

HISTORICAL OVERVIEW OF CUBA'S COSTS OF SUGAR PRODUCTION: IMPLICATIONS FOR THE FUTURE¹

G.B. Hagelberg and José Alvarez

The world is undergoing radical changes, characterized by the growing interdependence of all countries and sharpened competition in liberalized markets. For Cuba, the closing years of the old millennium spelled the end of an era and posed the challenge of adjusting its domestic economic order to integrate the island fully in the global economy. Cuba's sugar agroindustry was perhaps the most affected. Paradoxically, the sudden loss of its preferential arrangements abroad lent urgency to sweeping reforms within, if it was to recover some of its former competitive position, at the same time as the dependence engendered by the previous privileged status rendered such reforms all the more arduous.

The great Cuban scientist Alvaro Reynoso (1829–1888) could not have foreseen the shape of the world today when he wrote his famous sugarcane treatise almost a century and a half ago. But his view of the international sugar trade has a modern ring:

By the nature of things, we had to face the advent of competitors in our market, since this was necessarily related to other nations developing their wealth. We can only aim for equality of access, it being up to us to succeed with the low price of the product, which leads to increased consumption. Proposing to obstruct the progressive evolutionary course of humankind is as foolish as wishing to halt the movement of the earth (Reynoso, 1998 [1862], p. 346).

At the time this was written, Cuba produced roughly half a million metric tons of sugar and accounted for about 40 percent of the world's visible cane sugar production and 30 percent of the total visible sugar supply (Deerr, 1949–1950). Alvaro Reynoso, a polymath in the natural sciences, hardly touched on economic issues in his writings. However, he summed up his recommendations of the best way to grow sugarcane as follows:

... the aim is to produce the ton of cane at the least possible cost and then to extract the maximum amount of sugar feasible, so that, after taking into account all expenses, we can sell it profitably at the lowest price when we compete in any market with all the world's producers. That no one be able to sell as cheaply as we is the goal to be achieved (Reynoso, 1998 [1862], p. 346).

Cuba is no longer the world's leading sugar producer and exporter. The question is whether the competitiveness of the Cuban sugar industry has been so far eroded that even its ability to hold on to a mid-ranking position is open to doubt. This paper presents an historical overview of the costs of producing sugar in Cuba and suggests some guidelines for the future. First, however, it is necessary to set out the difficulties of assessing sugar production costs anywhere in the world and specifically in Cuba.

1. This paper is largely based on Hagelberg and Alvarez (2005), a chapter in a recent book (Pérez-López and Alvarez, 2005). The authors thank Lexington Books for granting permission to reproduce some parts.

LIMITATIONS OF NATIONAL COST ESTIMATES

General Problems

Attempting to quantify the costs of sugar production in any country is a thorny undertaking. All other things being equal, unit fixed costs fluctuate from year to year, along with the size of the crop, at the mercy of the weather. Estimated national averages of fixed and variable specific costs for any one year, moreover, hide great differences between individual producers, owing to the diversity of their scale of operation, equipment, practices, and local conditions. No two sugar farms are alike, and few, if any, sugar factories are designed and equipped the same way. The range and perpetual volatility of the numbers aside, the cost picture is commonly distorted by implicit subsidies of production inputs. Standardized and reliable cost data are a rare commodity throughout the sugar world, and Cuba is no exception.

Specific Problems Relating to Cuba as Observed from Abroad

Measuring Cuba's costs of sugar production presents additional problems. Against the background of the country's weak statistical tradition (Seers, 1964, p. 49), post-revolutionary government policies have negatively impacted on the quantity and quality of economic statistics.

Shackles Imposed by Ideology and Secretiveness:

Hopes that central control of the economy would boost the role of statistics and cost accounting in Cuba were dashed when the collection and processing of data were conflated with bureaucracy, and economic and financial analysis fell under the suspicion of carrying seeds of disloyalty. In a speech on September 28, 1966, Fidel Castro directly denounced economic and financial scrutiny of the government's policies:

A financier, a pure economist, a metaphysician of the Revolution, would have said: "Careful! Don't lower those rentals by one cent, because financially, because economically, because pesos more, pesos less." Those persons have a peso sign in the head and want the people also to have a peso sign in the head and in the heart. And if we want a people that gets rid of the peso sign in the mind and the heart, then we must

also have men who free their thought of the peso sign (*Cuba Socialista*, No. 62, October 1966).

The excursion into economic and financial know-nothingism that followed was abandoned in the mid-1970s in favor of a so-called economic management and planning system (*Sistema de Dirección y Planificación de la Economía*, SDPE). The implementation of the new system was formalized at the first congress of the Cuban Communist Party in December 1975. Castro declared that among the important tasks that had been initiated since 1970 were "the partial recovering of the economic controls and the emphasis in cost accounting and cost reduction." The SDPE, he said, recognized the existence of "the law of value," and the need "to determine, to the last detail, how much we spend in everything we produce..." (Castro, 1978, pp. 111, 112).

The system was also applied in the sugar agroindustry, but the available information is mostly descriptive of the methodology that was to be followed (Suárez Guerra, 1983; Fernández Martín et al., 1984; Palencia Méndez, 1986). In practice, by then, supports from the Soviet Union and other members of the Council for Mutual Economic Assistance (CMEA) made cost a secondary consideration. Carlos Lage, in recent years the senior official overseeing Cuba's economy, has described the attitude prevailing at that time: "A cent more or less in costs wasn't decisive when we were paid 30 cents or more per pound [of sugar]" (*Granma*, October 8, 2003). Confusion between bureaucracy and necessary record-keeping became endemic, especially among sugarcane growers, sustained by resentment against the close supervision exercised by superior organs (Royce, 1996, pp. 55, 115, 128).

Cuba's sugar ministry (MINAZ), for its part, responded to any improvement in the flow of data, if not their quality, in the mid-1970s by reinforcing its control over access. A four-day seminar on state secrets in the sugