed 20,000 tons and its use exceeded 10,000 tons, or exceeded tons s.e..

*Stevioside*. China has started to plant and produce stevioide since 1980s, its output is about 300,000 tons s.e., but its use is not so big. In the recent years, China has been exporting stevia leaves and raw stevioside, and her domestic use is equivalent to about 100,000 tons s.e.. Since its production cost is relatively high, the substitution of stevioside for sugar is not obvious.

*Cyclamates*. China has started her production since the end of 1980s, and has developed fairly rapidly in the recent year. Its output in 1988 was several hundred tons, and reached 1,500 tons in 1990, and 4,600 tons in 1996, or 230,000 tons s.e.. Cyclamates is one of the limited-use sweeteners like saccharin. Its price is about RMB 36,000 yuan/ton, or equivalent to RMB 720 yuan/ton s.e..

*Aspartame* and other new-type sweeteners. Since early 1990s, aspartame has been started the production in the cities along the southeastern coast. Its development is not fast because of its fairly high cost. However, the imported aspartame enters the Chinese market with its strong propaganda offensive in the recent years, its consumption begins to rise. It is estimated that the consumption had reached 100,000 tons s.e. in 1996.

In addition, the productions of *polyhydric alcohols* and *starch sweeteners* have developed slowly, since their prices have no competitive advantages compared with sugar. The output of polyhydric alcohols is about 45,000 tons s.e.. In addition to export, it is mainly used for the special food for the special group of people (such as diabetics). The production of starch sweeteners has started since the

early 1980s. Its production scale is small, its cost is high, and transport and use conditions have also limited its development. Its output is approximately 300,000 tons of commercial quantity. Its future development will depend on the degree of self-sufficiency in grain and grain price in China.

Among all the non-sugar sweeteners, the production costs and selling prices of polyhydric alcohols and starch sweeteners are all higher than those of sucrose. However, the using prices of saccharin, stevioside, cyclamates and aspartame etc. are all lower or far lower than that of sucrose, the degree of their substitution for sugar will depend on the product properties itself, the consuming consciousness of the consumers and the attitude to which the country takes.

#### FUTURE PROSPECTS

In the last few years of this century and at the beginning of next century, the economy in China will develop with a fairly high speed, and the average growth rate of her GNP will reach 7%, in which the developing speeds in the industrial use of sugar in foodstuff, beverage sectors etc. will be higher than the average growth rate of GNP. The following factors will influence on the development in the industrial use of sugar:

- The population growth and the growth of proportion of city population nation-wide;
- The change of diet structure;
- The improvement of the people's living standard, the increase of health consciousness,
- the selection of the consumers will turn to sucrose all the more; and
- The government will pay even more attention to the development of sugar industry , and
- will strengthen the limitation of production and
- use of chemically synthetic sweeteners such as saccharin etc.

It is estimated that by the year of 2010, the sugar consumption in China will be over 11 million tons, in which the proportion of the industrial use of sugar will rise to 70% from about 65% at present, reaching 7.7 million tons. Its main application fields will be the sectors of beverages, confectionery, bakery products and dairy products etc.

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### THE NORTH AMERICAN SUGAR MARKET: RECENT TRENDS AND PROSPECTS BEYOND 2000

*This was prepared by Mr Peter Buzzanell for the Sugar and Beverages Group, Commodities and Trade Division, FAO. Tables have been omitted due to space limitations and could be made available upon request.*

#### INTRODUCTION AND OVERVIEW

Ladies and gentlemen it is an honor to be invited to speak at this important international conference focusing on sugar markets in Asia and the Pacific. The Fiji/FAO Organizing Committee has asked me to present my analysis of the North American market. Developments in North American both contrast and parallel emerging trends in production, consumption, trade patterns and regional trade arrangements in Asia and the Pacific. Of particular interest to you, I believe, is the North American Free Trade Agreement (NAFTA) and its sugar provisions. NAFTA provides a model of how sugar provisions can be worked into a regional trade agreement among three countries with very different sugar regimes. The Canadian-U.S. Free Trade Agreement provides a model of a bilateral trade arrangement. Special attention is also given to Mexico's large labor intensive cane sugar industry and how it is emerging from its privatization initiative.

The North American region consists of three countries, Canada, Mexico and the United States of America, (U.S.), with a combined population of just over 400 million. The region, as a whole, has been consistently a sugar deficit area, requiring more imports than exports to meet growing consumption needs. However, changes in the region's sugar industries are causing new trends to emerge. For example, Mexico has been a deficit sugar producer, but in recent years has shifted to surplus producer status. The U.S. produces a significant share of its sugar needs, but remains a major importer and at a higher level than expected a decade ago. In contrast, Canada produces only a small share of its needs, depending largely on imports. For 1997/98, Sparks Companies Inc.(SCI) forecasts total North American production at 11.95 million tons and consumption at 14.49 million with per capita use averaging 34 kilograms. Trade is expected to total 3.46 million tons of imports, with over 2 million tons going to the U.S. and over 1 million tons going to Canada, while exports are estimated at 1 million tons, the bulk of which will come from Mexico. Both sugar production and consumption for the region has been trending up over the last decade.

Trade, both imports and exports, however, has shown considerable year-to-year variation. Sugar trade among the countries of North America is currently relatively small, but this is expected to change under NAFTA in terms of exchanges between Mexico and the U.S. For related sugar containing products and sugar substitutes such as high fructose corn syrup, the trade is currently also relatively small but highly continuous.

In order to project where the region is headed beyond 2000, it is important to understand the changing structures and forces underpinning the emerging trends in the sugar industries in the region. With this accomplished, the implications of NAFTA among the countries of the region and prospects beyond 2000 can be better assessed.

## **UNITED STATES OF AMERICA (U.S.)**

### **Introduction**

The U.S. sugar market continues to be dynamic in size and structure. U.S. sugar is an important part not only of the U.S. agricultural sector, but also of the global sugar economy in terms of production, consumption and trade. Like most countries, there is considerable Government intervention in the U.S. sugar market - - a loan program and tariff-rate import quota system - - which affects domestic prices as well as U.S. producers, consumers and foreign suppliers.

### **Sugar Production: Recent Trends and Industry Structure**

U.S. sugar production (including Puerto Rico) for fiscal year 1997/98 (October-September) is forecast by SCI at a record 6.87 million metric tons, raw value. Only the expected output in the combined European Union (EU) countries, India, and Brazil are forecast higher. U.S. sugar production, with major components of sugarbeet and sugarcane, outranks the only other major dual producer, China, by 40 percent.

### **Beet Sugar**

Sugarbeets are grown as a rotation crop in 17 of the 50 U.S. states by an estimated 2,000 sugarbeet farmers. There are currently 10 sugarbeet processing companies with 30 processing facilities near growing areas. For 1997/98, SCI forecasts beet sugar production at 3.88 million metric tons, accounting for 56 percent of total production. Only beet sugar production in France is consistently higher.

Beet sugar production has expanded from around 2.7 million tons annually in the early 1980s when new U.S. sugar policies were implemented to an average 3.7 million in the early 1990s, up by over one-third. The beet sugar production growth trend is 100,700 metric tons per year over fiscal 1983-1996. Sugarbeet harvested area has expanded by over 80,000 hectares from 485,000 in the early 1980s to 567,000 hectares this year, with some year-to-year variations.. While some areas have experienced a decline, notably the state of California,

this has been more than offset by expansion in the Upper Midwest states of Minnesota and North Dakota.

To accommodate the expanded area, U.S. beet processing firms have increased slicing capacity (tons of beets per day) to an average of 4,875 metric tons per factory, up by one-third from the early 1980s. In contrast to increased area in sugarbeets and capacity, sugarbeet yields have not trended upward, but vary widely from year to year due to weather. However, sugar per hectare has been rising, reflecting the growing of beet seeds bred for high sugar content, improved management techniques by farmers, and improved processing technology. For example processors have provided incentives to growers to raise crop quality (sugar versus tonnage). The improved management of nitrogen has been pivotal to this effort. Too much nitrogen costs growers twice-extra cost for unneeded inputs and lower extractable sucrose which reduces crop returns.

In addition, the beet sugar industry has benefited from investment in ion-exchange chromatographic separator technology which facilitates the desugaring of beet molasses high in sugar content. Beet sugar production from the desugaring of molasses (included in the total forecast) is expected to total 227,000 tons in 1997/98 from six facilities now in operation, compared with under 50,000 tons from one facility in the late 1980s.

Sugarbeets, while expensive to grow, are generally more profitable than alternative crops in most areas where they are grown and, under the current U.S. government sugar program, sugarbeets are expected to remain more profitable. The goals of sugar policy are to support U.S. beet and cane sugar producer returns and stabilize supplies. This is accomplished by supporting producer prices for domestic sugarcane and beets above international prices, but at no Federal budget cost. This approach means that, except in years when the world price is usually high, consumer prices are above what they would be without the program.

The U.S. sugar program involve a series of regulations including price support loans and limits on U.S. sugar imports. Unlike most price-supported crops, price support loans for sugar are made available from the U.S. Department of Agriculture (USDA) to processors rather than directly to farmers. Raw cane sugar is supported at 18 cents per pound and refined beet sugar at 23.90 cents per pound for the 1997 crop. These loan rates are national levels and vary among regions of the country.

Processors who receive loans are obligated to repay the principle and interest before they sell the sugar. But if market prices are below the loan level, processors may transfer the sugar (pledged as collateral for the loan) to the USDA as full payment for the loan. Processors who choose to participate in the loan program are obligated to pay specified minimum prices to producers of beets and sugarcane that correspond with the loan rates for beet and cane sugar.

To insure that foreign sugar does not enter the U.S. market in such quantities that would potentially undermine the domestic support system, import quotas are imposed on foreign sugar. USDA sets the size of the import quota for each marketing year. The Office of the U.S. Trade Representative is responsible for allocating shares of the quota among countries eligible to export sugar to the U.S. A group of about 40 countries has access to the U.S. quota, and each one's share has been largely unchanged since 1982.

### Cane Sugar

Sugarcane is grown in only 4 of the U.S. 50 states as well as Puerto Rico. The structure of the industry is characterized by a relatively small number of producing and processing firms with large scale operations, this has been especially true in the states of Hawaii and Florida. In contrast, Louisiana's industry is characterized by a relatively large number of small growers and a sizable cooperative ownership of the raw cane milling sector. Cane sugar production grew at a trend rate of only 17,237 metric tons during 1983-96 as growth in Florida and Louisiana was largely offset by the sharp contraction of Hawaii's sugar industry. Over this period, national area in sugarcane has expanded by over 80,000 hectares, led by Florida and Louisiana. In contrast, area planted to sugarcane in Hawaii and Puerto Rico has declined sharply.

Florida has displayed strong production growth, underpinned by expanded area and generally improved yields and recovery rates. Production rose from 1.0 million metric tons in the early 1980s to around 1.6 million in recent years. Louisiana has experienced freezes, hurricanes, and periodic poor growing and harvesting weather, but area in sugarcane has been trending up and the state has enjoyed 1.0+-million-ton sugar production in each of the last four years. Texas has made incremental improvements in its field and factory efficiency and also has had production at record levels in recent years, though this year it is being affected by drought.

SCI's cane sugar production forecast for Hawaii is unchanged at 295,000 metric tons, which would be down 6 percent from the 1996/97 production. A decade ago, Hawaii was regularly producing a near 1 million tons per year. Costs for labor, transportation of sugar to the U.S. mainland, and environmental compliance are some of the leading causes for contraction of the industry. Since 1992, six out of 12 mills have closed with two of those closings occurring in 1996. Some of the currently operating mills also have been losing money in recent years and some additional contraction of the industry is expected. According to a leading spokesman for the Hawaiian industry, if there is no additional mill closures, production in calendar year 1998 is forecast to decline only modestly, ending a decade of rapid contraction of the industry.

Currently, the U.S. cane sugar industry has 34 raw cane mills distributed in the growing areas: Florida, 7; Louisiana, 19; Texas, 1; Hawaii, 6; and Puerto Rico 1. These facilities vary in capacity with the mills in Florida having an average daily crush capacity of 20,000 tons per day versus the mills in Hawaii which average under 10,000 tons. Moreover, the general trend in the industry is to have fewer but larger mills. For example, Louisiana's industry 20 years ago had over 40 mills and now it has only 19, with the expectation that the state will have only 10 super mills in a few years, but will be producing sugar at record levels..

Unlike many areas in Asia and Latin America, cane sugar refineries in the U.S. have been largely stand alone operations located at port facilities. The melting capacity of U.S. cane sugar refineries at 12 plants is approximately 20,360 metric tons per day which equates to the ability to produce 6.0 million metric tons of refined sugar on a 270-day per year schedule.

A new trend in the U.S. is for cane producing and milling companies to invest in capacity to produce refined sugar at their existing raw mills. For example, U.S. Sugar Corporation in Florida, is currently putting on capacity to refine sugar for the first time. Other mill ownership groups are considering integrating their capacity in order to maximize use of their facilities, reduce costs and capture the refined sugar price premium in the U.S. market.

In another emerging trend in the industry, cane refining companies have been merging with beet sugar companies (for example, the merger

of Imperial Holly with Savannah-Michigan). Also, multi-nationals have been investing in the U.S. industry with Tate and Lyle purchasing Domino (a cane sugar refiner), Western (a beet processor) and Staley (a corn wet-miller and producer of HFCS). (Tate and Lyle also has invested in the sweetener industries of Canada and Mexico.)

### Sugar Consumption: Recent Trends Industry Structure

U.S. sugar consumption ranks third in the world behind India and the EU. The U.S. has the world's third largest population of 274 million and the largest and most diverse food processing industry. Despite a trend toward greater self-sufficiency in sugar production, the U. S. remains one of the world's largest net sugar importers - - only the Russian Federation and Japan are higher.

During the first half of the 1980s, sugar lost 2 million tons of the beverage market to lower-cost high fructose corn syrup (HFCS). Since 1986/87, with maturity of the HFCS market, sugar use has rebounded. For the decade of 1985/86 to 1995/96, U.S. sugar consumption growth was 1.9 percent per year. For the first five years (1985/86-1990/91) of the decade, the annual growth was 2.3 percent, while the second five years (1990/91-1995/96) has a growth of 1.4 percent. This resurgence largely reflects population growth (0.9% per annum), increases in the population of immigrants (many of their traditional diets are high in sugar), expansion of away-from-home food consumption, and increases in use by food processors.

The structure of demand in the U.S. differs from many countries. Only about 30 percent of demand is in the direct retail business while 70 percent is in the industrial processing sector. Leading sugar containing product manufacturers in the U.S. are the cereal/bakery product manufacturers and confectionery, ice cream and dairy product manufacturers. Under 200,000 tons of sugar are now used annually by the U.S. beverage industry - - the bulk of that market is now sweetened by either high fructose corn syrup in nutritive or regular soft drinks or by aspartame in diet drinks.

### Corn Sweeteners - Alternative to Sugar

Separate attention needs to be given to corn sweeteners, an important substitute for sugar in the U.S. due to its competitive pricing and product characteristics. The U.S. has the world's largest corn sweetener production capacity and it is the largest market for the industry's dominant product, high fructose corn syrup (HFCS). The U.S. corn wet-milling or refining industry currently consists of 28 facilities in 15 states. HFCS production capacity for 1997 is estimated at about 24.1 billion pounds, dry weight, up from 19.6 billion in 1995 and 11.9 billion pounds a decade earlier.

The recent expansion in capacity temporarily has outpaced strong growth in HFCS demand, resulting in a fall off in plant utilization. HFCS capacity utilization is currently running at about 70 percent, down from over 90 percent earlier in the 1990s.

HFCS deliveries in 1997 are expected to total 16.7 billion pounds, or 4.1 percent greater than 1996. Using deliveries as an indicator of consumption, this would equate to over 60 pounds per capita, up from 49.6 pounds in 1990 and 19 pounds in 1980. Total HFCS consumption is driven largely by HFCS-55 use in the soft drink beverage industry which normally accounts for 90 percent of its consumption. For 1997, deliveries of HFCS-55 are estimated at 10.0 billion pounds while HFCS-42 deliveries are estimated at 6.7 billion pounds. Low priced HFCS-42 continues to grow in demand, taking some additional markets from sugar whose price has been

particularly strong this year. For 1998, deliveries are expected to continue their upward trend advancing a projected 4.5 percent to total 17.5 billion pounds.

U.S. trade in corn sweeteners has been relatively small compared with domestic production and utilization and has been largely confined to border trade with Canada and Mexico. Trade with Mexico has been generating considerable recent attention, particularly due to the prospect that Mexico's soft drink industry might switch from sugar to fructose as its sweetener of choice.

#### **Sugar Trade: Recent Trends and Structure**

The U.S. remains one of the world's largest sugar importers, importing annually over 2 million tons of quota sugar and several hundred thousand tons of non-quota sugar for refining and re-export. In mid-September 1997, USDA announced the fiscal 1997/98 (October-September) tariff rate import quotas (TRQ) for raw, cane, refined and specialty sugar. The combined TRQ for 1997/98 totalled 1.825 million metric tons (2.012 million short tons), down 27 percent from the TRQ announced in September 1996. The sharp downturn in the combined quota reflects an increase in old-crop stocks and late arriving 1996/97 TRQ sugar carrying stocks coupled with a 5.3 percent increase in expected U.S. beet and cane sugar production for 1997/98.

As was the method last year, USDA is initially making 1.200 million metric tons (1.323 million short tons) of the raw cane sugar quota available to the market. The Office of the United States Trade Representative (USTR) has allocated the quota among 40 countries based on historic shares of the U.S. sugar import market using the base period of 1974-1981 with the high and low years taken out.

As the year progresses, USDA will allocate an additional quota tranche in January 1998 of 200,000 metric tons. This allocation will pivot on USDA's January World Agricultural Supply and Demand Estimates (WASDE) report for sugar. If the sugar stocks-to-use ratio in the WASDE report is less than or equal to 15.5 percent, the additional allocation will be released and the Office of the Special Trade Representative will allocate by country. If the ratio is greater than 15.5 percent, the allocation will be cancelled. The same process will occur with the March and May WASDE reports.

The current import quota system allows entry at the rate of 0.625 cents per pound, raw value basis. The duty is waived for sugar from beneficiary countries including Caribbean Basin Initiative (CBI), Andean Preference, and most Generalized System of Preferences (GSP) countries. During 1997 above quota raw sugar entering the United States for consumption is subject to a duty of 16.72 cents per pound and refined sugar 17.65 cents per pound. Under NAFTA, the duty for Mexican sugar entering the U.S. under the TRQ is zero. For 1996/97 and 1997/98, Mexico was determined to be a net surplus producer and can ship 25,000 tons of either raw or refined sugar to the U.S. Above quota duties for Mexico are on a declining scale, but still are high - for 1997 they are 14.4 cents for raw sugar and 15.3 cents for refined sugar.

The North American Free Trade Agreement (NAFTA), implemented on January 1, 1994, does not affect the overall trade forecast. However, if Mexico is designated as a net surplus producer, it will receive an annual quota starting in 2000/01 of 250,000 tons per year. After year 2008, all barriers to sugar trade between the United States and Mexico are to be ended.

The implementation of the Uruguay Round General Agreement on Tariffs and Trade (GATT) has not changed the basic features of U.S. sugar import or export regimes. The two-tiered TRQ system remained in place, and the low duty applicable to in-quota imports is unchanged. However under the Uruguay Round GATT Agreement, the United States agreed to maintain (bound) a minimum low-duty import level of 1.139 million metric tons, raw value (1.256 million short tons, raw

value, annually, comprised of 24,000 tons of refined sugar, raw value, and 1.232 million tons of raw sugar.)

#### **Sugar Prices: Recent Trends and Structure**

U.S. sugar prices have been well above world prices since 1982. The main mechanism for maintaining U.S. sugar prices has been a restrictive import quota. The two key sugar prices in the United States are the raw cane sugar price and the refined beet sugar price. The raw cane sugar price is based on sugar delivered to New York, and is quoted on the New York Coffee, Sugar and Cocoa Exchange. There is no futures market for U.S. refined sugar, but a price for wholesale Midwest refined beet sugar, f.o.b. factory, is quoted each week in the trade publication *Milling and Baking News*.

Over the last decade (1987-1996), the U.S. raw sugar price averaged annually 22.2 cents per pound, ranging from a low of 21.3 cents in 1992 to a high of 23.3 cents in 1990, a spread of only two cents. For the first eight months of 1997 raw sugar prices averaged 21.9 cents per pound.

In contrast to raw sugar, refined beet sugar prices have been more variable. Refined beet sugar prices tend to drop when there is a large beet sugar crop and rise when beet sugar production declines. For example drought and other weather problems reduced the beet crops in 1988 and 1989, contributing to high refined sugar prices in those years. Over the last decade annual refined beet sugar prices averaged 26.5 cents, but ranged from a low of 23.6 cents in 1987 to 30.0 cents in 1990, a spread of 6.4 cents. For 1997, January-August prices have averaged 28.4 cents.

Weather has much less influence on raw cane sugar prices, since weather-induced shocks to domestic supply can be accommodated by changing the raw cane sugar import quota.

The margin between refined and raw sugar prices has also varied. When this margin is low, cane refiners pay almost as much for raw sugar as they charge for refined sugar and are not able to cover their costs.

The HFCS product that is most substitutable for sugar, HFCS-55 (55 percent fructose, a liquid), is typically priced about 10 percent below the price of refined sugar. In addition to the price advantage HFCS has gained a reputation as a very consistent, quality, product reflecting its high-tech production techniques and specialized handling from plant to end user (i.e. use of temperature controlled rail cars). As a result, HFCS rapidly replaced sugar in a wide range of products, particularly soft drinks. HFCS-42 can also be substituted for sugar in a number of products. With very weak HFCS-42 prices in 1997 due to over-capacity in the industry coupled with high sugar prices, industrial users of sugar have been trying to search for way to increase their use of HFCS without adversely affecting the taste of their products.

The level of U.S. sugar prices will continue to be tied to the U.S. sugar program. Under the Federal Agricultural Improvement and Reform (FAIR) Act of 1996 the raw sugar loan rate is fixed at 18.00 cents per pound and the beet sugar loan rate is fixed at 22.90 cents per pound. The FAIR Act authorizes a 7-year sugar program.

### **U.S. Beyond 2000**

The U.S. sugar sector is foreseen evolving into a much more consolidated, cost efficient, and productive industry in the years ahead. Area harvested for sugarbeets is projected to rise modestly to 611,000 hectares by 2005, up about 2,833 hectares per year, according to the USDA's sugar baseline. Sugarbeet yields are projected stable, while the beet sugar recovery rate is expected to rise gradually on trend. Sugarbeets for processing, which totalled 20.4 million tons in 1985 and 28.8 million in 1995, are projected to total 27.8 million in 2005. But with higher sugar recovery rates, beet sugar production has increased from 2.72 million tons in 1985 and 4.07 million metric tons in 1995, to a projected 4.24 million in 2005.

The beet sugar industry would expand even more rapidly, but investment is likely to be constrained somewhat by the risk of program elimination. Under USDA assumptions, beet sugar's share of total domestic sugar production continues to grow from 49 percent in 1985, to 56 percent in 1995, and then to 58 percent in 2005. This assessment is underpinned by recent reports of significant expansion programs planned by beet producer-processor cooperatives in the Red River Valley of Minnesota and North Dakota.

Nationally, U.S. sugarcane area is projected to decline slightly from 1995 to 2000, then increase somewhat to 2005. National average cane yields, which have been falling due to loss of high-yielding Hawaiian area in cane, may increase slowly as research and development of better varieties proceeds and Hawaiian area stabilizes. The cane sugar recovery rate should rise on trend. For Texas, Louisiana and Florida, cane sugar production is expected to remain stable or grow slowly with Texas production projected at 136,000 tons by 2005, Louisiana production projected at 1.09 million tons, and Florida is expected to increase production to 1.59 million metric tons by 2005. Hawaii's sugar production is expected to stabilize at near 272,000 tons by 2005, with Puerto Rico expected to cease its sugar production by 2005.

U.S. cane sugar production is expected to total 2.88 million metric tons in 2000, and increase to 3.08 million by 2005, comprising 42 percent of total domestic production. This compares with 2.94 million in 1990 and 2.84 million in 1985.

The projected growth rate of U.S. sugar consumption through 2005 is about 1.5 percent per year, down from the recent 2 percent average due to constraints on the ability of sugar to continue to displace other foods and some additional loss of market grown potential due to HFCS competition. However, sugar continues to benefit from increased U.S. public emphasis on the negative nutritional aspects of fats. Total sugar use (including transfers to sugar containing products for export) is likely to reach 9.54 million metric tons in 2000 and 10.16 million in 2005, up from 8.62 million in 1990 and 7.82 million metric tons achieved in 1985.

The gap between U.S. domestic sugar consumption and production are projected to widen gradually through 2005. If the TRQ is managed the same way as in the past, quota sugar imports are expected to total 2.32 million tons in 2000 and 2.48 million by 2005. Quota-exempt imports are expected to remain at around 410,000 tons with re-exports of refined sugar and sugar in sugar-containing products mirroring the level of non-quota imports for re-export.

It should be mentioned that there is increasing discussion in the U.S. of changing the sugar quota allocation system. This system was set up in the early 1980s, based on a country's shipping performance to the U.S. market during the 1976-1981 base period. Several of the countries that received quota allocations are no longer net exporters. One solution being mentioned that could be administratively adopted by USDA would be to globalize the raw sugar quota above the GATT-WTO minimum.

Proponents of globalization argue that the change would achieve a more reliable supply of imported raw sugar and preserve U.S. cane sugar refining capacity which has been contracting. Cane sugar refining capacity acts as an important safety value which can compensate for variability in domestic beet sugar production and thereby, reduces the potential need for large volume imports of refined sugar. Moreover, to increase the financial viability of the U.S. refining industry - one-half of the refiners in the U.S. have closed since the early 1980s - USDA could give U.S. cane sugar refiners the right to import the globalized portion of the overall import quota. This would have the effect of keeping some of the quota premium with U.S. refiners rather than giving all of it to foreign suppliers. In addition, it would reduce the average cost of raw sugar without undermining the sugar price support program.

### **MEXICO**

#### **Introduction**

The sugarcane-based sugar industry is Mexico's largest agri-industry, with an estimated 300,000 families depending on it as producers and mill workers. The milling sector spreads across 15 of Mexico's 23 states and is a key component of economic and social development in many rural areas in the country. The sugar industry provides a basic input into the growing Mexican beverage and food processing industry. Mexico's per capita consumption is traditionally high by world standards, both in the form of direct consumption and in processed food products, particularly beverages.

Over the years, the Mexican sugar industry has oscillated between periods of production surpluses relative to demand and production deficits. As recently as the early 1990s, Mexico was in a deficit situation as the largely government-run industry could not keep pace with the rise in demand caused by the rapidly growing Mexican economy. This situation led to Mexico's importation of record sugar imports. Most recently, the now privatized industry has been producing a surplus of sugar, reflecting some technical and administrative improvements in the industry coupled with good weather. Concurrently, the Mexican economy contracted sharply following the December 1994 peso devaluation. This contraction in the economy coupled with higher sugar prices, the new role of sugar companies in marketing sugar and the emerging substitution of corn sweeteners for sugar has caused a fall off in sugar consumption.

The resulting surplus production has been largely exported. But these exports have been undertaken largely at a financial loss and were done mainly to relieve the country of burdensome stocks that could have depressed domestic prices. Currently, the Mexican industry is now in a much stronger position to produce sugar than in the early 1990s, but, owing to competitively priced corn sweeteners, they face potentially stiff competition in domestic markets. As a result, the Mexican industry and government is increasingly looking to the sugar provisions provided by the North American Free Trade Agreement (NAFTA) with the U.S. to market its sugar at prices comparable to those enjoyed in the U.S. market.

#### **Sugar Production: Recent Trends and Industry Structure**

Sugarcane is one of Mexico's most widely grown crops with production in 15 out of the country's 23 states. Nearly two-thirds of the total production is concentrated in five states (Veracruz, Jalisco, Oaxaca, Michoacan and San Luis Potosi) that form an arc that stretches across Central Mexico. Veracruz alone accounted for an average of 38 percent of the

country's total sugarcane production for the period 1993/94-1995/96, with the crop processed at the state's 22 sugar mills.

While the milling sector with its 30,000 workers is at the core of the industry, mill companies in the various states do not own land for sugarcane production. Instead, they depend on independent growers to service the mills with cane. Currently, there are approximately 140,000 cane growers in Mexico and they are represented by two politically influential groups. The large cane growers, numbering about 60,000, are represented by the National Union of Cane Growers (Union Nacional de Caneros). The second group, representing some 80,000 small "ejido" growers (growers using communal lands), is the National Sugarcane Growers (Nacional Caneros de Azucarera). Typically, each Mexican mill has about 2,500 growers cultivating sugarcane on 16,000 hectares (average of 6.4 hectares per grower), which seasonally grinds around 850,000 tons.

Sugarcane harvested area totalled 223,515 hectares in Veracruz in 1995/96, up 15 percent from 1993/94 and accounting for nearly two-fifths of the national total. Veracruz is the only state with more than 100,000 hectares harvested in 1995/96; the next highest were San Luis Potosi at 61,775 hectares and Jalisco at 56,831 hectares. In these pivotal sugarcane producing states, the expansion in area in cane has been encouraged by higher cane prices and aggressive expansion by some of Mexico's stronger mill ownership groups: Escorpion, Machado, Beta San Miguel, and Grupo Azucarero Mexico (GAM).

Sugarcane yields in Mexico vary considerably from year to year and between regions. About two-thirds of the growing areas, including nearly all of Veracruz, is rainfed, about 25 percent is irrigated mainly in January-May, and 10 percent is irrigated only on an emergency basis two or three times a year. Over the last three seasons (1993/94-1995/96), national cane yields per hectare averaged 72.6 tons, but oscillated between a low of 69.3 tons in 1993/94 to a high of 78.0 tons in 1994/95. Over the last five crop years, yields averaged 74 tons versus 69 tons for the preceding five crop years.

On a state level, rainfed dependent Veracruz averaged 70 tons per hectare. Jalisco and San Luis Potosi, both with some irrigation, averaged 86 and 59 tons, respectively. Sharply contrasting yields were those of Morelos (107 tons per hectares), and Puebla (116 tons) versus Quintana Roo (57 tons) and Campeche (42 tons). Morelos and Puebla benefit from good growing weather, highly fertile soils and irrigation. In contrast, Quintana Roo and Campeche have less favorable climates and soil condition for sugarcane cultivation and little irrigation.

On the quality side, Mexico's sugar recovery rates the last three years have averaged 10.6 percent and sugar per hectare of 7.7 tons. The significant differences for the seven states in terms of sugarcane yields per hectare also show up in quality indicators. The average sugar recovery and sugar per hectare for the seven selected states are as follows: Veracruz, 10.8 percent and 7.6 tons, respectively; Jalisco, 11.5 percent and 9.9 tons; San Luis, 11.3 percent and 6.7 tons; Morelos, 10.9 percent and 11.7 tons; Puebla, 11.0 percent and 12.8 tons; Quintana Roo, 9.4 percent and 5.4 tons; and Campeche, 9.5 percent and 4.1 tons.

For 1996/97, SCI estimates Mexico's cane yields, recovery rates, and sugar per hectare for the crop harvested November 1996 through June 1997 at 69.7 tons of cane per hectare, its recovery rate at 11.6 percent, and its sugar produced per hectare at 8.12 tons. These estimates indicate another outstanding crop, revealing an industry that is generally productive by world standards and improving.

Reflecting an upturn in cane production the last three years, Mexico's sugar production averaged 4.6 million tons, raw value. For the preceding five years, production shifted from a low of 3.1 million tons

in 1989/90 to a high of 4.3 million in 1992/93 and averaged 3.7 million tons - 900,000 tons below output of the last three years.

Mexico's sugar industry produces several types of sugar. Because its sugar refining is integrated with its cane mills, refined sugar is produced at many of the country's cane mills. For the last three seasons, the Mexican industry produced between 1.7 and 1.8 million tons of refined sugar (99.9 pol.), which is 42 percent of the total production. This compares with 1.2 million and 34 percent of the total in both 1986/87-1988/89. Over one-half of Mexico's annual production in recent years has been "standard sugar" (estandar) (99.6 pol.). In recent years, very little raw sugar (mascabado) (96 pol.) has been produced in Mexico.

Mexico currently has 61 mills spread across the 15 producing states. Veracruz alone has 22 mills; Jalisco has 7; Michoacan, 5; and San Luis Potosi, 4. Three mills have closed since the early 1980s.

The cane milling industry currently has a 333,000-ton per day grinding capacity. The total national capacity has changed little since the late 1980s, but a number of mills have increased capacity as others have declined or closed.

The Mexican industry is characterized by a relatively large number of medium- to small-sized mills. Thirty-eight mills are between 4,000 and 8,000 tons of grinding capacity, 17 below 4,000 tons, and four are between 8,000 and 12,000 tons, and only two are above 12,000 tons daily grinding capacity.

Mexican milling industry production data for the period 1993/94-1995/96 reveals that nearly 60 percent of the mills produced between 25,000 and 75,000 tons and one-third produced about 75,000 tons. Compared with the earlier time period (1986/87-1992/93), there has been a general trend toward higher annual production in a larger number of mills.

In the late 1980s and early 1990s, Mexico's cane sugar milling sector passed from largely government control to private ownership through a government approved privatization program. Mills were sold in groups and a pattern of mill ownership emerged.

As of mid 1997, there were 17 groups of owners, the largest among them were as follows: Escorpion with nine mills, followed by Machado and Mexicano with seven each, and Beta San Miguel and Grupo Azucarero Mexico (GAM) with five each.

In addition to these numbers, some of the groups dominate the production of refined sugar. In 1996/97, for example, the Escorpion group produced 43 percent of Mexico's refined sugar (753,500 tons out of a national total refined production of 1.77 million tons, standard basis). The five largest groups produced a combined 2.62 million tons in 1996/97, 58 percent of total production.

Early in 1997, there were several sales of mills reported. The Santos Group bought the Plan de Ayala and Cosamaloapan mills and the Grupo Azucarero Mexico (GAM) bought the Grupo Multiple mills San Pedro and San Francisco mills. According to industry sources, over the next several years, the wave of ownership consolidations is likely to increase as more financially viable mill groups take over the weaker ones.

It is apparent from examining the capacity by mills that several key groups have been investing capital in mills to



expand capacity. Most of these investment funds have come from within Mexico. The only significant foreign investor is the British-based Tate and Lyle Company that has a 49 percent interest in the Saenz Group that owns the Aaron Saenz and El Monte mills in Tamaulipas and the Tamazula mill in Jalisco.

#### **Sugar Demand: Recent Trends and Structure**

Sugar consumption growth was strong in the early 1990s but has trended downward over the last several years. The recent contraction in domestic sugar use reflects a combination of factors including the general economic downturn caused by the peso devaluation of December 1994, an upturn in sugar prices, and the growing substitution of fructose for sugar in the beverage market. For 1996/97, SCI forecasts Mexico's sugar consumption at 4.2 million tons (raw value). With production forecast at 4.6 million tons and consumption at 4.2 million, the implied 1996/97 surplus is 500,000 tons. This situation is forcing the sugar industry into policy decisions that aim to reduce price-depressing stocks in the country.

The composition of sugar consumption can be divided into household use (47 percent) and industrial use (53 percent). The major industrial user of sugar in Mexico is the soft drink industry. Currently, well over 1.0 million tons of refined and standard grade sugar is used by the industry annually. While continued growth of the soft drink industry is a certainty, the industry's choice of sweetener-sugar or corn sweeteners is an increasingly topical issue.

Mexico's soft drink industry produces about 3.5 billion gallons of soft drinks or (39 gallons per capita). According to beverage industry sources, Mexico ranks second only to the United States in per capita soft drink consumption.

A key reason for the traditionally high soft drink consumption in Mexico is its young population. More than one-half of the population is under 21 years old, the largest consumer sector. Other factors favoring growing consumption are climate, the potable water problem and nutritional factors, particularly the importance of the calorie contribution from nutritive soft drinks to the average consumer's diet.

The marketing of consumer packaged sugar and sugar-containing beverage and food products is concentrated in Central Mexico where about 50 percent of the population resides. Before privatization, the Government's marketing arm, Azucar S.A., marketed all the sugar within Mexico. Since privatization, various milling and refining groups market the sugar with the aid of international firms such as E.D. & F Man, Louis Dreyfus, and Czarnikow-Rionda as well as domestic food distributors such as Ortega.

#### **Sugar Trade: Recent Trends and Structure**

Mexico's trade in sugar has shown significant long-term variations between net exports and imports:

In the 1960s and 1970s, Mexico imported no sugar, while it exported several hundred thousand tons per year.

Stagnant production and growing consumption reduced exports in the late 1970s. In the first half of the 1980s, Mexico exported in one year out of five while imports grew.

Mexico did not import sugar in 1985-88, exporting a record 1 million tons in 1988 due to reduced consumption reflecting a slow down in the domestic economy.

A reversal of the supply-demand situation caused substantial import volumes in 1989, 1990 and 1991. In the early 1990s, trade in both imports and exports was reduced to minimal amounts as Mexico became relatively self-sufficient in sugar.

In the last three years 1994/95-1996/97, Mexico's sugar balance shifted to a net exporter status. Large amounts of exports have been shipped under the Mexican Government's Temporary Export Program (TEP) which was announced in April 1995. The program waived an export tax of \$260 per ton (11.8 cents per pound) if exporters pledged to re-import an equivalent amount of sugar within six months. The re-import requirement is waived if the Government of Mexico determines that the sugar will not be needed domestically.

Mexico's Sugar and Alcohol Chamber has encouraged its members to take advantage of TEP. The aim has been to reduce the price-depressing surplus of sugar in Mexico even though many of the groups export at a loss. However, these losses are offset by higher domestic prices, reduced costs and interest payments for domestically stocked sugar, and the availability of increased operating revenue.

On the import side, Mexico is estimated to have imported small volumes of sugar in recent years. Key suppliers were Guatemala, Costa Rica and Columbia, reflecting recent trade agreements between the Mexican Government and these countries which provide for limited duty free access for their sugar into Mexico. Much of this and other world price sugar is used in Mexico's re-export program for products - PITEX (Program for Temporary Imports for Export in Products). This program is similar to the U.S. re-export program for products. PITEX imports are exempt from paying the current import duty of \$395 per ton (17.9 cents per pound).

For 1996/97, SCI forecasts net exports of 450,000 tons (exports of 550,000 tons and imports of 100,000 tons). A share of the exports are regular exports while the rest will again go out under the TEP, with the aim being to reduce the level of price-depressing stocks in Mexico. A small volume, 25,000 tons, will enter the U.S. under Mexico's NAFTA quota.

#### **U.S. Mexico Corn Sweetener Trade and Trade Issues**

U.S. trade in corn sweeteners has been relatively small compared with domestic production and utilization and has been largely confined to border trade with Canada and Mexico. Trade with Mexico has been generating considerable attention, particularly due to the prospect that Mexico's large soft drink industry might switch from sugar to fructose as its sweetener of choice.

Mexico's soft drink industry is one of the world's largest and the country's per capita use of soft drinks is the second highest in the world after the U.S. The Mexican soft drink industry utilizes about 1.6 million tons of sugar annually. Corn sweeteners provide a viable alternative sweetener to sugar owing to the increasingly high price of sugar in Mexico. Corn sweeteners are available to the Mexican soft drink industry either through trade with the U.S. or, more recently, from domestic sources.

U.S. corn sweetener exports to Mexico have been rising every year since 1990/1991, and in 1995/96 reached 89,200 metric tons, dry basis. The largest corn sweetener export to Mexico has been HFCS-55 at 47,273 tons in 1995/96. For the first nine months of 1996/97 (October 1996 to June 1997), HFCS-55 exports to Mexico had already reached 112,007 tons, more than double the total for last year. Some of the expansion of U.S. HFCS capacity in the last few years reportedly was intended to be earmarked for the expanding Mexican market. Moreover, the annual growth in trade has been facilitated by a 1.5 percent annual decline in Mexico's tariff on HFCS resulting from NAFTA.

However, potential growth in exports was stymied by the maxi-devaluation of the Mexican peso in December 1994 and the subsequent contraction in the Mexican economy. More recently, the future of U.S. HFCS exports has been clouded by trade disputes between the U.S. and Mexico. In December 1996, Mexico raised the tariff on HFCS from 10.5 percent to 12.5 percent in partial retaliation over a U.S. decision to raise import duties on Mexican-made corn brooms shipped to the U.S. Under the NAFTA schedule, the HFCS tariff on imports from the U.S. would have fallen to 9 percent in 1997. In early 1997, the Mexican Government initiated an anti-dumping investigation against HFCS imports from the U.S. at the request of the Mexican sugar industry. On June 25, Mexico imposed provisional dumping tariffs on U.S. imports ranging from 3 to 6 cents per pound for HFCS-42 and 3 to 8 cents per pound for HFCS-55. Hearings on the case were the week of August 25 at Mexico's Trade and Commerce Ministry (SECOFI). The Mexico Trade Secretariat is expected to decide whether to make the tariffs permanent by December 1997.

If the tariffs are sustained, the U.S. corn sweetener industry is expected to take the dispute to a WTO or NAFTA trade dispute panel. The U.S. Senate has already passed a resolution calling for Mexico to review its anti-dumping case against U.S. HFCS in the context of WTO trade rules. Also in early September, the Office of the U.S. Trade Representative announced that the U.S. had requested WTO dispute settlement consultations regarding actions by Mexico in its anti-dumping investigation on HFCS.

Mexico also has capacity to produce corn sweeteners domestically. Currently, two facilities are producing HFCS from imported U.S. corn which also have benefited from increased access to the Mexican market under NAFTA. These two facilities, with a combined annual capacity of between 250 and 350 million pounds or 125,000 - 175,000 short tons, dry basis, are the result of recent foreign and Mexican investment. The first facility to begin HFCS production in Mexico was ALMEX in Guadalajara in 1995. The facility is owned by Tate and Lyle, A.E. Staley, and Archer Daniels Midland (ADM). The second facility is the Arancia/CPC plant located in San Juan del Ray near Mexico City which began HFCS production in late 1996. Both facilities are dependent on imports of U.S. No. 2 yellow corn to run their operations (Mexico produces mainly white corn for human consumption). The Mexican Government currently provides quarterly import permits to these companies for access to U.S. corn. Until last year, the permits were granted on an annual basis.

In an agreement that was made public on September 9, the Mexican sugar industry has apparently successfully lobbied the soft drink industry to cap the use of HFCS. According to press reports, the soft drink bottlers have agreed to limit the use of HFCS to 350,000 tons per year, of both domestic and imported HFCS, for a three-year period. The U.S. corn sweetener industry is expected to protest the legality of the pact.

#### **Sugar Prices: Recent Trends and Structure**

Historically, the Government of Mexico controlled the internal wholesale and retail prices of sugar. These prices were calculated and published by the Secretariat of Commerce and Industrial Development (SECOFI). In August 1995, the government announced a price liberalization program for sugar. It was agreed, together with the sugar industry, wholesalers and retailers, that prices would increase on a monthly basis until early 1996, at which time prices would be determined solely by market forces.

In August 1995, the wholesale price of standard sugar, f.o.b. mill, was 2,397 pesos per ton or 17.55 cents per pound (exchange rate 6.191 pesos = 1 US\$); in January 1996, it was 2,966 pesos per ton (exchange rate 7.4730), equal to 18 cents per pound; and in September 1996 it was 3,525 pesos per ton (exchange rate 7.5330), or 20 cents per

pound. The most recent announcement by the government for 1996/97 pegged the wholesale sugar price at 3,340 pesos per ton (exchange rate 7.815), equal to 19.4 cents per pound. By government decree, wholesale sugar prices are linked to the sugarcane price for the duration of the season, but refined sugar prices are allowed to float freely. According to Mexican industry data, the price of refined sugar as of January 1997 was 22.2 cents per pound, f.o.b. mill and 24.5 in September 1997. As a result, Mexico's prices currently are somewhat below the United States, but well above the world price.

Under the current Government scheme, sugarcane prices to growers are determined monthly, based on a percent of the monthly wholesale price of standard sugar times KARBE, kilograms of standard quality sugar recovered at the mill. KARBE data includes sucrose content, juice quality of cane, and efficiency of the mill. In the 1993/94 season, the cane price as a percent of standard sugar was 53 percent; in 1994/95, 54 percent; and in 1995/96, 56 percent. For the 1996/97 crop year, producers received 57 percent.

In January 1997, sugarcane growers and processors agreed to raise the sugarcane price for the 1996/97 season by about 26 percent to 1,903 pesos. This was equivalent to U.S. \$243.50 per ton at current exchange rates, or 11 cents per pound. The cane price is 57 percent of the new wholesale sugar price of 3.340 pesos per ton (U.S. \$464.86 tons per ton or 21 cents per pound). Growers had originally asked for an increase of 30 percent while the processors offered 21 percent. The final agreement leans more toward the grower-side and the price was retroactive, applying to all cane cut for the harvest that began in November. The 26 percent increase is 9 percent above the 15 percent inflation level projected by the Mexican Government for 1997.

The long-standing issue of paying individual growers on the basis of quality (i.e., percent sucrose in cane) remains unresolved. In the early 1990s, implementation of this method of payment was being encouraged as a means, as demonstrated in other countries such as Australia, South Africa, and the United States, to provide growers with an economic incentive to raise the quality of their cane (i.e., manage the crop to maximize sucrose content not just weight). Demonstrations of U.S. "core sampling technology" were provided to the industry with test models set up at key mills. The plan was to have the technology in place within two years. Despite this planing, the project has gone nowhere due to differences between growers and mill owners. Grower groups say that mill companies have complained of logistical problems with the new payment system because there are so many small growers, but the growers believe the real reason mills balked at installing the system was because the "mill processing loss issue" has not been resolved. In contrast, millers say that growers do not want the system because it will identify good growers versus poor growers. Without the system, however, good growers will continue to subsidize poorer ones and neither good nor poor growers will have incentives to improve the quality of cane provided to mills.

#### **IMPLICATIONS OF NAFTA**

The North American Free Trade Agreement (NAFTA) became effective on January 1, 1994, and will eliminate most trade barriers between Canada, Mexico and the U.S. over the next 15 years. NAFTA does not address sugar trade between the U.S. and Canada which is largely covered by the Canadian-U.S. Free Trade Agreement signed in 1989.

For purposes relating to access of the other country's sugar market, a formula defines Mexico or U.S. net surplus production at roughly equal to projected sugar production minus projected domestic consumption. If this formula yields a positive number, the country is a net surplus producer. According to a late revision in the original NAFTA text (termed "side letter"), the two governments agreed that HFCS would be included in the formula, but on the consumption side only. Thus, a country would have to produce sugar in excess of its consumption of both sugar and HFCS in order to attain net surplus producer status.

As part of the NAFTA consultation process related to sugar, representatives of the two governments meet annually to exchange information related to each other's net surplus producer status. At these meetings, Mexico has been designated as a net surplus sugar producer for 1996/97 and 1997/98 (Oct-Sept). Accordingly, Mexico can ship 25,000 tons of duty-free to the U.S., either as raw or refined sugar. As the NAFTA sugar provisions are reciprocal, the U.S. has been designated a deficit producer in 1996/97 and 1997/98.

The chronological provisions of NAFTA in terms of Mexican access to the U.S. market are as follows:

In years 1-6, Mexico will have duty-free access for sugar exports to the U.S. in the amount of its net surplus production, up to a maximum of 25,000 metric tons, raw value. If Mexico is not a net surplus producer, however, it will have duty-free access for 7,258 metric tons, or the "minimum boatload" amount authorized under the U.S. tariff-rate quota.

In years 7-15, Mexico will have duty-free access to the U.S. sugar market for the amount of its net surplus production, up to a maximum of 250,000 metric tons, with minimum duty-free access still at the "boat load" amount.

Sugar tariffs between the United States and Mexico are scheduled to decline by 15 percent over the first six years and to zero by year 15. By the end of year six, Mexico is committed to install a tariff-rate quota system, with a second-tier tariff applicable to all other countries that is equal to the U.S. second-tier tariff.

Given that NAFTA is reciprocal, the same barriers for Mexican sugar access to the U.S. market also apply to U.S. sugar access into the Mexican market. Since the U.S. is not likely to attain net surplus producer status, especially with a GATT-bound minimum import level, U.S. sugar will not have duty-free access (except for a boat load quantity) to the Mexican market until the year 2008. Without these trade barriers, more U.S. sugar would be sold into Mexico. For example, there might be cross-border trade from U.S. production facilities near the border. Also, sugar quality is important to many buyers, and the U.S. has a comparative advantage in high-quality types of sugar.

There is also a provision in NAFTA that allows U.S. sugar refiners to import raw Mexican sugar, outside the TRQ, for refining and re-export back to Mexico. This allows U.S. refiners to utilize their excess capacity and Mexican companies to receive quality refined sugar for targeted export markets in northern Mexico.

#### **Mexico Beyond 2000**

The direction of Mexico's sugar and HFCS supply and demand balance in the coming years is extremely difficult to forecast. Many factors could push production to either expand or contract. For example, Mexico has additional sugarcane land that could be brought into production. More remunerative prices could raise the use of yield increasing inputs. Modifications in the land tenure system are likely to foster amalgamation of land units, leading to greater efficiencies. All of these factors would combine to spur production advances. In contrast, sugar production could stagnate or decline due to producer prices below expectations, which would foster a shift to more remunerative crops.

Concurrently, the sweetener of choice for Mexico's large soft drink industry appears to be in transition and this evolution will significantly affect the level of sugar and HFCS consumption. If the current effort to cap the use of HFCS is successful, by 2000/01, SCI foresees Mexico's production at a maximum growth of 5.2 million tons and sugar consumption at a moderate growth rate to 4.5 million tons. Production of HFCS in Mexico would be 300,000 tons from the recently installed capacity, while HFCS imports would be negligible, reflecting efforts to cap total HFCS growth. This scenario would result in a sugar surplus of 700,000 tons and a NAFTA-based surplus of 400,000 tons. Under this scenario, Mexico would be eligible to ship 250,000 tons of sugar annually duty-free to the U.S.

Beyond 2000/01, the direction of sugar consumption will continue to depend on the mix between HFCS and sugar in the beverage market. However, with a rapidly increasing population and assuming a healthy economy, Mexico's off-take of sugar in other use categories besides beverages should grow substantially. This is what has happened in the U.S. as sugar has many functional characteristics which make it the sweetener of choice independent of price. On the production side, the Mexican industry clearly will need substantial investments to make itself more cost efficient and like the U.S. and Canada, there is likely to be some segments of the industry that will contract. Assuming that there is no change in the U.S. price structure, Mexico's increased trade access under NAFTA to the higher priced U.S. market after 2000 should also help the long-term financial viability of the Mexican industry and encourage both Mexican and foreign investment in the sugar industry.

#### **CANADA**

##### **Introduction**

In contrast to the U.S. and Mexico, Canada has a small domestic sugar production base. Most of the country's demand needs are met by raw sugar imports that are processed by Canada's refineries. Canadian - U.S. border trade in sugar, corn sweeteners and sugar containing products is relatively small in volume but important to the industries in both countries. This trade has not always gone smoothly and there have been a number of recent bilateral trade disputes. Trade is also influenced by the Canada-U.S. Free Trade Agreement signed in 1989 and the NAFTA signed in 1994.

##### **Sugar Production: Recent Trends and Industry Structure**

Canada's domestic sugar production is based on sugarbeets. Production takes place in the provinces of Alberta and Manitoba. For 1997/98, Canadian beet sugar production is estimated at 110,000 from 750,000 million tons of beets expected to be harvested from 6,100 hectares. Since 1980/81, Canada's beet sugar production has ranged from a low of 92,000 tons to a high of 171,000 tons. Production is concentrated in the province of Alberta this season due to the recent closure of the sugarbeet processing plant in Manitoba.

As with the U.S. and Mexico, the structure of the Canadian sugar industry has been changing. Until recently, the Canadian sugar industry consisted of two beet sugar factories and four cane sugar refiners, with ownership in the hands of two companies. The vast majority of industry capacity is controlled by BC Sugar, which owns the country's two beet sugar factories in Alberta and Manitoba, which serve the Canadian Prairie market, and three of Canada's four cane sugar refineries. In 1995, the company united its cane and beet sugar operations in western Canada under a single brand and operating name, Rogers Sugar. Meanwhile, BC Sugar's

refineries at Montreal and St. John continue to operate under its Lantic Sugar Division. Until recently, the BC Sugar Company also owned the Refined Sugars Inc.(RSI) refinery in Yonkers, New York. Canada's fourth sugar cane refinery, at Toronto, is owned by Tate and Lyle, through its Redpath Sugars subsidiary.

This past winter, Rogers Sugar Ltd. announced that it would permanently close its Winnipeg, Manitoba, beet sugar processing operation. The Winnipeg operation was termed not economically viable as a result of the loss of the U.S. market that absorbed 60 percent of the plant's output. In 1994, the U.S. switched to a global quota for refined sugar and Canada lost its allocation. In addition, the closure was apparently also caused by general over capacity in the Canadian industry due to significant expansion of the Redpath refinery.

Because of the closure of the Winnipeg, Manitoba plant, no sugarbeets were planted in Manitoba this year. Sugar beet growers in Alberta this season planted an estimated 5,500 hectares. In an interesting new development, in Ontario province, farmers are growing sugarbeets, about 1,200 hectares this season, to be processed in the U.S. in the neighboring state of Michigan for the U.S. company, Michigan Sugar.

Over the last decade, the Canadian government has supported sugar beet farmers, not by import protection, but through a system of direct income payments to growers. Under the National Tripartite Stabilization Program (NTSP) for sugar, beet farmers have received a form of deficiency payment. This income support program has been funded equally by producers, the federal government and the governments of the beet producing provinces of Alberta and Manitoba. In operation since 1987, the program has guaranteed a return equal to a calculated support price. For example, sugarbeet farmers are supported with a deficiency payment in any year that the price paid by the beet sugar processor falls below a target level. Sugarbeet growers are taxed to help replenish the fund when the price paid is above the target level. The aim is for the fund to be self-financing.

The NTSP for sugarbeet growers in Manitoba terminated with the 1996 crop. Alberta growers opted out of NTSP at the end of the 1995 crop year. While the program offered substantial payouts to producers in the mid-1980s, there were no payments since the 1991 crop. Agriculture Canada reports that the program's accounts will close in late 1997 with surplus funds, a portion of which are normally returned to premium paying participants. It is not clear what will replace the tripartite program.

#### **Sugar Consumption: Recent Trends and Structure**

Sugar consumption in Canada for 1997/98 is forecast at 1.25 million tons, with domestically produced sugar accounting for only about 9 percent of the total. For a population of 29.4 million, per capita sugar consumption is estimated at 39.7 kilograms, nearly double the world average. Over the last decade, sugar consumption and per capita use has averaged 1.11 million tons and per capita consumption has averaged 37.6 kilograms.

About 40 percent of annual sugar use goes for home use while industrial use by the food and beverage industry takes nearly two-thirds of the total. Like the U.S., Canada has domestic HFCS available as a substitute for sugar. Use is concentrated mainly in the soft drink manufacturing sector. Canada has several HFCS plants all owned by CASCO whose parent company is CPC International. While the U.S. soft drink market now uses HFCS exclusively, a small segment of the Canadian industry uses a blend of sugar and HFCS with the share shifting with price. In general, HFCS in Canada is priced just below sugar to maintain a market price advantage in the liquid sweetener market.

A sizable portion of Canada's HFCS production is marketed in the U.S. by CPC International, the owner of CASCO. The heavily populated Northeast U.S. is part of its natural marketing territory. At the same

time, other U.S. HFCS companies market some of their output in Canada.

#### **Sugar Trade: Recent Trends and Structure**

With annual domestic consumption in excess of 1.2 million tons and domestic production providing under 10 percent of annual needs, Canada must depend heavily on imports. The bulk of these imports come into Canada in the form of raw sugar and are processed into refined products at the country's four refiners. White or refined sugar imports have been supplied principally from the U.S.

The bulk of raw sugar imports coming into western Canada for processing come from Australia while the big supplier into eastern Canada is Cuba with which Canada has maintained good trade relations. According to the International Sugar Organization, in 1996 Canada imported a total of 1.26 million tons of which 1.23 million was raw sugar and the remaining 30,000+ tons was refined sugar. Australia shipped 64 percent of the raw sugar total; Cuba, 12 percent; and Brazil, 11 percent. Other important shippers to Canada have been Belize, Guyana and Swaziland. Under the old Commonwealth Sugar Agreement, these countries along with Australia were given priority to export their sugar to Canada.

With respect to tariff structure, Canada has maintained generally low tariffs on raw and refined sugar imports. The government's main sugar policy has aimed at protecting Canada's domestic raw cane sugar refining industry. As a result, higher tariffs are imposed on refined sugar than raw sugar. Refined sugar imports from Most Favored Nation (MFN) countries pay a duty of C \$30.86 per ton or U.S. \$ 22.00 per ton or about 1 cent per pound, whereas raw sugar from MFN countries pay C\$ 22.05 to C\$25.57 per ton or U.S. \$15.80 to U.S.\$18.30 cents per ton or 0.717 cents per pound or 0.830 cent per pound, depending on the polarization of the sugar.

In recent years the bulk of refined sugar imports have come into Canada on a declining tariff schedule as determined by the Canada-U.S. Free Trade Agreement.

#### **Canada - U.S.: Free Trade Agreement, NAFTA and Related Trade Issues**

Canada and the U.S. entered into a Free Trade Agreement (FTA) effective January 1, 1989, and tariffs on sugar are scheduled to decline to zero in 1998. At the start of the agreement period in 1989, the U.S. duty on Canadian refined sugar was 0.60 cents per pound, and the Canadian duty on U.S. refined sugar was 0.78 cents per pound. The U.S. also had an import fee of 1 cent per pound on refined sugar applied under Section 22 of the Agricultural Adjustment Act of 1933.

In October 1990, the United States replaced the eight year-old quota system with a tariff-rate quota. The implementation of the U.S. tariff-rate quota was complicated by the FTA, which prohibits the application of the higher rate of duty to Canadian sugar. However, Canadian sugar exports to the U.S. were expected to remain close to 1.1 percent of the "low-duty allocations" under the tariff-rate quota.

The NAFTA has not changed U.S.-Canadian sugar tariffs, but requires that Canadian sugar entering Mexico be given Mexico's Most-Favored Nation (MFN) over-quota customs duty. The NAFTA allows Canada to apply a duty on Mexican sugar equal to the Mexican duty on Canadian sugar.

Despite the various trade agreements between Canada and the U.S., the two countries have continued to have a series of trade

disputes over sugar and sugar-containing products to the U.S. and the level of U.S. sugar exports moving into Canada.

In mid-1995, Canada was shipping about 40,000 tons annually of its domestic beet sugar production to the U.S. The duty paid on this sugar was 0.20 cents per pound, as specified in the Canada-U.S. Free Trade Agreement and NAFTA, plus a 1-cent per pound fee. But this treatment changed with the adoption of the new U.S. tariff schedule to implement the Uruguay Round GATT agreement. While the low duty schedule was not affected, the new tariff schedule put limits on Canadian low-duty sugar access to the United States.

In addition, U.S. imports of some sugar-containing products, including those from Canada, were constrained by quotas to protect the U.S. sugar program. As of January 1, 1995, the U.S. placed several categories of sugar-containing products into tariff categories with tariff-rate quotas (i.e., fixed amounts that can be imported at low tariffs while additional quantities face higher tariffs). Canada had been rapidly increasing exports of these products, such as powered-drink mixes. They now are limited to a tariff-rate quota of about 72,000 tons (64,000 metric tons), which is well below the amounts Canada had been exporting to the U.S.

Concurrently, a wave of U.S. sugar shipments to Canada under the re-export program led to the imposition of anti-dumping duties on refined sugar imports into Canada from the U.S. and EU from July 1995, and these are due to last until late 2000.

More recently, Canada and the U.S. reached some accommodations on these sugar-related issues. As of early September 1997, Canada and the U.S. reached an agreement over a long-running dispute regarding sugar-containing product trade. The agreement avoids the dispute going to a NAFTA settlement panel. The deal results in Canada dropping its challenge of the U.S. re-export program for sugar-containing products. In return, Canada now will receive guaranteed access to the U.S. market for a minimum of 10,300 metric tons of refined sugar and 59,250 metric tons of sugar-containing products, under the TRQ for edible preparations (i.e., dry crystal mixes, cake decorations, confections). The standing U.S. TRQ for edible preparations (HTS 1701.91.5400) is 64,709 metric tons. Canada can compete for the balance of the quota (5,459 tons) on a first-come, first-served basis. To be eligible for the access, U.S. Customs must designate the sugar-containing products "as a product of Canada."

#### **Sugar Prices: Recent Trends and Structure**

Pricing for individual refined sugar products in Canada is based upon the bulk refined granulated sugar price, which, in turn, is based upon the New York No. 11 daily futures contract for raw sugar price plus a margin for refining services. An additional amount, or differential, is then added for each particular product and packaging configuration. From this daily list price, discounts are negotiated which reflect supply and demand conditions in the domestic market.

Domestic refined sugar prices also are affected by the presence of import competition. Refined sugar imports had faced no quantitative restrictions and only low levels of import duties. A second source of price competition for sugar is from alternative sweeteners, mainly high fructose corn syrup which is a close substitute for refined sugar in a range of uses. As a result, refined sugar prices in Canada reflect domestic and imported refined sugar price competition as well as price competition from alternative sweeteners. These factors, taken together, explain why Canadian sugar prices have tended to remain below both those of the U.S. and Mexico.

#### **Canada Beyond 2000**

Given recent history and the lack of processing capacity, it appears unlikely that domestically produced beet sugar will expand significantly in Canada. SCI projects that Canadian beet sugar production will remain

in the 110,000 to 150,000-ton range in the years ahead. It will be interesting to watch whether the Rogers Sugar facility in Winnipeg will reopen and how much sugarbeet agriculture will grow near the U.S. border in the Ontario province to service the needs of the Michigan Sugar Company.

With population growth expanding slowly and competitively priced sugar available to households and industrial users, SCI forecasts sugar consumption in Canada growing to 1.325 million tons by 2000/2001 and 1.45 million by 2005. Concurrently with this consumption growth will be the need for incrementally more imports, the dominate share of which will continue to be raw cane sugar. Import needs are projected to be 1.2 million tons in 2000 and 1.33 million in 2005. Australia is expected to remain the dominate supplier in western Canada, while Cuba (supplemented increasingly by other suppliers) will service the increasing needs of refiners in eastern Canada.

#### **North America Beyond 2000**

North America's large and diverse sugar production agriculture and processing industries, organizational structures, consumption patterns, and trade flows are in transition. These recent trends and current developments also offer signs to potential future outcomes:

**Production:** North America's sugar production is forecast at a record 11.95 million tons for 1997/98. Prospects are strong that this production level will be exceeded in the decade ahead. Mexico's cane sugar industry is expanding with increased area in production and better yields underpinned by better management and increased investment levels. The U.S. beet and cane sugar production base also is expected to expand, assuming no major change in the price support level; however, the growth likely will be uneven as higher cost areas of both beet and cane production contract while lower cost areas expand. The growth of production will be particularly interesting to watch in the sugarbeet area of the Red River Valley and the cane area in Louisiana. In contrast, Canada's beet sugar production base is likely to remain small as farmers in western Canada concentrate on more remunerative grain crops.

Technology will play a key roll in expansion reflecting improvements in the field and factory. Higher yielding beet seed will be available to farmers in the U.S. and Canada. New cane varieties will be coming on line in the U.S. and Mexico. Management of the sugar crops in these countries will strive to establish a balance between tonnage and sugar content. To achieve its potential, Mexico will need to devise a system that provides incentives to produce for quality, i.e. higher sugar content. This will require investment in monitoring systems acceptable to both growers and processors. At the factory, new technologies, such as the desugaring of beet molasses, will be fine tuned and new systems such as membrane filtration systems at cane mills, will foster higher pol sugar.

**Organization Structure:** North America's sugar industries are undergoing significant changes in structure that have important implications for the future. In Mexico, the new land law allows greater concentration of holdings and reduces fragmentation that has led to lower yields, difficulty in applying new production input technologies, and logistical problems at harvest. In the U.S., the cooperative grower processor movement is very strong and is expanding, led by the grower cooperatives in the Red River Valley that account for over 50 percent of the U.S. total beet sugar production. In Canada, the U.S. and Mexico, sugar companies are merging to

aid in creating production efficiencies and larger marketing organizations. For example, traditional regional companies such as Imperial-Holly in the U.S. are moving to be a national marketer given their recent merger with Savannah-Michigan. Mexico's milling sector has gone from largely government owned to a privatized industry. In Mexico, the U.S. and Canada, the trend toward larger and fewer sugar companies is expected to continue with the more financially viable firms flourishing. In addition, the strength of cross-national sugar firms such as Tate and Lyle with interests in Canada, the U.S. and Mexico is likely to increase as will the trend of Canadian firms, such as B.C. Sugar, investing in the U.S. (i.e. Refined Sugars Inc. in New York) or U.S. firms investing in Mexico.

**Consumption:** Sugar consumption growth in the region is expected to continue to outpace production expansion. In 1997/98, North America's population is estimated at 403 million and with a per capita consumption of 33.6 kilograms that equals 14.46 million tons of sugar use. By 2005, North America's population, according to the World Bank, will be 424 million (U.S. 286.70 million, Mexico at 106.72, and Canada at 30.70 million). Assuming the per capita use rate does not change, North America will be consuming 15.24 million tons of sugar, raw value, in 2005, up nearly 800,000 tons or 5.4 percent from the 1997/98 forecast. This projection assumes that the current sugar price structures in the U.S., Mexico, and Canada, remain unchanged. Only incremental growth is foreseen in sugar's chief substitute, corn sweeteners. The HFCS liquid sweetener markets in the U.S. and Canada are already mature. The key looming question is the future growth of HFCS as a substitute for sugar in Mexico - - that question is extremely difficult to gauge at this point as it involves social as well as economic issues.

**Trade:** With the gap between sugar demand and regional production expected to widen, net sugar imports into North America are expected to expand. Canada is projected to need 1.1 to 1.3 million tons of annual imports, again mainly raw sugar coming from traditional origins. U.S. imports of tariff rate quota (TRQ) sugar are also expected to grow to 2.48 million by 2005. The composition of TRQ imports is likely to change as pressure is building that the current system of allocations is dated and the move to a partial globalization of the raw sugar quota would be a viable solution.

Mexico's import and export future levels are again difficult to judge as much depends on the financial health of the industry and this, in turn, pivots on the potential level of impact of HFCS on the Mexican sugar sector.

Clearly, the level of sugar trade between Mexico and the U.S. will grow reflecting the current NAFTA access schedule and declining tariff levels as the region moves toward becoming a "customs union." The trade between Canada and the U.S. will remain small but important to the respective industries, especially the volume of sugar-containing products crossing the respective borders. Moreover, as the region has recently experienced, viable trade dispute mechanisms need to be in place to resolve inevitable trade disputes relating to the marketing of sugar and sugar containing products.

### FACTORS DETERMINING INDIAN SUGAR PRODUCTION AND ITS COMPARATIVE ADVANTAGE

*This was prepared by Mr Satish Kansal for the Sugar and Beverages Group, Commodities and Trade Division, FAO.*

#### INTRODUCTION

India has become largest producer of sugar cane/sugar producing 280 MnT of cane and 16.5 MnT of sugar in 1995-96, making it the largest producer of sugar in the world, representing about 20% of cane sugar production. India also produces another 10 MnT of traditional sweeteners (gur 9 MnT, khandsari 1 MnT). India also has a large consumer base, thus makes it quite vulnerable to international sugar

market, in the event of surplus or deficit situation. At the sametime it has good potential and prospects.

Sugar production commenced in 1920's but it got industry status in late 20's/early 30's when India had 29 sugar mills producing just 100,000 tons of sugar. The industry, facing competition from imported sugar, sought tariff protection. Sugar production picked up under the Sugar Industry Protection Act passed in 1932 and country became self sufficient in 1935. Also cane pricing act was enforced to provide good cane price to farmer. This was followed by land reforms putting ceiling on land holdings to protect small farmers, formation of cane grower cooperatives and setting up of sugar mills jointly with farmers called as cooperative mills on ownership and sharing basis. Today this sector produces 60% of country's production.

Under the structured Industrial Development Policy, sugar industry was part of the Five-Year Plans introduced in 1951 and has been under the direct control of the Government ever since. Sugar industry is highly politicised and so closely controlled by the Government which has no parallel in the industry. Govt. control, covers all aspects of sugar business i.e. licensing/capacity/cane area, procurement/pricing/sugar pricing/distribution and Imports and exports.

Sugar scene in India has been that of protectionism. The mills, the farmers and the consumers all have been protected one way or another. Whereas the protection to farmer and consumer has been consistent, it has not been so consistent for the mill owners.

Overall government policy has given impressive results. The production has gone upto 16.5 MnT. per capita consumption up from 5 to 13 kg over a period of 3 decades. There is a potential - what is needed, is some changes in policy to make it world class player.

Winds of liberalisation have touched sugar also. Licensing is liberalised. The imports freely allowed. Exports deregulated. Many lessons learnt. Competition became intense. Customer more demanding on quality and service.

The document gives an overview of agricultural background development in cane. Sugar production, consumption, policy/regulations. The paper ends up dealing with important issues, aspects of deregulation, decanalisation of exports, the potential and the comparative advantage of Indian sugar.

#### HISTORICAL BACKGROUND

History of sugar and sugar cane in India goes back to several thousand years BC. Indian mythology vouches for this since it contains some legends depicting origin of sugar cane.

It was sometimes in 4/6<sup>th</sup> century art of sugar making was discovered. Method was crude beyond imagination. Cane was cut in pieces - crushed under heavy weight - juice thus obtained was boiled and stirred, till it turned solids.

Solids of uneven shape and size were called sarkaran, a Sanskrit term of 'gravel'. Modern word 'sugar' is derived from the word Sarkara.

Thus it could be rightly said that India has been the original home for sugarcane as well as sugar manufacture.

However, for all practical purposes, scientific sugar processing by vaccum pan method may have started sometimes in 20s. The development process was slow. Country met its sugar

requirement through imports. In mid 20s number of sugar mills sprang up in UP and Bihar. By 1930-31, there were 29 sugar factories producing just 100000 MT of sugar and they found adverse competition from Japanese sugar which was ruling the Indian market.

#### Good beginning leading to self reliance

Industry took up the matter with "Tariff Board" and Sugar Industry Protection Act was passed by the Indian Legislature in 1932. Under this act, protection was granted to the indigenous sugar industry. Salient features:

- The act shall be for a period of 14 years ending on 1 March, 1948.
- Performance was to be reviewed before 31 March, 1938.
- Govt. to identify measures for next 8 years.

However, anytime during the period of Act, if it was found that sugar was being imported at the prices to make domestic industry ineffective, Govt. should have power to levy additional duty on imports. With enforcement of Sugar Protection Act, within a period of four years country became self-sufficient in sugar by 1935. It was a great beginning indeed.

#### Balancing of revenue (tariffs)

However, the Govt. lost revenue by way of custom duty on reduced imports. Govt. again reviewed the position in 1934 and decided on two fold action:

- Imposition of excise duty on factory produced sugar.
- Union Government passed legislation to enable provincial Government to enforce minimum price of cane to be paid to cane growers.

The main objective of the Act was to regulate the price of sugarcane intended for use in sugar factories and assure sugarcane growers a fair price for their produce.

Govt. of U.P. enacted Sugar Cane Rules in 1934 followed by Bihar and Orissa Sugar Cane Rules in 1934. In 1951, Central Govt. took over control of sugar industry under the Industries Development and Regulation Act.

The post protection history of Indian sugar industry is amazing. From the mere 32 mills in 1931-32 number of units rose to 130 by 1934-35 and the production arose from 0.17 MnT to 0.95 MnT. The rate of expansion was 460%. The growth continued till 1938-39, when the production touched 1.28 MnT.

#### Exploitation leading to land reforms

Most of the new mills were set up by private rich individuals/industrialists in North Indian states of UP and Bihar. They owned sugar cane farms and also purchased cane from small farmers - who were at the mercy of such mill owners. The exploitation of small farmers by sugar mills, led the Government to take various measures. First was policy of land reforms. Ceiling was put on holding by an individual including a sugar company. This led to disinterest of private sugar mills. But the growing need of sugar and so the sugar cane gave birth to Govt. partnered Cane Growers Programme in which growers co-operatives owned sugar mills. - First such step was in Maharashtra - Western India - 50 years later this sector produced 60% of country's production. Success was attributed to stable alliance amongst small/medium/large cane growers and Mills where they are partners.

#### First set back

The first cycle of reversal was seen during the period 1939-44 and it continued till 1950-51 for various reasons when the output fluctuated between 0.89 to 1.1 MnTons mainly on account of instability of cane supplies caused by weather conditions, preference of farmers to essential food crops which gave them higher return. Food production became a priority during the war period.

#### Development after 1951 - the five-year plans

The Govt. of India was entering into industrialisation. With limited resource, on one hand and to provide focus and prioritise the Industries on the other, Govt. introduced 5 year plans and which have been subsequently referred to as First Five-Year Plan. Second Five-Year plan and so on. The objective of these plans was to have a structured and planned and timely implementation of the industrial, infrastructural, services sector and agriculture growth.

#### Here we are

- We produced 16.4 MnT sugar in 1995-96.
- Installed capacity stands at 12.4 MnT.
- Number of sugar mills is 448.
- New mills and expansion in pipeline.

#### SUGAR PRODUCTION

Indian Sugar production growth came up under structured and planned sugar programme. The demand, the production requirement, the capacity needed and cane production went through a planning process and close monitoring by the planners over past 4 decades.

Further in order to achieve the set targets. Govt. has been setting up committees, task forces from time to time to make policy changes in consultation with Industry, State Agriculture Departments etc. such as cane and sugar pricing policy, levy price fixation free sales / levy sugar ratio etc. Also government has been closely monitoring the licencing policy.

The production of sugar cane, the cane utilisation, the production of sugar has been given in Annexure II. The target and actual production in the last year of the plan is as under:

Government has been encouraging setting up of new sugar mills as well as expansions upto 5000 TCD allowing upto 100% of sugar for new mills and 80% for expanded units, to be marketed in free market for certain number of years. Thus the growth has been lateral. Today there are 448 mills with installed capacity of 12.5 MnT with average size of 2150 TPD with some units of 10000 TCD and few of 5000 TCD.

In India, sugar cane is also utilised for production of traditional sweeteners like gur and khandsari. The country produces a total of about 10 MnT (9 MnT Gur and 1 MnT Khandsari). This sector enjoys all the freedom. No controls, no restriction on cane prices - the sector can pay commercial price. Thus poses a direct threat to sugar industry and sugar production has not followed cane production.

However, over a period of time with changes in Govt. policy on free sale/levy ratio from 35:65 TO 60:40 can utilisation for sugar has gone up from 30% to 55% and for gur/khandsari sector has come down from 58 to 34% (Annexure III).

Sugar Industry has gone through a structured planned growth based on projected requirement of sugar for consumption.

#### First Five-Year Plan

Since the consumption was seen going up additional capacity came up by way of new unit as well as through expansion of the existing units.

• Achieved output in 50-51	1.12 MnT
• Target sugar production	1.50 MnT
• Mid plan revised target	1.80 MnT
• Production in last year	.89 MnT

#### Second Five-Year Plan

The Industry continued to perform well and Govt. also encouraged the growth with increase in demand.

- Production 1960-61 3.50 MnT
- Installed capacity .45 MnT

### Third Five-Year Plan

In 1965-66 which was the last year of the Third Five-Year Plan Industry continued to grow and exceeded the planned targets.

- Planned Target Production 3.50 MnT
- Production in 65-66 3.54 MnT

### Third and Fourth Year Plan Gap Period

Until now the Govt. was fully controlling the Sugar Industry. It anticipated that if total control continued the Industry could go into a reversal mode. Govt. adopted the policy of Partial decontrol with effect from 1st October 1967 The policy has since seen total control to partial control to decontrol and back to partial control. Why this has happened will follow later in the chapter.

Results were encouraging. Mills could produce more/sell more at a good/bad price and pay more to the farmer.

- Production 66-67 2.13 MnT
- Production 67-68 2.16 MnT
- Production 68-69 3.76 MnT

### Fourth Five-Year Plan

The Govt. for the 4<sup>th</sup> plan fixed target for production at 4.7 MnT and license capacity of 4.87 MnT. Since capacity was not coming up the licensed capacity target was raised to 5.5 MnT.

- In the first year of the 4<sup>th</sup> plan i.e. 1969-70, production was all time high 4.6 MnT.
- With high stocks on hand, Govt. decontrolled sugar in May 1971.
- Sugar prices crashed in domestic market - mills could not pay the farmer dues.
- Farmers moved to other crop causing decline in sugar production in following season 1970-71 to 3.1 MnT (Down by over 32%).
- Sugar prices in domestic market moved up. Industry volunteered to offer uniform price for Rs. 1500/T for domestic market and also offered to export 3.5% of its production.
- Govt. again brought industry under its control effective 1st July, '72.

### Fifth Five-Year Plan

Planning Commission appointed task force to develop programme of sugar industry for the fifth plan period 1974-79. Its findings:

- Requirement 5.5 MnT
- Export/Buffer stock 0.5 MnT
- Total Need 6.0 MnT
- Capacity Target 7.0 MnT

The Industry performed extremely well by exceeding plan targets (5.72 MnT) by producing 6.47 MnT in 1977-78. Action:

- Govt. decontrolled sugar from August 1978 and withdrew monthly release system for domestic market.
- Mills panicked, off loaded all its stocks. Mills were on way to sickness.
- Learning from history, Govt. acted fast once again imposed partial control with effect from 17.12.1978.

### Sixth Five-Year Plan (1980-85)

Govt. focus and attention on sugar industry further increased - Objective realistic growth and pricing structure. Appointed committee for the same. Recommendation:

- Cost structure reviewed and price of levy sugar fixed on Statutory Minimum Cane Price (SMP) without linkage to free market price for sugar or actual cane price paid.
- Govt. continued to announce SMP linked to 8.5% recovery.
- To continue dual sugar policy.

Following the recommendation, the policy of partial decontrol continued in the real sense from 30<sup>th</sup> Nov. 1980.

Sugar production fluctuated from 3.9 MnT in 1979-80 to 8.7 MnT in 1981-82 industry suffered losses - causing delay in cane payment. Production came down to 5.5 MnT in 1983-84 leading to imports.

### Seventh Five-Year Plan

The estimated requirement of sugar 9.8 MnT during the 7<sup>th</sup> plan period 89-90. The projected growth rate was 5%.

#### Targets:

Licensed capacity	13.26 MnT
Installed capacity	11.46 MnT

Licensed capacity by the end of 89-90 stood at 16.21 MnT against the target of 13.26 MnT. The installed capacity was however only 9.34 MnT (unimplemented licensed capacity of about 7 MnT).

Govt. also announced a pragmatic sugar policy with increase in statutory minimum price of cane basis recommendation of the Commission of Agriculture Cost and Prices and change in the levy/free ratio of the sugar in year 1992-93 to 40/60. Industry got a boost.

- Result once again the status changed from importer to exporter.

### Eighth Five-Year Plan

Govt. constituted a Task Force to deliberate various aspects of the sugar industry in the 8<sup>th</sup> plan period:

Requirement	13.41 MnT
Installed capacity target	14.12 MnT
Licensed capacity target	18.20 MnT

Eighth plan was delayed by two years and Government made projections on the basis of parameters on the year 1994-95. The status at the end of VIIIth plan:

	Target (MnT)	Actual(MnT)
Licensed capacity	20.0	21.1
Installed capacity	15.5	12.5
Production:96-97	14.8	13.0
Consumption: 96-97	14.6	13.5

There are 448 mills with installed capacity of 12.4 Mt average capacity of 2150 CD. Over 100 new mills and expansion of existing mills will add 9.0 MnT to capacity.

### Ninth Five-Year Plan - Targets

The targets of the Eighth Plan have been achieved. The approach paper indicates the following plan:

Year	T a r g e t (MnT)			
	Lic. Capacity	Installed Cap.	Production	Consump.
1997-98	20.1	16.4	15.5	14.2
1998-99	21.2	17.2	16.4	15
1999-00	22.3	18.2	17.2	15.8
2001-01	23.5	19.1	18.2	16.5
2001-02	24.8	20.2	19.1	17.5



## PROCESSING

India is the only country in the world who produces plantation white sugar. All other countries are producing either raw sugar or refined sugar or both. Thus the processing capacities are quite different and so also is the quality of sugar.

In terms of number of mills, India ranks first with 448 Mills, followed by China 241, Brazil 231. World total of 2500. Average size is 2150 TCD, much lower than world average. In India, we are still setting up 2500 TCD mills whereas the trend globally is to set up 10000 TCD mills. (Annexure IV.V)

### Capacity

Mill capacity is calculated basis normal crushing period. At the end of eighth plan, the target licensed capacity was 18.9 MnT and installed capacity of 14.1 MnT against which the licensed capacity was 21.0 MnT and installed capacity of 12.4 MnT. The target production in 1995-96 was 14.1 MnT against which the country produced 16.4 MnT. This was due to high sugar cane production and early/late crush incentive. However, there is still a shortfall in achieving installed capacity. The reasons for non fulfilment of target were:

- Non availability of finance from institutions to new sugar factories and to existing factories for expansion.
- Specified capacities have been installed but could not be utilised due to certain technical reasons such as Letter of Intent, compliance of pollution controls etc.

In 1995-96 the total installed capacity was 12.4 MnT and there were 448 mills i.e. average capacity of 2150 TCD. Its distribution was as under:

Capacity TCD	No. of Mills
<1250	63
1251-2500	313
2501-5000	60
5001-9000	8
10000	4

- There are about 100 new units or expansion schemes under implementation which will add to capacity of about 9.0 MnT.
- The current licensing policy envisages new units of minimum capacity of 2500 TCD.
- Government has recently announced incentive schemes for new mills as well as for expansion of existing units by way of additional release of sugar for free markets.
- All the same time, the minimum distance between the two mills has been reduced from 25 km to 15 km.

Thus the growth of capacity continues to be horizontally.

## BY- PRODUCTS & DIVERSIFICATION

### Baggase

Basic utilisation of baggase continues to be as a fuel. Dry baggase contains 40% cellulose, 30% pentasone and 20% lignin. It is suitable raw material for paper industry. 30% of cellulose requirement comes from agricultural residues. However, since the mills are scattered all over the country, collection of surplus baggase poses a problem and makes paper units uneconomical. Efficient utilisation yet to come up.

### Co-generation of power-use of baggase

Baggase is used as captive fuel in the mill as power. Most efficient as well as balanced mills should be able to save baggase to the extent of 10% of its production. The potential for co-generation and export of power to the grid after meeting mills own requirement of energy is estimated by expert bodies, at 3600 MW by 1996-97. India has not exploited its huge potential like other countries like Hawaii, Mauritius etc. where co-generation of power from sugar mills has become a dependable source for supply of power.

Central Government needs to coordinate this with state government electricity boards for utilisation of the surplus power which sugar mills even can generate. Co-generation should be encouraged. Commercial aspects of power purchase arrangement and distribution needs study.

The investment required is about 60% of what will be required for setting up a conventional thermal power plant. A beginning has been made with 5 such plants coming up.

### Molasses

Molasses for many decades have been fully controlled in every aspect i.e. price/movement/end use etc. In 1993, the Central Govt. decontrolled the molasses. Most states have complied with the centre's directive but some state government's like Bihar, UP have reimposed controls like dual pricing, Movement end use controls etc. this is only helping in keeping free market molasses prices high leading making availability difficult for distilleries and country liquor production thereby encourages illicit liquor production from Gur - hence more diversion of sugar cane.

There are total 283 distilleries and 108 sugar mills having distilleries attached. Total installed capacity is 2700 Mn Litres. At current level of sugar production and surplus availability, total is estimated at 400 Mn Litres which could go upto 700 Mn Litres by the year 2000.

### Developments – agricultural

Just after India attained freedom, 50 years ago, Indian governments first and immediate concern was food production. In the words of the first Prime Minister of India - "Everything can wait, agriculture can not." The words expressed common concern as population was growing at a much faster rate than food production.

That the country became self sufficient in food grains was a demonstration of unprecedented collaboration between policy makers, administration, scientists and overwhelming response of farmers. To give a further boost Farmer was provided incentive by way of an attractive support price and disposal mechanism by way of procurement of the food grains by the Govt. agencies.

The agricultural thrust continued in other agriculture commercial crops as well like oilseeds, sugar cane where Govt. appointed technology missions and where India became self sufficient from a net importer. In sugar, it became an exporter, exporting as much as 1 MnT in 1995-96. Today India has made a place for itself in the world agricultural map where it enjoys a prominent position with rest of the world.

### Developments - Sugar cane

It was in mid 1960's that sugar became a priority and Govt. set up task force to plan requirement and growth. Policy was to focus on cane production, utilisation and processing capabilities. Remunerative cane prices led the farmer shift to sugar cane and oilseeds. The growth in sugar cane production has been both in acreage and yield. Whether this trend will continue, will depend upon crop economics as farmer has been adopting commercial approach.

There is a need for rationalisation of sugar cane policy to encourage farmer to improve yield and mills to build up rapport with farmer to build up trust, commitment resulting in assured supplies of clean and freshly cut cane (improve extraction). In return farmer gets better and quick return.

### Support system for agri crops

Agriculture sector still contributing 28% to India's GDP. Projected growth rate is 3.5%. The focus of agriculture scientists has been on increase in productivity, by providing scientific inputs - demonstration by State Agriculture Departments in fields with farmers of such practices.

To overcome the biggest apprehension of exploitation of farmers by financiers and traders. Govt. provided support to ensure remunerative prices as well as marketing of agriculture production.

### Price support system

Price support system for agriculture produce has been one of the significant factors providing confidence to the farmer. The commission on agriculture costs and prices, in the Ministry of Agriculture is vested with the responsibility of determining the minimum price a farmer must get, which brings him prosperity and keeps him motivated. Various state departments of agriculture monitor the quality and the value of direct inputs like seed, pesticides, Irrigation, fertiliser, manure etc. and also the fixed costs like interest, rental of land etc. Farmer is compensated more than the cost of the inputs.

At the same time to encourage the farmer to experiment in new crop (most recent being sunflower) - the farmer is compensated lot more than the cost of input. A typical costing to arrive at the minimum support price, is annexed.

### Procurement system

Procurement system also needs a mention. Govt. procures the food grains and stores to provide relief to the farmer who otherwise will have to hold an inventory and block his finance.

Also Govt. has appointed some state federations and cooperatives to intervene in the market i.e. to support prices of oil seeds, grains etc.

### CROP ECONOMICS

The phenomenon of crop switch is driven by one single factor i.e. farmers confidence in the price support system and the payment commitments against his cost of produce. For inducing the farmers to invest in yield apart from raising infrastructure and use of inputs, price support to farmer has to be demonstrated. With total area sown stable at 142 Mn Ha, further increase has to come only from increase in yields whatever may be the means i.e. seeds, irrigation, pest treatment, harvesting, etc..

Farmers attitude of commercialisation has been amply seen by shifting from food grains to sugar cane and oil seeds. This trend can not be assumed to continue and if farmer could shift from food grains to non food grains - he can also switch back if non food grains become less remunerative at any stage.

The attached table will show the cost of production of crops competing with sugarcane. The data is sourced from the Central Agricultural Dept. who in turn get it from state agriculture deptts but the same is not so regularly compiled.

While calculating the return per hectare of land - a farmer may decide on cropping basis only operating costs or basis total costs.

The agricultural practices vary from state to state depending upon the irrigation facilities, soil condition, weather, inputs from local state agriculture depts. State support in form of subsidies on water, power, diesel, etc.etc. as and also work attitude of regional labour.

### Sugar cane economics (interstate)

U.P., Maharashtra and A.P. are amongst the largest producer of sugar cane, representing 60% of total cane produced. The variations are because of different agronomic conditions and farming practices.

### Comparisoin of return on various crops in same district

In order to make an effective comparison, a study was conducted for a season in Western U.P. taking into account all elements of various inputs i.e. direct costs.

Operations	Unit	Wheat	Paddy	Potato	Sugar cane plant
Field preparation	Rs.	700	875	700	3800
Sowing/Transplanting	Rs.	690	840	7800	7000
Fertilizer & Manure	Rs.	2100	2325	2775	6000
Irrigation	Rs.	750	1250	625	4000
Plant Protection	Rs.	-	-	1000	2000
Harvesting/Disposal	Rs.	4500	4000	1850	6060
Total Cost	Rs.	9115	9665	20900	32860
Yield	Ton/ Ha	5	5	21	58
Value of Product	Rs.	20000	21250	31500	41400
Return/Ha	Rs.	10885	11585	10600	8540
	US\$	306	325	298	240

### Multicropping pattern

- Overall return to farmer is basis multi-crop cultivation
- Multicropping results in maximisation of crop production.
- Various multicropping patterns with sugarcane are followed like
  - Wheat/sugar cane plant
  - Potato/sugar cane plant
  - Mustard/sugar cane plant
  -
- Ratoon cane crop constitute 45% of cane area or 30% of cane production - Even with ratoon - short duration crop are undertaken like pulses.
- In India, one ratoon is common while in areas like U.P., Punjab, Haryana, practice of multiple ratoon is in vogue. Other countries also adopt multi-ratooning like Mauritius 6 to 8, Australia 2 to 3 and in Cuba 3. To 5.
- Thus with multicropping-ratoon sugar cane and plant cane with other crops gives the best return to farmers.

### Sugar cane production

Sugar cane is one of the important cash crop. The production has grown dramatically over past several years. Sugar cane growing area in India may be broadly classified into two agro-climate regions:

REGION	STATES
Sub-Tropical	Uttar Pradesh, Bihar, Punjab, Haryana
Tropical	Maharashtra, Gujarat, Tamilnadu, Andhra Pradesh, Karnataka

Sugar cane industry was initially set up in the sub-tropical region. Till 1950's - 90% of area under sugar cane was in this region. With commencement of planning process, sugar cane found its route in tropical area. sugar cane being a tropical crop finds favourable agro climatic conditions for its growth in this region - i.e. higher yields. Growth after 1950's was more in this region and by 1994-95 the sub tropical region, sugar cane area was 65% and cane production 55% of the total cane produced.

Now the tropical region is already developed and reached near saturation level. The biggest state in this region - Maharashtra faces acute problem of lack of water which effects cultivation of sugar cane. The sub-tropical belt, with fertile land, high

water table and irrigation, appears to be the area for future growth.

India has total 26 states. Sugar cane is produced in 15 states. Above 9 states produce 97% of cane. 5 states contributed to about 87% of sugar cane produced in 1994-95.

#### The trend

The sugar cane crop has been in growth mode though there have been fluctuations and a sharper increase came in last 15 years. The growth can be attributed to:

- Government's thrust on sugar production - planned growth
- Govt./State Agriculture Dept's input on field extension, seed varieties, crop maintenance
- Cane development programmes of sugar mills
- Increase in cane support price covering more than input costs
- Crop switch resulting in more crop area in sugar cane due to better return
- Increased irrigation facilities and increase in energy consumption for irrigation
- Favourable monsoons.

#### UTILISATION OF SUGAR CANE

The sugar cane produced in the country is utilised for the following purposes:

- Production of white sugar
- Production of traditional sweeteners
  - Gur
  - Khandsari
- Seed, feed and direct consumption (chewing)

Production over the period has shown a significant growth. Over the past fifteen years. Production of sugar cane, white sugar is not consistent due to utilisation pattern of sugar cane.

The above data would reveal a trend that would indicate:

- Cane used for seed/chewing/feed as percentage stays constant at about 12%.
- Cane utilisation for sugar has been moving up and down.
- There is inverse relationship between sugarcane production and percentage utilisation for gur and khandsari.

On yearly basis, loss of sugar production is lot more than drop in sugar cane production and likewise increase in production is also much more than increase in sugar cane production. Thus such reversals can be witnessed again in 1996-97.

#### Role of traditional sweeteners - gur/khandsari

Gur is produced by continuous direct heating of crude extracted juice in open pans - till it turns solid paste. Khandsari is sugar produced from unrefined cane juice.

The trend and the data reveals that sugar production has a strong and direct rivalry with traditional sweeteners segment i.e. gur and khandsari.

While healthy efficient competition is order of the day but gur and khandsari is an inefficient utilisation of limited resources of raw material, i.e. sugar cane

#### Comparative Extraction and Recovery from Sugar Cane (%)

PRODUCT	Juice/Extraction	Recovery
Gur	55	9.5 to 11.0
Khandsari	70	6 to 7
Sugar	90-92	9 to 10

Let us take a look at gur and khandsari and the concessions these two sweeteners enjoy over white sugar.

#### Gur

- Predominantly produced in UP, Maharashtra, Andhra Pradesh and Tamilnadu.
- Initially produced to meet basic farmers' own need of sweetener.
- Direct consumption in household in winter season as a digestive sweet.
- Gur is commodity which is traded on futures - thus provides speculation.
- Gur has no controls - some commodity taxes such as Cane Purchase Tax, Trade Centre (Mandi) tax are also evaded.
- Thus gur manufacturers can pay more for sugar cane at the time of shortage, causing diversion.

#### Khandsari

- Immediate substitute of sugar.
- It is sugar produced from unrefined juice.
- Competes directly with sugar due to excise duty difference.
- Good Khandsari sells at marginal discount to sugar.
- At times of low sugar cane production i.e. high molasses price, high sugar prices - Khandsari operation is profitable.
- Hence can pay for sugar cane - even more than sugar mills causing diversion.

#### Competition with sugar mills

Thus because of complete freedom. gur and khandsari enjoy, they give stiff competition to sugar mills - be it cane procurement, cane prices, unrestricted sale of product as well as by - product.

Net Result: In the event of low sugar cane crop

#### Whereas

- |             |   |
|-------------|---|
| SUGAR MILLS | <ul style="list-style-type: none"> <li>• Have to sell sugar at dual price to the extent Govt. decides and not beyond two weeks.</li> <li>• Have to sell Molasses at dual prices at ratio fixed by Govt</li> <li>• Have to pay for sugar cane at fixed price.</li> </ul> |
|-------------|---|

#### On the other hand

- |                       |  |
|-----------------------|--|
| GUR / KHANDSARI MILLS | <ul style="list-style-type: none"> <li>• Can sell product and Molasses at free Market price</li> <li>• Can sell forward - there is a futures market for Gur.</li> <li>• Thus with more cash and good margins pay market price for cane</li> <li>• high at time of shortage and low at the time of Glut.</li> </ul> |
|-----------------------|--|

This explains the reason of excessive diversion of sugar cane and the changes in the sugarcane utilisation pattern for sugar versus traditional sweeteners.

#### Impact on overall sugar economy

- Khandsari manufacturing is a waste of precious agricultural resource of sugar cane. The recovery is 6 - 7% against 10% in sugar.
- Thus on every 10 MnT cane utilised for khandsari, means a loss of 300,000 tons of sugar equivalent.
- At times of cane shortage, it has been found that upto an extra 10% of cane gets diverted to gur and khandsari.
- This explains that sugar production is not in line with sugar cane.

#### PRICING

##### Sugar cane pricing

Till mid 1960's industry was fully controlled. To provide support to farmer, in 1965-1966, the sugar cane price for

sugar mills was fixed based on production and input costs called SMP (Statutory Minimum price). The sugar mills on one hand paid SMP. Gur and khandsari producers could pay lower or higher than SMP. This would result in diversion of sugar cane to khandsari and gur causing a decline in sugar production and also lower cane production.

Therefore, Government adopted partial decontrol policy i.e. mills could sell 35% sugar in free market enabling mills to pay more than SMP (like khandsari & gur) but the same was administered by states called SAP. Thus sugar production went up from 2.13 Mn. T in 1966-67 to 2.16 Mn. T in 1967-68 to 3.75 Mn. T in 1968-69.

In early 70's, Government appointed a commission, amongst other things, the tasks being to recommend mechanism to stabilise sugar cane supplies to sugar mills. The commission got known as Bhargava Commission, which sought the views of industry, cane growers, Cooperative Sugar Federation. The cooperative mills wanted 100% benefit of free market sugar benefit to farmer on the logic that levy price was fully covering the production cost whereas private mills wanted 50% sharing. While sugar cane constituted 70% of the sugar cost Bhargava Commission recommended 50% of the profit sharing (on the logic that sugar mills will have to pay 60% income tax on 50% profit - mills will effectively get 20%).

The government accepted the Bhargava formula and incorporated the same in the Sugar Cane Control Order of 1966.

Thus in practice, country has two systems of sugar cane price movement. In cooperative mills dominated states, i.e. Maharashtra, Karnataka, Gujarat, sugar cane price is based on profit sharing formula while in other states dominated by private mills - State Government advise the sugar cane price known as State Advised Price (SAP). The statutory minimum price or SMP is used only to determine the price for levy sugar

But this is not the end. The politicians need to impress upon farmers that when they fight for farmers right, the later has to discharge its obligations i.e. apart from guaranteeing supplies also improve quality/productivity and not to ask per unit price alone. (At the time of shortage farmers are lured by gur and khandsari manufacturers who can pay more.).

The farmers need to understand that cane price has to have a relation with sugar price. Concept is already in place in some parts of the country. The mills, farmers and cooperatives and politicians need to work together agree on the principle of cane pricing which should have a relation to sugar sales proceeds, quality and productivity. Then only a natural continuous growth can be expected.

Sugar cane prices based on Bhargava formula will lead to competitive farming and competitive processings. Both farmer and mills will have to become competitive in respective areas.

### **Sugar pricing**

The country has dual sugar pricing policy.

#### **Levy sugar price (fixed by Government)**

It is a peculiar situation where raw material price is fixed by the Government which goes up every year. Sugar price for the levy sugar (40% of production) is fixed without taking into consideration of all factors that go into production - i.e. 40% of the sugar is sold below cost of production. Thus Government, for all its valid reasons, has protected the farmer and the household consumer who gets levy sugar.

#### **Non levy - sugar (free market price)**

Once the house-hold consumer is protected through levy price - mills should be left free for the free portion of sugar. But it is not so. Free is not free at all. How much quantity - and when all the Govt. decides. The quantity is determined based on historical data of past plus to keep

the prices under check - who uses this sugar. 80% of free sale is used by Institutional users who are free to charge on their product.

Besides the controls, on sales, are such that mills are forced to sell its product fortnightly basis due to fear of the quantity short-sold getting converted into levy. The advantage is taken by the trade i.e. the retailer. He adjusts his price upwards when the mill rate goes up but does not drop when mill is forced to sell at lower price.

The sugar price is perhaps the lowest in India comparing to other countries. The annual increase in 1994-95 over 1988-89 is only 5.3% as against 13.5% in case of Rice, 10.8% in case of wheat, 13.5% in case of food grains. 18.0% in case of groundnut. The sugar cane price is up 20%. (Annexure VII). Annexure VIII shows the sugar cane price announced by the Government (SMP) and the actual cane price paid. Annexure IX shows the Trend in Sugar prices. Thus, there is no mechanism by which sugar mills can price or hedge their product in the market where price fluctuation can be as much as 8 to 10%.

India perhaps is the only country in the World where sugar cane price is going up and the sugar price is not keeping pace. Sugar cane prices - both SMP and SAP have been going up. Sugar prices have not followed cane prices. India is the only country where there is no relation between sugar realisation and cane prices. Therefore, if the growth is to be assured, cane pricing-one of the key issues for the health of sugar industry, has to be realistic.

### **TRENDS IN SUGAR CONSUMPTION**

When we speak of per capita sugar consumption for India, we shall consider traditional sugar cane based sweeteners (gur & khandsari) as well.

Thus with sugar and gur/khandsari consumption taken together the consumption stands at around 24 kg/annum. Trends and comparisons with other countries (Refer Annexure X,XI)

- Per capita consumption of all sweeteners has been fairly stable at 20kg until 1980.
- In this period however there has been a gradual shift from gur/khandsari to sugar.
- In 1960 - sugar was 4.8 kg or 25% of all sweeteners which in 1980 grew to 8.2 kg or 42%.
- Between 1980 to 1995 - total consumption grew to 24 kg with sugar at 13 kg or 55%.
- Thus growth between 1960 to 1995 has been as under:

**1960 –1980** Total sweeteners steady at 20 Kg. sugar  
Up from 4.8 to 8.2 kg.  
Gur khandsari down from 15.2 to 11.5 kg.

**1980-1990** Total sweetener moved upto 24 kg.  
Sugar upto 13 kg.  
Gur/khandsari down to 10.7 kg.

### **Sweeteners consumption India vs world**

- Today India's per cap. consumption of 24.4 kg is higher compared to world average of 20.4 kg.
- Well high above Asia average of 12.8 kg.
- Lowest is in China at 6.5 kg - which distorts Asia average - (alternate sweeteners basic buying high)
- Compare's well with Pakistan 23, Srilanka 24.1, Thailand 24.9.
- But behind Philippines at 28.7 and well behind Malaysia 39.8.

- Also substantially behind developed countries such as US, Canada, Australia, New Zealand, EC and developing countries and major sugar producing countries such as Brazil, Cuba.

#### **Trend in consumption pattern**

- Major increased witnessed between 1980 to 1995
 

- World average	19.8 to 20.4
- Asia average	8.6 to 12.8
- Asia average increase is 50% hence. We confine discussion on Asia:
 

* Japan	Down 10% to 21.5
* China	Up 50% to 6.5
* Thailand	Up 80% to 24.9
* Malaysia	Up 25% to 39.8
* Pakistan	Up 150% to 22.9
* Sri Lanka	Up 50% to 24.1
* Philippines	Up 28% to 24.4
* India	Up 20% to 24.4
- While there has been a general trend in health consciousness but Western habits are catching up fast. Good growth potential in:
  - \* Soft drinks
  - \* Food products
  - \* Confectionery segment
- Back to India, the dual pricing/marketing policy clearly segments two sectors i.e.
  - \* House hold direct consumption i.e. levy sugar i.e. 40% of production.
  - \* Out of free market sugar 60% of production - 80% goes for indirect consumption and 20 % for direct consumption.
  - \* Thus total off- take for house-hold consumption would be 48% of sugar produced.
- 4% growth in sugar consumption is expected. (2% from the population growth and 2% is expected from the institutional segment).

#### **REGULATIONS**

The Industrialisation in India has been highly regulated and protected leading to monopolisation and centralisation. Over a period of time, however the Govt. encouraged new business - new entrants but beginning of the 1990's the reforms and liberalisation has changed the environment. Protection has disappeared. Imports exports liberalised. Production have overtaken, demand competition has increased, new technology has come in supported by direct foreign investments, All this has resulted in growth in consumerism driven by better quality and availability at reasonable prices.

Sugar however remains insulated, liberalisation and reforms touched sugar limiting to only imports and in some way in exports. Some of the major regulatory measures at the central Govt. and State level are as under:

#### **ISSUES RELATING TO SUGAR INDUSTRY**

##### **Central Government Measure**

##### **Licensing**

- Sugar industry is a schedule industry under Industrial Development Regulation Act requiring license to manufacturer.
- Gestation period has been reduced from 3 years to one.
- Minimum capacity of a new sugar mill is 2500 TCD and expandable upto 5000 TCD.
- Minimum distance between 2 sugar mills is now 15 kms which used to be 40 km.
- Cane availability is now not so critical requirement.
- Government gives incentives where in new mills can sell upto 100% of the sugar in free market against 60% of existing mills -

Government has also announced such incentive for expansion upto 5000 TCD.

- The impact has been horizontal growth-causing cane shortage-higher per unit processing cost etc. etc.

##### **Production Monitoring**

The Sugar (control) Order 1966, regulates the production, sale of sugar, stock limit. It also prescribed standard of quality - to which sugar must conform at the time of delivery.

##### **Sugar Cane Pricing**

Sugar Cane (control) Order 1966, was issued to promote sugar industry and to ensure fair deal to cane growers by fixing minimum price payable by sugar mills. Act provided cane price fixation basis 50% profit sharing. Not enforced in some states where such state fix its own price.

##### **Sugar Supplies for Public Distribution**

The Levy Sugar Supply (control) order 1979, was issued empowering the Govt. to direct sugar mills to supply levy sugar to authorised persons/organisation etc. at a price fixed for the season.

##### **Dual Sugar Pricing Policy**

Under the provision of the Sugar Control Order, Govt. has been regulating the sugar supplies for distribution under PDS and free market. Several times in the past, industry has gone through complete control or partial control to complete decontrol and back to partial control. (Annexure XII)

Under the current policy 40% of the sugar produced is to be delivered by mills, for public distribution, at a price fixed from season to season. Balance 60% can be sold in the free market as per quantity decided by Govt. on month to month basis for each mill. Also mill has to sell minimum 47.5% in the first fortnight and 52.5% in second.

##### **Quality/Packaging**

Governed by Indian standards. Grade 31, 30, 29 and Packaging only in 100 kg jute bags. Consumer packs allowed in 1, 2, 5 kg in any packaging. Exports packing can be in 50 Kg and in any packaging material and so also imports

##### **State government regulations**

Over and above the central Govt. control, each state Government enforces its own regulatory measures to protect the State/farmers. Following are some typical controls in the State of Uttar Pradesh which are there in other states in some form or other.

##### **Restriction on Sugar Cane Purchase Order, 1966**

This Order provides for restriction on purchase of sugarcane by gur producers. It also provides for permits for purchase of sugarcane by a khandhari manufacturer holding a licence.

##### **Sugar Cane Cess Act, 1956**

This Act has been promulgated for imposition of cess on cane sold to a sugar factory. At present the rate of cess is Rs. 140 PMT on sugar which is collected at the time of delivery of sugar.

##### **Sugar Cane (Purchase Tax) Act, 1961**

This Act proposes to impose a tax on the purchase of sugarcane by the owner of a sugar factory. A sugar factory is not allowed to remove any sugar until Purchase tax has been paid thereupon. At present the rate of Purchase Tax is Rs.220 MT on sugar.

### ***Sugar Cane (Regulation of Supply & Purchase) Act, 1953***

This Act regulates the supply and purchase of sugarcane required for use in a sugar factory, khandsari unit and for manufacture of gur, it provides for:

- Declaration of reserved area/assigned area for the purpose of supply of cane to a sugar factory.
- Speedy payment of the price of cane (action for delays)
- Cane purchase by mill through cane growers coop-societies.
- Payment of commission to cane growers coop-societies.
- Power to declare some cane unsuitable for sugar mills.

### ***Sugar Cane (Supply & Purchase) order, 1954***

It provides for rules and regulations governing purchase of cane in a reserved area/assigned area and purchase for cane at cane purchasing centres within the reserved area of a sugar factory.

### ***Molasses Control Order***

While the Central Government has decontrolled the molasses, the State Governments, had imposed its own regulations like:

- Ban on interstate movement
- Restriction on end use i.e. sale to a specified consumer.
- Ratio of control fixed rate and free market rate
- Also specifies consumers who will get at control price.

### **Regulations for trade - domestic**

Sugar is governed by the Provision of Essential Commodities Act. The act provides stipulations on trade licenses, stock limits and rotation period for stocks. In addition, there are restrictions on sales and distribution, i.e.

- Mills can sell only to licensed dealers.
- A dealer can sell to another dealer only once.
- At times dealer is not allowed to sell to another dealer in the same state.
- Anybody storing more than 900 kg. of sugar needs license.
- Stock to rotate before 15 days.

### **Sugar - distribution and trading practices**

Under the dual pricing policy Government announces from time to time portion of the sugar, that can be sold in the free market and what is to be supplied at the fixed price under the public distribution system called levy sugar.

### **Levy Sugar sales/distribution system**

Currently 40% of production (effectively due to non-levy unit 33%). Quantity for distribution per month fixed unit per kg/family etc. Varies basis additional requirement arising due to important festivals.

Food Ministry issues allocation of various food departments/corporations. Such depts approach individual mills to lift the sugar and for onwards supply to various public distribution system (ration shops) appointed by the State Govt.

Consumer get their sugar allocation on fortnight basis against the ration card issued to each family head.

In reality, however, not all such sugar reaches bonafide users and finds way into open market due to large price differential that exists between levy and free market sugar (Rs. 5.50/Kg. Or 6.25 c/lb).

### **Free sales sugar marketing system**

#### ***Quantity***

Currently it is 60% of the production for older mills. Extra fee sale sugar is allowed for late and early crushing and also for new units. Effectively it is 67%.

#### ***Free Sales Release***

Food Dept. assesses the monthly requirement for the country basis-historical demand pattern over the previous years and allowing growth ranging 4 to 5%.

The statewise allocation is then fixed basis historical data plus any specific festival demand for the month in that state.

Millwise allocation is then made basis production/stock of the mills on pro-rata basis. Individual mill adjustments are made for the export release of the previous months or additional incentives out of late/early crush.

### ***Period of Sale***

Mills have to complete sale and despatch of 100% of the such sugar released by the government on monthly basis and within stipulated period, so prescribed.

Also in order to reduce speculation and ensure supplies in market, mills are bound to sell the quota evenly in two fortnights of the month i.e. 50:50. However, the only relaxation is that mills can sell upto minimum 47.5% in a fortnight and a maximum of 52.5%.

Failure can lead to prosecution under the sugar control order and such quantity can be converted in levy sugar. Thus mills are forced and have to comply with this requirement. This is one singular factor which determines the price of sugar in market (not consumer).

### ***Authorisation for Sale***

Such sugar can only be sold to government approved licenced wholesaler only and to actual users who have a storage/dealing license.

Further these wholesalers have to sell only to retailers but can sell to another wholesaler only once. The wholesalers also have to sell such sugar within 15 days of receipt - on first in first out basis (earlier this was 7 days).

The institutional bulk consumers, in order to meet their requirement and to buy at the best prices are also required to have a wholesaler license. (Any person/user can store sugar upto 900 kg without license).

There is no restriction in movement of sugar from one state to another.

### ***Customer Base***

• House Hold Users	900 Million
• Retailers selling sugar	300,000
• Licensed wholesalers	70,000
• Establishments	800,000

### ***Trade Channel***

Thus driven by statutory requirements most trade from the mills is to licenced wholesalers - who in turn service retailers for the household customers and endusers for institutional demand.

Moreover, with such a large customer base spread all over the country, neither it is possible for the individual mill to access them, nor service. Thus trade is an important link in the supply chain.

In order to make sure of commitments/transactions and collection of sales proceeds a system of indent and order collecting agent got developed over a period of time in most states. These agents are appointed by the mills whose role is:

- To book order from wholesalers.
- Place such orders and delivery instructions on mills
- Arrange deliveries from mills to the wholesalers.
- Collect payment from the wholesalers
- Pass on sales proceeds to the mills

The mills for the above service pay a consideration by way of commission (0.5 to 0.75%).

The secondary sale is transacted through brokers. Such brokers bring the wholesalers and the retailers in contact for the ultimate sale and charge a fee (upto 0.25%)

The retailers either pick up the sugar or the wholesaler makes the delivery to the retailer at a cost.

#### Segmentation - Consumer base (Typical)

The distribution/segmentation of the Sugar is

	000 MT	%
<b>PDS</b>	4400	33
<b>Free Market</b>	9100	67
<b>Total</b>	13500	100

The distribution of the free market segment is

<b>Institutional</b>	7100	78
<b>Household</b>	2000	22
<b>Total</b>	6400	48
<b>Household</b>		

Thus almost 52% or say half of the sugar produced goes in for indirect consumption i.e. institutional segment.

- **Large Buyers such as:**

	000 MT	%
* Soft drinks bottlers	300	4.23
* Biscuit manufacturer	600	8.46
* Food products	50	0.70
* Confectionery	200	2.81
* Pharmaceuticals	50	0.70
* Hotel/restaurants	100	1.40
* Sweet meat	5800	81.70
<b>Total</b>	<b>7100</b>	<b>100.00</b>

#### Segmentation - regional

The product quality in different states is based on customer preferences/cane quality/processing capabilities etc. also driven by local sugar availability.

#### Sugar market - major trading centres

Sugar is allowed to move freely through the country. Apart from local price, cross movement shift in different states from neighbouring states taken place due to transportation costs and local prices, the differentials got determined basis delivered cost in consuming centres.

Major Trading centres are

- Mumbai • Ludhiana • Kolhapur
- Calcutta • Vijaywada • Chennai
- Delhi • Ahmedabad

#### Sugar Price

Determined by demand/supply gap in each state and cross movement from surplus to deficit states. Each state has developed preferences of colour/grain size etc/

Primarily sale is on Ex.Mill basis and free market price is more trade driven then customer driven as almost 100% sugar is marketed through trade and mills have to sell the sugar to fulfill statutory obligation - thus demand is actually created by Trade.

While sugar price at mill level and wholesale level fluctuate, within 5 to 6%, retail price moves only upwards.

Also sugar price entirely depends upon Govt. fix on price. Sugar prices had been kept artificially low both for free sale as well as PDS

- Have not followed cane prices
- Have been far behind compared to other commodities
- There is no relation to International prices.
- Indian sugar average price at 17.0 c/lb is perhaps lowest all over the world (Ref Annexure XIV)

#### INTERNATIONAL TRADE

India has always been in the International market either for imports or exports. In last 15 years, India imported 6.596 Mn. T sugar and exported 4.496 MnT. Imports have outweighed exports. The volume of exports and imports are based on surplus or shortfall anticipated or determined between demand and supply.

It is likely due to inconsistent policy, delayed action, monopolization etc. the imports and exports may have not been most efficiently handled and India may have paid high price for imports and perhaps didn't get best price for its exports.

#### Policy on international trade

The International Trade in India has generally been highly regulated both in terms of authorisation as well as volume. There has been a dramatic change since 1991. With the wave of economic reforms and Liberalisation Policy, even essential commodities like edible oils and sugar also got freedom/relaxation in imports/exports. While imports of sugar were put under OGL, exports got decanalised.

#### Imports

In last 3 decades. First import was in 1979-80 and the imports until 1993 were canalised through Government agencies such as

- \* State Trading Corporation of India.
- \* Food Corporation of India.

- Govt., under advise of the Food Ministry, would access the shortfall and give a directive for import.
- In 1993-94, anticipating a heavy shortfall of over 2 MnT, Govt. allowed free imports under open general license. Almost half of imports were private. Today imports are freely allowed.

#### Exports

India entered the world market as an exporter in the year 1957 and has exported sugar all along. The quantity has been as low as 20000 MT in the year 84-85 to as high as 1.02 MnT in the year in 1995-96. The exports have never been an economic proposition due to dual sugar pricing policy which makes the free market prices high.

Thus to boost exports Govt. enforced an act in 1958, called as Sugar Export Promotion Act. The very purpose of the Act, as the title suggest, was to boost exports. Salient Features were:

The exports were canalised through two canalising agencies:

- State Trading Corpn. of India (STC)
- Indian Sugar General Import Export Corpn. (ISGIEC)

These agencies will procure sugar from the mills willing to supply the sugar, otherwise, as per act. all mills were obliged to supply for export. The profit and loss so achieved on the exports would be shared amongst all the mills on the apportioned quantity.

#### Impact of decanalisation of exports

How much sugar will be exported - the decision rested with the Central Government i.e. it will announce how much sugar can be exported. The monitoring agency will then issue public notice on the system which broadly is:

- Exporter to have registration with APEEDA.
- Exporter enters into an agreement with a buyer in another country and then applies to APEEDA for export registration certificate with following:
  - Bank certified original contract
  - Copy of the letter of credit.
  - Registration fee.
  - Non performance bank guarantee of 5% of contract value (to be encashed in the event of export not taking place in time).
  - In case of merchant exporter, consent letter of the mill supplying sugar.

The procedure was simple, it was on two counts that export didn't get a boost.

- One Fear of 5% Bank guarantee encashment.
- Two Export not profitable.

India could still export upto 0.5 MnTons was a matter of chance that Pakistan's demand came and India got advantage of low freights. 80% of the exports were to Pakistan. In long run, the policy of decanalisation is a non starter, under the dual sugar pricing policy because domestic price of free sugar is high. International price will determine the economics. The contribution is negative. The loss will be solely be borne by the exporter (earlier it was shared by the entire industry).

#### ISSUES RELATING INDIAN SUGAR INDUSTRY

##### Profitability of sugar business

The Reserve Bank of India's study, in respect of select Industries, has indicated that gross profit in sugar industry has been lowest at 9%. The post-tax profit has been significantly lower. Risk free Investment give an yield of 15%.

The study conducted by industries association of the sugar industry, for listed companies covering 15 year's performance has revealed that:

- It incurred losses in 9 out of 15 years.
- Over 50% of units incurred losses.
- Gross profit over capital employed has been as low as 1.2% and never crossed 12%.
- Even the best mills could not pay dividend over 10%

Therefore, the key issue is to develop strategy and a consistent policy which will help the sugar industry and sugar production to grow. To see a growing Trend line is not good enough.

##### Sugar mills capacity

The Government has been issuing licenses based on its planned requirement of sugar and also the gestation period which could be upto 3 years. There has been delays in conversion of license into Installed capacities due to:

Investors delaying the investments because of declining profitability during the period.

Financial institutions not coming up for committing finances in companies with sugar as a core-business.

Some basic issues leading to poor health of sugar industry remain unaddressed - the licensing policies have been modified to attract investments by way of incentive i.e. New sugar mills will be allowed to market upto 100% of its production in free sale (against 60% from existing units) for a certain period.

There lies the catch - while the new units come up, some old units become sick and close and may decide to set up another new mills. Thus effectively there was no substantial increase in capacity but more free sale sugar in market - i.e. Lower prices or delayed release for old mills at the expense of new mills.

The government, on the advice of Committee of Members of Parliament, scrapped the incentive schemes effective 31<sup>st</sup> March 94 and all new licenses (over 50) were to be without any Incentives/Sops.

But it was not be - sugar is the only industry where only one thing is certain that policy can not be certain. Despite with good production in 1994-95 and 1995-96 and capacity utilization of 110% and 125% at installed capacity of 12.4 MnT with another 1 MnTon in pipeline, under some pressure. Government again announced an inventive scheme with retrospective effect i.e. covering all licenses issued after 31<sup>st</sup> March, 1994 which earlier did not have provision for such incentive. Under this scheme-

	CAPACITIES	INCENTIVES	
		High recovery	Others
New Mills:	1750 TCD Back ward area 2500 TCD Normal area	100% Free Sale 5 years	100% Free Sale 8 years
Expansion:	Upto 2500 TCD 2500 to 5000 TCD	85% Free Sale 80% Free Sale	100% Free Sale 90% Free Sale
	(Quantities subject to some ceilings)	(For 5 years on additional production)	

All such capacities either from new units or expansions have to come by October 1999 to avail such incentives. There is a need to address to the basic issue whether we need horizontal growth. To achieve economy of sale, to be competitive, per unit capacity must grow vertically to target average capacity of 3500 TCD which today is no more than 2150 TCD. The licensing issue must be addressed accordingly.

- Expansion only to be allowed
- New capacity only in cane surplus regions
- Minimum capacity not less than 5000 TCD

##### Policy towards traditional sweeteners

The role of traditional sweeteners has been dealt with in details. There the issue is not to do away with this segment. It can't even be suggested since these have been there and their are consumers for these products particularly gur.

The consumption pattern has already gone through a shift i.e. conversion towards sugar. During 1960 to 1980 sugar at 4.8 Kg. represented 25% of all sweeteners at 20 Kg. Sugar has gone up from 4.8 Kg. to 13 kg and gur and khandsari per capital has come down from 15 kg to little over 10 kg and we see it going down further to 9 kg where it will stabilise.

While gur has a demand of its own in the rural population base - there is no justification in allowing gur to be diverted to manufacture illicit liquor. (What a pity to use a product what sugar by product - molasses can do)

Khandsari production recovers 4% less sugar and produces 4% extra molasses - what a waste of valuable resources of cane again.



There is need:

To remove control on sugar or bring gur and khandasari under similar controls.

To have uniform taxes/duties for all sweeteners.

To impose ban on further capacities in gur/khandasari sector and to be covered by licensing.

To have common cane price and not more than the price fixed by Government.

Once all sweeteners are governed by the same regulations/controls we see these two sectors stabilising on the strengths of its own. Net impact will be no more fear of diversion of sugar cane. The efficient segment will survive and will benefit all segments the farmer, the consumer and the producer.

### **Sugar cane pricing**

It was almost two decades ago when the committee comprising of cane growers, sugar mills, co-operative decided the cane price to be determined basis minimum statutory price. Plus 50% sharing of profit. This is also in line with International practice where sugarcane price is related to sugar sales realisation.

But in actual practice only few states like Maharashtra, Gujarat, Karnataka have followed this agreement. In other states, the respective government's fix the price for political gains. Here the Central Govt. has to act firmly once for all, that cane price will be as per the provision of the sugar control order.

There may be a need to relook, if necessary, in order to maintain a growth rate of 3 to 4% in sugar cane production. The farmer in India has options. If he shifted from wheat/paddy to sugar cane or oil seeds - he can always go back.

Sugar cane price for farmer is a sensitive issue. It has to be such that the return/hectare of his land, is well placed compared to wheat/paddy etc. Wheat procurement price in 96-97 have been increased by 35% (From Rs. 3800/ton to Rs. 4750/ton equivalent to US\$ 106 to US\$ 132/MT). Have free sugar price have support price for cane.

### **Estimate of production**

Apart from the various issues which we need to address, is tasks of managing inventory well. With latest communication systems/information systems/techniques available what we got to set right is the system of Forecasting/availability. We know the carry forward stock, demand is reasonably known, we got to have a realistic estimate of sugar production.

This is one single factor where we have gone wrong time and again. If the estimates and actuals can be off by as much as 15%. Decision making becomes difficult. Take a look at last few years.

Some of the reasons are:

- Lack of scientific/organised base thus lack of correct information in the first place.
- Vested interest - may be to get better prices in domestic prices or to increase exports.
- Incorrect assessment on variation in yield/recovery
- Delay in correction/revision of estimate due to sudden change in weather conditions or other un-foreseen factors.
- No structured information system to assess usage of sugar cane by gur/khandasari units - the so called "Cane Diversion Phenomenon."

The industry/Govt/co-operative's body should be constituted and have scientific assessment.

### **Management of surpluses/deficits**

Over last five years, we have witnessed a closing stock of the season of as low as 1.224 MnT in October, 1989 equivalent 1.5 month's

consumption to as high as 7.95 MnT in October, 1996 equivalent to 7.5 month's (or 60%) consumption. The standard norm in India is 2.5 months or 20% of consumption (2.8 MnT) i.e. excess inventory of 4.7 MnT at the end of 1996. The impact of this has been:

Blockage of excess Inventory of over Rs. 5000 crores. (US \$ 1680 Mn)

Yearly impact: Rs. 1200 crores (US \$ 335 Mn)

Damage of stocks

Low prices of sugar in domestic market

Delay in payment to farmer - forcing him to shift to other crops.

Drop in Production in next year

The inventory can be used to its advantage. The carrying cost provides the flexibility.

The advantages:

Carrying cost goes down thus low total cost.

Increased liquidity to pay the farmer.

Regular presence in International market.

### **Deregulation liberalisation**

#### ***Delicensing***

With 448 sugar mills in existence and an other 100 in pipeline, this aspect should be examined. The policy should be to:

Encourage new capacity with development of cane responsibility. Min. capacity 5000 TCD.

Expand vertically to achieve economy of scale.

New capacities in surplus cane areas. Minimum distance norm should stay and distance be flexible between 25 to 40 kms. 15 kms distance could make some sugar mills unviable.

Incentives if any, to be in the form of reduced excise duty etc. - not of high free sale quota.

#### ***Captive Farming to Improve Yield/Recovery***

Low or stagnant recovery of sugar from sugar cane is an issue which has not been dealt with at national level. Over last 10 years, while the yield has gone up by 24.5% i.e. from 57 MT/Ha to 71 MT/Ha, the average recovery has been fluctuating between 10.3% to 9.9% it has been lower in the year of high cane production. Some reasons.

- Staling of cane (Min. 12 hrs to as high as 8/10 days).
- Unplanned harvesting
- Cane lodging.

Government should encourage captive farming. Sugar mills will take more interest in cane development, newer varieties, tissue culture, sophisticated farming/crop treatment techniques/planned harvesting etc. Impact will be higher yield. Better recovery.

Improvement of 0.1% recovery would yield 0.15 MnT of sugar.

#### ***Decontrol/Doing away with a dual pricing***

There have been three options such as full control, partial decontrol and complete decontrol. Over past 4 decades - all have been experimented with two/three times. But almost for three decades now, since 1967-68, except for a brief spells of decontrol/control in between 25.5.71 to 30.6.72 and 16.8.78 to 17.12.79 partial decontrol has been in existence. In this policy a certain portion of sugar has to be supplied at Government fixed price called levy and balance can be sold in free market.

The ratio of levy to free has changed over a period of time from 35:65 to 60:40 (1992-93).

Decontrol has not been successful in the past. In 30 years, it did not work for 30 months. Why risk again - the industry view is divided while some section is for decontrol and the cooperatives/Federation against.

#### Why control and what to do

- In free market economy where is the need of control - cement, steel, vegetable oils, fertilizer have been decontrolled. This resulted in better quality, availability, improved performance of the sector.
- Dual pricing to be done away with. It should be free market pricing of 100% sugar.
- However, in order not to allow the policy to fail as in the past, quantity should be fixed by month.
- Mills could be given flexibility of selling upto 10% more or less to be adjusted in next month.
- The monthly quantity should be worked out basis expected demand and to maintain prices within a range.
- Regulatory mechanism for monthly quantity should stay. This is a must to stabilise domestic prices and unauthorised pumping of stock by mills once flexibility has been provided.
- Domestic prices will make exports viable.
- Sugar, for Public Distribution System, will be procured by the Govt. agencies in free market or Imports for distribution at the price it wants.
- To guard against violent fluctuation in prices, futures trading in sugar to be allowed
  - In domestic market for domestic sugar.
  - At London and New York exchange for international trade.
- Use of futures market should be seriously and expeditiously considered even in partial decontrol policy.
- Sugar cane prices should be based on support price, concept basis cost and comparable return/hectare of land.

#### Packaging

Industry should be left free what it does for packaging. It could be 1 kg to 5 kg for Household consumers, 10kg to 25kg for small institutional consumers and 50 kg for bulk users, 100 kg packing should be banned under the ILO convention.

#### By-Products

Molasses, molasses base products should be de-regulated. The price to be determined by the free market forces. Trading and interstate movements should be freely allowed.

#### Regulations

There is need to look at all the controls/legislations. Regulations, acts, etc. at the Central Government level and the State level. The process need to be simplified - multiple regulatory bodies to be replaced by single body. The list of compliance should be by exceptions. Producers/traders etc. need to be told what they can't do.

#### International trade (imports-exports)

The Sugar policy has to have a provision for import and export of sugar. Amongst largest producer of sugar, India is the only country where it has a large consumer base, therefore, its exim policy has to keep this in mind.

Ideally the imports and exports have to balance the gap and surplus situations and to sustain and to maintain reasonable price level of sugar.

Since 1980, total Imports have been 6.6 MnT against total export at 4.50 MnT though India has been an exporter all through out. Thus India could be in the international Trade for both import and export

depending upon its domestic production which with stable inventory could keep domestic prices at a reasonable level to boost production. What it means is export more at a time of high physical stock and cover through futures import with option of delivery in the event of subsequent lower production, if any, i.e. maintain floating inventory.

Who should import and who should export is an issue to which there can not be a straight answer because of complexity of Indian agricultural and sugar business dynamics.

Under the liberalised economy to suggest control may look conservative, but at the same time, the imports and exports of sugar are needed with following objective:

To maintain domestic sugar prices with in a band.

Thus maintain certain minimum inventory and monthly plan of import/exports.

And encash opportunities in the international market.

Under free pricing, sugar exports could be deregulated. But India with such large consumer base can not afford total freedom on volumes. Some regulatory - quantitative or tariff are necessary to maintain adequate availability.

#### Sugar industry body

The issue or organisations needs to be debated between industry and Government to set up a responsible and responsive organisation. Logically with such a large base of 448 sugar mills, an effective centralised agency should take this responsibility.

The sugar industry associations could play more responsible role like Australia. South Africa etc. Then only they could achieve stabilised policy for sugar business.

There is a need of coordinated and concerted effort for appreciation and consolidation of the needs of the consumer, farmer, processor and to address to various above issues if India has to attain the glory of self sufficiency and attain the status of net exporter and an important significant player in the international market.

#### COMPARATIVE ADVANTAGE- INDIAN SUGAR

Here we address some of the factors which give India an advantage in the international market, in comparison to other sugar producing countries. We will also dwell on some issues which place India in a disadvantageous situation. Broadly advantages and disadvantages are summarized as under:

ATTRIBUTE		ADVANTAGE	DISADVANTAGE
Product	Plantation White Sugar		Less flexibility for exports as cannot offer Raw Sugar
Quality	45 to 200 / ICUMSA	Over Brazil	Over EEC and can't compete with refined sugar.
Sugar Policy			High regulated and controlled and politicized.
Sugar Cane price	63% of Av Sugar Price		With assured price farmer does not bother about quality and delivery
Sugar Prodn.	70 Mt Ha	Compares well with major producers	
Sucrose content	12.00%		Low against 12.5% in thailand. US-but far behind Australia, Brazil

Sugar recovery	82.50%	Next only to Australia 90.0%	
Economy of scale	2000 TCD		Low compared to other countries.
Factory Production costs			Less competitive compared to Thailand, Australia
Cane Farming/ Harvesting	Manual Av Farm Holding 1.57 Ha		No control on cane quality, cane procurement due to low land holdings.
Cane Utilisation			Traditional sweetener segment. Free from controls.
Fobbing Costs	6.5% of Ex. Mill Cost	Compares well with major sugar exporters even with Port berthing delays	
Export market	Natural markets	Natural markets of Srilanka Pakistan, Bangladesh, Nepal, Indonesia, Gulf	Exports are opportunity based due to dual pricing policy.
Price Hedging Mechanism	Trading on Futures		All imports and exports open to market risks.

- India produces only plantation white sugar while most countries produces. Refined or raw sugar or both.
- Traditionally India has not produced raw sugar as it does not have a market locally and it would cost 30\$/MT to convert into white sugar making it uneconomical.
- This puts India in somewhat disadvantageous position. If opportunity arises, can not offer
  - Raw sugar
  - Also Indian sugar has to compete with world's refined sugar.
- At the same time, produces granular sugar which has a market in Pakistan, Bangladesh, Indonesia.

#### Sugar policy

The dual policy of sugar pricing, keeps the free market price artificially high thus export is not economically viable most of the time. The difference over average price, in case it was free pricing, could be Rs. 1350/MT (US \$ 35 to 40). The export policy is not consistent resulting into restricted exports even when there is an opportunity - In fact non compliance penalty of 5% export value has become a disincentive. Indian farmer gets 62% of sugar price as cane price - compares with 50% in Pakistan, 68% in Brazil. However, cane price is not linked to sugar sales realisation nor it is linked to cane quality leading to low recoveries.

#### Productivity

India has improved its productivity considerably over a period of past two decades and compares well with major cane sugar producers (Annexure II and XV). However, the improvement has only been on yield of sugar cane per hectare which has gone up from 58 in the year 1984-85 to 71 in the year 1995-96. At this level of average 70 MT per hectare, it compares well with other sugar producing countries. However, within the country it is as low as 46 in the state of Bihar and as high as 113 in the state of Tamil Nadu. There is a scope of improvement in some states like UP, Bihar, Punjab, Haryana, Andhra Pradesh with average touching 75 MT. (Dealt in Chapter on cane production).

The sucrose content averages 12% which is not good as compared to Brazil/Australia. With better farming practices and favourable climate, it could improve to 12.5%. Sugar production as percentage of cane has been ranging between 9.3 to 10.3%. Here also 1% improvement is achievable.

There is substantial scope of improvement in productivity both in terms of yield as well as sugar contents and recovery by adopting better harvesting practices and close coordination of sugar mills with farmers. It has been estimated that better farming and harvesting practices could result upto 1.0% improvement in extraction which can lead to 10% increase in production.

The comparison with other sugar producing countries is as under:

COUNTRY	Recovered sucrose production per hectare (MnT)	Av. Cane sucrose content (%)	Av. Sucrose recovery rate (%)
Australia	10.5	15	90
Brazil	5.5	13.5	76
Cuba	5	12.5	82.5
India	6.5	12	82.5
Mexico	6.5	12	78
South Africa	7.5	13	85
Thailand	5	12.5	80
U.S.	8	12.5	82.5

#### Cost of production

While there is not much information with respect to cost of production of other countries, on the basis of information available through a paper presented at an international conference, India is a low cost producer but because of lateral capacity expansion, with average capacity of 2000 TCD, can not reap the benefit of economy of scale. Same is true in farming sector where land holding is mere 1.57 Ha.

But there is a scope of improvement in sugar content and recovery which can bring the cost down by as much as \$25/MT.

#### Sugar stocks

The biggest burden on the Indian Sugar Industry is the inventory carrying cost. The average period for which the sugar remains with mills in 8 months and the time it takes to finish previous season's stock can be as much as 18 months. The Govt. has created a buffer stock of 1 MnT for one year - cost will be \$60/MT plus blocking \$ 335 Mn worth of foreign exchange. Thus \$ 60/MT is net flexibility for export. The opportunity gets missed year after year because of too-cautious approach.

#### Export markets

India has a distinct advantage of its geographical location. It is land locked with neighbouring countries like Pakistan, Nepal, Bangladesh and Bhutan. Also Sri Lanka is the nearest country by Southern India. All these countries (except Pakistan who like India is exporter/importer depending upon its consumption) are regular importers of sugar. Besides some Gulf countries as well as Indonesia have a market for Indian granular sugar. India is most competitive for Pakistan, Bangladesh, Srilanka and Nepal.

Indian Sugar will have \$ 30/MT freight advantage over Brazil, 15\$ over Thailand, Besides Indian sugar should command premium over Brazilian sugar.

#### FOBing costs

While infrastructure bottlenecks do exist but if the export is planned on regular basis and planned well, it could be well organised effectively. Indian FOBing costs from Coastal factories and distant factories are as under:

Unit: Rs./MT

Head	Coastal Mills	Distant Mills
Transportation	300	1000
Godowning	50	50
Insurance	25	25
Handling expenses	100	100
Clearing/Forwarding	50	50
Demurrage	150	150
Total Rs./MT	675	1375
US\$MT	19	38
% of Ex. Mill costs	6.5	13
Average Ex. Mill Cost: Rs. 10500/MT		

Recently loading rates upto 3000 MT/day have been achieved by way of sharing the advantages with the port labour.

The FOBing costs in India, for coastal Mills, as percentage of Ex. Mill cost compares well with other countries.

Country	FOBing Costs % Ex. Mills Cost of Production
India - Coastal	6.5%
India - Distant	13.0%
Australia	3.0%
Thailand	7.0%
Cuba	8.0%
France	9.0%
Brazil	20.0%
South Africa	11.5%

#### SUMMARY

- India is one of the largest producer of sugar in the world and so also the consumer. Can manage its inventory to its advantage by rotating the same through imports and exports.
- Agriculture growth pegged at 3.5% - sugar cane has to compete and compete on its own.
- There exists a potential in terms of increase in productivity, extraction and production.
- Like in the past planners/policy makers/farmers producers - should get together to form a policy also acceptable to politicians.
- Optimisation of sugar mill capacity - vertical growth need of the day.
- Pricing
  - Decontrol may not be the answer - at the same time dual pricing policy has to go to provide level playing field for all sweeteners.
  - Govt. can procure sugar from market and subsidies in case, it is a must for PDS.
  - For the good of consumer, farmer and the mills sugar price should move in a band, meaning monthly inflow to market to be regulated by Government.
  - Balanced export/import policy.
- Mills and farmers to work together to improve yield and extraction through better harvesting.
- To become internationally competitive - i.e. cost effective and quality producer.
- To be ready for free marketing i.e. to hedge on futures.
- With consistent policy and competitiveness India can be a regular player in the international market.

#### WILL THE PHILIPPINES REVERT TO ITS NET SUGAR EXPORTER STATUS?

*Prepared by Mr Jose Maria T. Zabaleta for the Sugar and Beverages Group, Commodities and Trade Division, FAO. Tables and charts have been removed due to space limitation.*

#### INTRODUCTION

It is believed that early Arab traders had introduced sugarcane into the Philippines even before the Spanish era, and indeed the plant is found throughout the country in various wild species making the Philippines a source of noble cane or genetic material for breeding purposes.

The culture of sugar cane as a commercial crop started in the Philippines in the 18th century, and by the 19th century the crop had adapted itself so well to our soils and climate that sugar became a major commodity for export. By the 20th century, the growing needs of America for sugar fuelled a major expansion of the crop. This, together with new technology in sugar milling and the provision of adequate financing, created what is now known as the Philippine sugar industry.

The crop is currently grown in 17 provinces which are widely distributed in 8 regions from the northernmost island of Luzon to the southernmost island of Mindanao. The island of Negros in the central islands of the country, with its 17 operational mills, remains the primary cane-growing region accounting for about 55 percent of the total land area planted to sugar cane. Rapid industrialization in Central and Southern Luzon, where Metro Manila is located has resulted in a significant reduction in hectareage in the island. On the other hand, the opening of new farms in the island of Mindanao signifies the growth potential of the island for sugar production.

The Independence Era after World War II saw further growth for the industry, as it retained access to the lucrative U.S. market and enjoyed the post war boom. Sugar established itself as one of the young country's major products in trade and commerce, created wealth, spawned development, gave employment, and often enriched its major players. In so doing, it created both political friends and social enemies; and its complexities, often misunderstood, in later years destroyed its reputation and maligned its modus operandi.

About 40,000 farmers and another 500,000 farm workers are currently involved in cane growing, making the sector one of the largest employer in the country. The close to 520,00 individuals directly and indirectly dependent on the industry represent close to 7% of the country's population.

While the U.S. limited importation from the Philippines in the 50's with a quota, the lucrative prices that prevailed at the time allowed for sustainability and growth. This then resulted in another export boom after the imposition of the Cuban embargo by the U.S. in the 60's. The sugar industry prospered, old mills expanded capacity and in the 70s alone, 11 new ones were built as new land areas were put under cultivation. Prices and markets were so good that, supported by adequate government financing, production reached a total of 2.7 m tons in 1977, of which 2.42 million metric tons were exported to the U.S. and World Markets. Domestic demand was about 0.82 million metric tons at the time.

When the Marcos dictatorship saw the lucrative sugar industry as a potential source of financial gain, especially in the midst of rising world market prices in the early 70's which reached the 56 ¢ a lb. level in November 1974, a monopoly was

established to handle all sales of sugar and promote further development of the industry. The monopoly's gain was shortlived, however, as world market prices tumbled to below the cost of production and as the Philippines lost much of its U.S. quota with the expiration of the Laurel-Langley Agreement which gave practically limitless preferential access to Philippine sugar in the U.S. market. The Philippines was exporting around 1.6 million metric tons to the U.S. when the said agreement expired in 1974. The volatility of world sugar prices is shown.

The collapse of export markets, both to the U.S. and the World, was compounded by a silent but pervasive policy of the Marcos regime, to keep urban consumers satisfied and hold at bay demonstrations by keeping food prices down in the cities through price controls and government monopolies. These market distortions through price interventions could not be sustained, however, and in time the sugar industry collapsed. Production dropped from a high of 2.7 m tons to a low of 1.3 m tons in 1987, when sugar came to be called the "sunset industry", and when insurgency prevailed in most sugar growing areas that were then called the "social volcanoes" of the country. While the industry was able to overcome the crisis of the 1980s, sugar production continues to follow a downward trend as shown.

After the peaceful Revolution of 1985, the sugar monopoly was dismantled, nationalized sugar mills and refineries acquired by government were privatized, and market forces were restored, albeit under the protective guidance of government which established the Sugar Regulatory Administration. The SRA's major mandate was to rebuild the industry, spur its further development, and regulate inventory levels. It allocated sugar production, through quota classifications, to supply domestic markets, the U.S. quota, and all surplus or residual sugar was destined for the world market. It had a mandate to regulate supplies and keep markets supplied, but had no authority to buy, own, or much less even manage sugar marketing. This seeming contradictory policy has resulted in daunting problems as, except for the few times that prices were kept stable, most of the time it failed in its duty. While the retail prices of sugar were kept at high and stable levels, the SRA could not control the drastic fluctuations of millsite prices of raw sugar, to the detriment of the producers. To use a variance of a well known cliché - it baked the cake but could neither keep it nor eat it.

To make matters worse, the Philippine government, while the monopoly was in place and subsequently when the SRA was established, still assumed that the country had the competitive advantage to remain an exporter. Internationally, it supported the liberalization of the sugar trade and the lowering of tariffs hoping to penetrate more markets. Domestically, it made no provisions to shield its market from either efficient exporters or the volatility of the world market. It offered a Margin of Preference of 35% to refined sugar from ASEAN countries in the Preferential Tariff Agreement of 1977, when government built three new refineries. In 1990, it offered a tariff reduction program at the Uruguay Round of GATT greater than most sugar producing countries. Little did it expect at those times that Thailand would embark on a major investment and development program for sugar and that Australia would take such bold steps to stimulate further its already efficient industry.

The result has been that the tariff concessions (initially at 100% and a final bound rate of 50%) have worked against it and have facilitated entry into the Philippines of world market sugar while its own industry struggles to reform itself and adjust to a changing economic environment internationally as well as domestically.

The passage of time, the experience of the Marcos created monopoly, the Aquino land reform program, the new urban based shift to industrialization, and the winds of change in trade policy all tell us that

the Philippine sugar industry must metamorphose and change its shape, character, and destiny.

## **THE FARMING SECTOR**

### *Farm productivity and farm size*

To be competitive in the global economic environment, a sugarcane farm requires a minimum economic unit or size. It also requires equity investment, good management, and the practice of the findings of the latest productivity enhancement research.

A sugar farmer in Okinawa can consider 7 hectares as an economic unit, he sells his product at three times the high U.S. price and receives a green payment or subsidy from the 200% tariffs on all sugar imports into highly industrialized Japan. This farmer is assured a middle class life or he will abandon his farm for the city.

His counterpart farmer in the Bicol or Cagayan provinces has hardly any financing, poor infrastructure, sells his product at a third of the price of his Japanese counterpart, and ekes out a living that assures him a peso based "D" market income for the rest of his life. The declining farm yield is an indication of the sorry state of productivity of the farmers in the Philippines.

To earn a middle class income, therefore, he needs at least 5 times the size of 7 or 5 hectares of land. Anything else is not an economic. For him to compete with an Australian farmer, he must have at least half the size of an Australian farm. However, about 71% of the sugarcane growers operate farms not larger than 10 hectares and the number of such farmers is growing owing to the effect of the Comprehensive Agrarian Reform Program of the government.

### *Land tenure and ownership*

The Comprehensive Agrarian Reform Program (CARP), a law passed in 1987 to cure social unrest in the Countryside, distributes large plantations in excess of 25 hectares to its workers and beneficiaries. As a result of the program, the average sugar cane farm size has shrunk from 14 in the early 70s to only 9 hectares in 1993. The distribution of farms in parcels of 3 to 5 hectares, patterned after rice to pacify the landless, and the natural redistribution through inheritance of farms over 100 years, have rendered most Philippine sugar farms uneconomical in terms of size and harvesting systems, and have made extension extremely difficult. The system of redistribution under the law, where government purchases the land from the landowner at nominal value without regard to improvements and equipment, has halted investments in irrigation, soil amelioration, and new equipment. Moreover, since banks cannot foreclose mortgaged lands and sell them on the open market, government being the only buyer by law, financing by banks has ceased. Where, on the other hand, the land has been awarded to beneficiaries, they in turn start business with a 30 year debt on the land and no capital or equity to invest and scarce financing from government banks. This has all resulted in lowered productivity, insufficient technology, and a new bondage to the soil by small farmers who in time have discovered few options but to abandon, lease, or sell their rights. The meager size of their holdings, whether individually or collectively owned, has contributed to this problem.

While the CARP has a few success stories in rice and vegetables, and indeed served the purpose of appeasing social unrest in the countryside, it is now, on its tenth year, undergoing scrutiny. The law is poised for amendments that would encourage reconsolidation through cooperatives and

even perhaps the forming of corporations and joint ventures with entrepreneurs, not the least of which are the sugar mills themselves in the case of sugar. Plantation crops such as bananas for export, pineapple, and rubber have already formed a *modus operandi* with the CARP, and it is only now that sugar has entered this stage. It may perhaps take another five to ten years more before sugar fully adjusts to these new structures in land tenure and can gain the impetus required to rebuild itself fully.

#### ***Research, development and extension***

The sugar industry has relied for too long on research and development to be undertaken by government. The trend in many sugar producing countries has been to privatize this activity as no one will look after the benefits of R & D, search for new technologies, or innovate production processes as much as he who stands to benefit the most. The SRA is mandated by its charter to privatize R & D but the private sector thus far refuses to assume the full responsibility and enforce the collection of a lien paid by all producers to carry out this mandate. Oppositors bicker, independent growers sue, and leaders squabble, while year after year the industry foregoes the benefits of the latest technology because it refuses to pay for it collectively. An enabling law is being considered in order to remove all government intervention in R & D and place it squarely in the hands of the private sector.

#### ***Management and cultural practices***

Agricultural practices - from proper plowing and cultivation to insect and disease control, and extending further beyond to partial or total mechanization - are mostly obsolete in Philippine farms. Technology is circa 1930s and at best late 50s. Cultural biases and a lack of education and extension prevent modern methods from being applied, especially in the smaller farms. These conditions have been identified in a number of studies as one of the primary culprits to the declining farm productivity and quality of cane delivered and crushed in the sugar mills as shown.

There is a need to carry out a well defined extension program to educate, train, and motivate farmers to intensify management and apply modern methods. The gains in productivity, considering climatic conditions and soils in the Philippines, can be astounding provided the economics can be proven to the farmer and he can secure the facilities and credit to match new technology.

### **THE INDUSTRIAL SECTOR**

#### ***Obsolete mills***

In 1991, the sugar industry started to implement a Rehabilitation and Modernization Program to upgrade the mills which have been left in a state of disrepair and obsolescence during the crisis in the 70s and 80s. While it is true that some of the mills have invested and completely re-built and changed their equipment, making them the equivalent of new mills, and others have made major investments in upgrading or adding equipment- it is undeniable that many mills are also maintained in their dilapidated state and used as milking cows by their proprietors. These mills not only produce inferior sugar which oftentimes fetches lower prices, but also prevent farmers from optimizing the potential of their farms. They are prone to breakdown and cause harvest losses and have very poor extraction, significantly contributing to the decline in sugar recovery per ton of cane.

Since a sugar price shakedown will also hurt those not guilty of complacency, such as investors in new or rehabilitated mills, the only answer would seem to be for the SRA, given proper authority, to impose mandatory recovery rates and capacity parameters as conditionalities in granting milling licenses. Other options would be the imposition of market-based incentives, fines and stricter regulations, either through the SRA or self-regulating mechanisms.

While ruinous competition by overlapping and interloping mill districts is a malaise, the other extreme where a solitary mill takes advantage of

its position to maximize profits at the expense of the farmer is just as serious a malaise. The industry will have to come to terms with this problem sooner or later and a re-study of the situation is called for. In Queensland, redistricting has been carried out with the help of state authorities who enforce rights-of-way and build the necessary infrastructure. Perhaps a similar approach should be undertaken by the Philippine government.

#### ***Forward integration/diversification***

It has been determined worldwide that forward integration is not a part of the sugar business, and that manufacturing candies or bottling beverages is not a necessary direction for sugar mills and refineries, only an investment option. Sugar cane milling however, produces large volumes of by-products particularly molasses, bagasse and filter cake/press.

That having been said, it is also noteworthy to mention that by-product diversification (e.g., alcohol from molasses, paper and particle board from bagasse, vegetable dehydration with steam) is a very viable corollary business to sugar manufacturing and that waste product utilization (e.g., organic fertilizer from filter mud, co-generation of electricity from bagasse) are very profitable undertakings. In many countries and numerous mills throughout the world, this has occurred, spurring the development of industrial estates beside mills, but the Philippines has been unable to do so because of an obsolete law passed in the early 50s which mandates the sharing of by-products between the mills and the planters. This law has prevented the development of downstream industries by mill companies. Meanwhile, undetermined volumes of surplus bagasse, and filter press lay in waste in mill yards and in fact contributing to the environmental problems of many mill companies.

#### ***Backward integration/extension***

The introduction of new technology can best be done by the mills as they are in a position to hire professionals for the purpose and to access technology internationally. Having more cane supply and better quality cane increases mill profits, thus the incentive is there if the need is identified and the environment for it is in place.

Proliferation of small farms and perhaps even the abandonment of uneconomic-sized farms will also encourage mills to lease larger and larger tracts of land to farm themselves. This has occurred worldwide and is starting to happen in the Philippines, as smaller and smaller farms become less profitable when compared to the efficiencies that can be attained with modern methods and machinery.

The backward integration of mills through the operation of large tracts of land is expected to give the mills better control of the harvesting program and improve the synchronization of cane harvesting - milling operations which at present, is a major problem and contributory factor to huge sugar losses due to delayed milling of harvested cane.

Extension, credit support, and education is also a vital component in ensuring cane quantity and cane quality for sugar mills. Sugar factories for the past 30 years have limited themselves to the confines of the mill yard and forgotten the farms in contrast to the 1920s and 1930s when most mills were established and cane supply was a major concern. They now have to look again at sugar cane productivity enhancement, and the supply of related vital services, as a major mill activity.

## THE GOVERNMENT SECTOR

### *Pricing policy and tariffs*

The law that created the Philippine SRA calls for a pricing policy set to make sugar farming and milling profitable, while keeping prices to consumers reasonable. In most major sugar producing countries, this is done by regulating domestic supply within volume parameters that allow market forces to operate within a certain price band. The mechanisms for this regulation, however, are subjective and not spelled out in clear terms in the law or its implementing rules. This has led to wild swings in prices as SRA Administrators or Agriculture Ministers are changed and their interpretation of policies change. Price stability is now known more for its absence, in the case of sugar, than for its promised implementation.

Tariffs for commodities are usually held at levels that insure against imports from subsidized or dumped markets, and are usually in consonance with pricing policy. As the world sugar market is known for its volatility and unpredictability, cyclical nature, and uncertainty in the medium and long term, the Philippine tariff concessions offered at both the GATT Uruguay Round and the ASEAN Free Trade Area Agreement (AFTA) may prove insufficient to keep farmers profitable when sugar prices fall below the Philippine average cost of production. The question is not whether the Philippines can export sugar at 10¢ a lb. or less, but more one of whether the Philippine sugar industry can survive when sugar is allowed to be imported in unlimited quantities at those levels. Without a pricing formula firmly in place to maintain domestic prices at remunerative levels, it is estimated that half of Philippine sugar farmers would abandon their crops when world markets collapse. Sugar mills, lacking cane supply, would be forced to close, and the country would be unable to attain or regain even self-sufficiency.

Recent moves by government, which organized this year a Presidential Task Force on Sugar to address this problem among others, indicate that corrective measures are necessary with regard to tariffs and inventory management, coupled with major policy changes to make the industry more efficient.

### **Monitoring and regulations**

A government agency, such as the SRA, must estimate domestic needs and provide a stable supply from production or controlled imports to meet these needs.

The *quedan* system of Warehouse Receipts as it now operates was established by the American Colonial government in the 1920s. The system offers an ideal framework to carry out this task. All sugar is classified as to market destination and market benefits are fairly distributed to all producers. The sugar *quedan* likewise offers itself to collateralization through the Warehouse Receipts Law, and, therefore, secures financing for sugar and enhances its trade and marketing.

A review of the system of classification as to market share or destination is, however, necessary as mills located near urban centers or located in the interior are no longer interested in export markets, while mills with their own ports in distant provinces can efficiently export sugar to viable markets such as the U.S., or even the world market when prices justify.

### **Legislation**

As legislators tend to favor certain constituencies with their own perceived needs, they are prone to be pressed for special legislation favoring one party versus another. It is now felt by many that government's role should be to create the environment for the industry to grow and prosper, and not to draft bills and pass laws which create artificial costs (such as the Social Amelioration Act, Profit Sharing for large estates under CARP, VAT on Refined Sugar, Republic Act 809 mandating sharing levels between mills and planters, etc.) that

tend to favor certain sectors or create imbalances within the industry that do not exist in neighboring countries.

The industry's needs would best be served if constrictive laws are repealed and replaced with none. Incentives to agriculture must be made universal and not Board of Investments-regulated, and certain incentives, such as loss carry-over and tax free importations of specialized machinery and equipment must be promoted for agriculture and agro-industry in general. Sugar and agricultural products, all bulky commodities transported over great distances, are forced to pay high tariffs for trucks to protect local assemblers. Agriculture pays high tariffs for plastic products to protect local manufacturers, pays value added tax and high tariffs on chemicals and equipment imports but is unable to recover this from its selling price.

It now appears that state policy and legislation is skewed in favor of industrial expansion to the detriment of agriculture. This is the one area which needs further correction as the industry enjoys no subsidies but sometimes feels that it suffers from indirect subsidies to other industries.

## MARKETS

### *Industrial users*

In fairness to producers of sugar-containing food products, producers should not only supply the domestic market with adequate supply and carry sufficient inventory stock, but should also consider a sugar price that is defensible in the greater context of the global environment. An internal sugar price that is the average of say Indonesia, Thailand, and Mexico (all Pacific-Rim developing countries producing sugar) is a fair target to maintain and a fair price level to both producers and industrial users.

For industrial users to lower prices to unreasonable levels due to a bumper crop or for producers to sell at exorbitant prices in times of crop failure is an unreasonable situation that can only create a backlash. Price bands should be agreed to, as they are in many countries mentioned, when the product in question is a basic commodity and a major crop grown by a major segment of the rural population.

Imports should be resorted to as a last resort, and only when government declares that a shortage indeed does exist. GATT commitments and agreements should be respected, but are difficult for producers to accept as fair when sugar prices and stocks in most producing countries are "managed". Except for perhaps Australia, sugar is still subjected to high tariffs that are used as farmer subsidies in some countries, is limited in trade by rules on pooling in other countries, or is controlled through state trading agencies in yet others. The recent entry of refined sugar from the E.U. into Philippine Export Processing Zones and Free Ports at zero tariff, and the entry of sugar containing manufactured goods such as candies and chocolates from tariff free city states has rendered the ideal of entering an era of global liberalization in trade in question. The industrialized countries must lower their tariffs to levels that reflect competitive advantage, and at a faster rate, otherwise the dilemma that faces producers of sugar and sugar containing products in the Philippines will continue to be a subject of political debate all over the world. It would be a pity indeed if the economic gains that liberalized global trade offers for the future cannot be applied to agricultural products until the next generation.

### *Marketing and trade*

Sugar trading and marketing in the Philippines has been returned to the private sector, but with a vengeance as a

backlash to the Marcos monopoly, and is proving to be too fragmented. Sugar mills and planters' associations and cooperatives do not market and sell sugar collectively, as individual planters, mostly small, sell their sugar to a ladder of traders. Too many hands all add to the price as sugar volumes undergo consolidations prior to refining and then again have to go through another ladder of traders, distributors and dealers prior to reaching the retail markets. The present cost of intervention in trading is exceptionally high and must be brought into line for the greater benefit of all producers and consumers. The role of traders should be more as market distributors rather than that of *quedan* consolidators, while lately sugar trading has even become more of a speculative business on its own due to the high fluctuations in price that occur in the domestic market.

### LABOUR AND SOCIAL CONDITIONS

While labor in the mills is highly unionized and, therefore, amply protected by Collectible Bargaining Agreements and existing legislation, the opposite is true in sugar farms, both big and small.

Sugar is a seasonal crop where, even if high wages would become mandatory and enforceable, the conditions of feast and famine would continue to exist among plantation workers. This, again like in other sugar growing areas around the world, is not unique to the Philippines. The answer might seem to be to subsidize wages in the off-season, a practically unaffordable alternative, or to create a seasonal parallel industry that can operate during the sugar off-season, perhaps an unrealistic alternative as well. If we look at what other countries have done, we see the replacement of man by machines, in part because fewer men have to be subsidized during the off-season. To do this, the Philippines would need tremendous investments in mechanization and a massive re-education and re-deployment of labor including a relocation strategy that would move labor to potential employment centers. This relocation is occurring now. Unfortunately, the result of urban migration and squatter colonies in the big cities.

A well-designed plan with a rural industrialization component is now being undertaken by government and would probably be achieved over a twenty-year period. This may sound like an unattainable objective but it has actually become a necessity if the country is to squarely face its options for the future. A well-planned strategy is called for, with clear objectives and the will, by both the government and private sector, to carry it out.

### COMPARATIVE ADVANTAGE

The middle islands of the Visayas and the northernmost island of Luzon lie in the typhoon belt of the Pacific Ocean, and its eastern seaboard, often visited by as many as twenty hurricanes a year two or three of which are often considered as destructive, is not suitable for maize, many tree crops, and year round agriculture. Sugarcane, however, grows luxuriantly and well, and suffers little from typhoon damage. It is, therefore, a crop of preference not only because its product, sugar, has a long shelf life and is easily transported, but because the farmer is never really in danger of losing his entire harvest because of its resiliency.

The southernmost island of Mindanao is typhoon free and therefore sugar competes with other tropical crops in a balanced manner reflective of market conditions and investment priorities.

The Philippines also does not have large tracts of land as most islands, due to their geological origins, have a large percentage of mountainous areas. Most islands, moreover, not having a major land mass to serve as a catchment area, are also mostly dependent on the rains of the monsoon season to feed their rivers.

All told, this would indicate that, allowing for other crops, not more than 100,000 additional hectares of land could be made available for sugarcane cultivation in the future, about 50,000 in Luzon and another

50,000 in Mindanao. The Visayan islands of Negros, Panay, and Leyte have probably reached their full potential. The present 370,000 hectares under cultivation may soon be reduced by as much as 10% to provide for urban sprawl in the midst of an economic boom and to retire lands that are too unproductive or distant from sugar mills to pursue cultivation.

Increases in production would, therefore, have to come from increased productivity on 370,000 hectares and from new areas not to exceed 100,000 hectares. Given the right government policy and assuming a pricing policy remunerative to investors, both in mills and farms, the Philippines can, therefore, attain and continue to sustain self-sufficiency.

The Philippines has the financial capability and human resources to develop the industry to competitive global levels. Much will depend on the time when changes in the investment environment mentioned are carried out. If done in the next year or two, then we will be on our way earlier, if not, then we shall see a decimation of at least 50% of the present players after which there will surely be a backlash that will cause policy changes to be put in place. The question, therefore, is not whether the Philippines will become an exporter of sugar again in the future, but whether it will be able to supply its own growing appetite and demand for sugar and perhaps keep its share of the U.S. market while it is still there.

### THE SITUATION IN THE 90s & CURRENT DEVELOPMENTS

#### *Research and Development*

The industry's performance has been marked by fluctuations in production, from 1.7 million tons in 1990/91 to a high of 2.1 million metric tons in 1992/93 and down again to 1.65 in 1994/95. While climatic factors do play an important role, it is felt that the major cause has been due to fragmentation of farms to smaller production units which are highly dependent on yearly price fluctuations and do not have the financial resources. Moreover, the lack of capability to restore full production in many areas and the inability to improve productivity have been attributed to a lack of research, development, and extension.

Concerned with the declining yield and productivity of sugarcane farms, the National Council of Sugar Producers commissioned an audit of the sugar industry in early 1995. The study team was composed of Dr. Rosario of Madecor, Dr. Heinz formerly with HSPA, Dr. Ryan of BSES, and Dr. Paningbatan of UPLB.

The main recommendation of the study team was to strengthen the existing research and development support. Thus the Philippine Sugar Research Institute Foundation, a privately funded and administered foundation was organized in late 1995.

#### **Initial Activities of PHILSURIN**

To have a focused direction in solving the problems of the industry, PHILSURIN conducted the following studies:

##### 1. *Internal assessment of the sugarcane breeding program.*

This study resulted in the rehabilitation of the photoperiod chamber in La Granja, rehabilitation of the quarantine facilities of BPI in Los Baños, training of two sugarcane breeders in Colombia and Florida, and more importantly an integrated sugarcane breeding program for the country. The study also highlighted the inadequate manpower pool of highly trained scientists involved in sugarcane R & D. To this end, PHILSURIN will provide scholarship grants to UPLB to train five PhDs in the next three years.



2. **Evaluation of the fertilization recommendation of SRA.** The study has just been completed and the recommendations will be implemented in the coming months.
3. **Cane handling and transport system.** This was conducted by a team from Sugar Knowledge International Limited of UK. This study has just been completed. The objective of this study is to come up with solutions in reducing the delay from cutting to milling.
4. **Integrated management of sugarcane ratoon stunting disease.** This study has just been started.

To strengthen extension, PHILSURIN has conducted a three day seminar for more than 200 extension workers in the industry. It has also hired several Mill District Development Committee Coordinators to ensure speedy delivery of new technologies to the planters.

More are needed to be done. PHILSURIN is committed to raise the level of productivity of the sugarcane planters to be in a competitive position with other sugar producing countries of the world.

### SUGAR DEMAND PROFILE

In 1993, the industry commissioned a study by the Center for Research and Development of the University of Asia and the Pacific to determine the short and long-term prospects for sugar. The study included a Market Research component done by the Asian Research Organization (a member of Gallup Poll International).

The Philippine archipelago was sampled as to per capita variations in different locations and under varying economic conditions. It concluded that on a per capita basis, Ilocos region, Metro Manila, and Central Luzon had the highest usage in 1993 at 18.3 kg., 18.0 kg, and 16.6 kg., respectively. All the other regions, including two in Luzon and seven in Visayas and Mindanao recorded a per cap consumption below the national average. Per capita consumption for all regions ranges from 11 kg. to 13 kg.

The study likewise investigated market distribution channels. On the demand by different user groups it concluded that for the same period, the country's total consumption grew by 3.5% annually. By main groups, i) household sugar consumption rose by 3.5%; ii) industrial use by 4.6%; and iii) by contrast, institutional use declined by 1.8% yearly.

Finally, sugar demand for the future, considering price elasticity, comparative trends in other developing economies, and population growth indicated that the country's consumption of sugar, in raw sugar terms would grow by 3.3% to 4.3% or from 2.06 to 2.19 million metric tons by the year 2000. Furthermore, looking beyond to the year 2010, it was possible that local consumption would reach a high 2.95 million metric tons.

### SUGAR PRODUCTION PROFILE

#### *General Information*

Sugarcane is grown in 17 provinces located in 8 regions on 6 islands. It is grown on a wide variety of soil types, from sandy loams to clay loams and from acidic volcanic soils to calcareous sedimentary deposits.

The island of Negros accounts for half of the country's total production, and is ideally suited for cane cultivation, as climatic factors such as regular monsoon rains and low typhoon incidence complement its good soils.

The harvest season commences from October to December depending on whether the area is on the eastern or western seaboard, and ends more or less in May. Rarely does the grinding season exceed 180 days except in the Victorias Milling District, due to even rainfall distribution, but this has been put in question lately as the Philippine

window for cane ripening appears to be limited by a dry period of 120 to 150 days.

#### *The agricultural sector*

Planted area has declined from a peak of 540 thousand hectares in 1975/76 to a trough of 345 thousand hectares in the 90's. Sugarcane production has closely followed trends in hectareage, with a peak of 29 million metric tons in 1975/76 to a low of 14 million metric tons in 1986/87. The 90's have been marked by periods of declining productivity, mostly attributed to poor farm cultivation and poor harvesting schedules in addition to insufficient development and extension capability. However, the scientific community attributes these figures to years of neglect in research and development.

The number of sugarcane farms has reached about 41,000 where 80% of planters cultivate holdings of 10 hectares and below, although they collectively own only 29% of the country's total cane area. About 55% of the land is owned by planters with more than 25 hectares. These lands, however, could no longer be mortgaged or sold since 1987 as they await coverage of land reform and purchase by government to comply with CARP. Whether these farms will be fragmented further, consolidated thru joint ventures of corporations with beneficiaries or cooperatives, or leased by mills is an unknown factor at the moment as the CARP is scheduled for review and possible amendments in 1998.

Except for about 10,000 hectares of land with varying degrees of mechanization, and some following fully Australian mechanized planting and cultivation systems of the early 80's, most farms use manual labor extensively and use a mix of tractors and buffalo for plowing and land preparation.

A few unsuccessful attempts have been made to harvest with chopper harvesters, but the industry seems to be moving to a manual cutting/ grab-loader combination in most areas. The number of farm workers nationwide is about 500,000 with total direct or indirect dependents of some 5 million people.

Productivity, in terms of TC/Ha as well as sugar content or TS/Ha, has been on the downtrend. Sugarcane yields now average nationwide about 50 TC/Ha while sugar yield is at about 4.5 TS/Ha., although highs of 100 TC/Ha and 9 TS/Ha have been proven to be achievable in most areas where irrigation is practiced, cultivation is well-managed, and harvesting is timely. The higher yields have been attained with exciting varieties despite productivity constraints in disease resistance, ratooning capability, and sugar content.

#### *The milling sector*

There are 41 installed sugar mills in the country where 37 are operational, and with varying capacities. Most are located in the main sugar growing island of Negros along the fertile coastal areas. Rated capacity indicates that most mills are of an economically viable size subject to sufficient cane supply. Grinding capacity averages about 5,000 TC per day using conventional milling equipment. Half of the mills have been upgraded in the past five years at a total cost of about P10 B while about half are short of cane supply, lacks capital, or would need to be closed down. Each mill employs around 500 workers on either a permanent or seasonal basis. Most sugar output is in the form of raw sugar (97.5 pol, 1,400, affined color ICUMSA), except for some washed sugar (800 - 1000 ICUMSA color) and some sulphated white sugar.

Mill performance has also been on a downward trend due to poor quality of cane and lack of cane supply. In some cases, this has been the result of obsolescence and disrepair of the mill itself. While mechanical time efficiency and over-all mill recovery have improved due to upgraded equipment, the problem of capacity utilization caused by low cane supply has taken its toll.

Sugar mill performance could be improved further with the continued inclusion of the industry in the Investment Priorities Plan (IPP) of the Board of Investments (BOI) which was introduced in 1992. This program provides incentives in the form of duty-free importation of equipment, and 23 mills have so far taken advantage of this program.

#### *The Refining Sector*

The refining sector is composed of 16 sugar refineries, 15 of which are annexed to raw sugar mills. Average refining capacity is about 8,000 50-kilo bags per day, with Victorias Milling as the biggest with a capacity of 25,000 50-kilo bags per day. Capacity utilization for the whole sector is about 78% using a variety of technologies including carbonation, ion exchange resin, phosphatation, and granular activated carbon. Recovery is about 0.92 metric ton of refined sugar per metric ton of raw sugar.

### **TARIFFS AND TRADE LIBERALIZATION**

#### *GATT - WTO*

At the Uruguay Round of GATT which included agricultural products for the first time, the Philippines offered perhaps the biggest reduction in bound tariffs for out-quota imports for sugar over the life of the Agreement. While the local sugar industry supported government in its accession to the GATT-UR, it did so with the Philippine Senate's support to modify tariffs due to the dangers of the world market where, for some years that came in cycles, sugar prices drop below the cost of production of most sugar producing countries. As this was not considered an immediate threat in 1995, this has presently become a very real threat to the continued existence of the industry as prices fell to the 10.5 ¢/lb level in 1997. It has called for a Modification of tariff commitments (Article 28 of the Agreement) and the government has now given the industry a favorable endorsement of its position. There are also moves to take recourse of Special Safeguards under the Agreement on Agriculture and Regular Safeguards under the Regular Provisions of the Agreement on Safeguards, due to both an import surge in 1996 and a need to trigger escape clause mechanisms in 1997. Hearings and negotiations are now taking place on this matter.

#### *Margin of preference within the ASEAN Preferential Tariff Agreement and the Common Effective Preferential Tariff Agreement*

The MOP or Tariff Discount offered by the Philippines on refined sugar, resulting in tariffs below the MFN of GATT, and distorting the price of raw sugar, has become a political issue in the Philippines. While both Thailand and Indonesia offer MOPs, they effectively do not allow this to distort their government set internal price bands for sugar as imports are under the control of the Thai Sugar Board in Thailand or BULOG in Indonesia. The Philippines, having dismantled its state trading arm, is now threatened by an influx of refined sugar from Thailand that may destroy its newly installed refineries and distorting the internal price of sugar. There is a clamor from the industry for the government to either restore state trading for imports or enjoyment of the MOP, or for price band mechanisms such as stock and inventory management, to be put in place by the SRA. This would then include in the equation the entry and control of imports. This proposal is also now under serious consideration by government.

### **POLICY ISSUES**

A policy study conducted in 1994 by ACIAR, headed by Mr. Brent Borrell and funded by the Australian government, cited issues that tended to prevent the Philippine sugar industry from being globally competitive. It cited the higher prices of sugar exports to the U.S. under the quota in the past as one of the causes of complacency,

although today it comprises 10 to 15% of the country's local production. Further, it questioned the legally mandated sharing system between sugar mills and planters as a disincentive for mill investments and stressed the need to apply a CCS system of sharing similar to that of Australia and Thailand. By-product sharing was put in question as it prevented the downstream development of those products, to include power generation. The classification of sugar by market destination and its allocation to all individual planters and millers was also said to be an important issue to look into, although other countries apply a similar system through other means such as pooling, single desk selling, and market quotas.

While the views presented under the ACIAR study were not well received in the Philippines, its intention was primarily to spur further studies and discussions that would result to a reassessment of the local sugar industry. This it has achieved, as many of the issues in the study are now the subject of much debate within the country.

A Presidential Task Force, of which this author is a member, is mandated to study the fundamental structure of the industry in order to restore production to self-sufficiency levels, increase productivity, and enhance long-term competitiveness in the world market. While the final output of the Task Force is purely recommendatory, it is expected that legislation will follow in 1998 and that the executive arm of the government will act accordingly in the near future or within the year 1997.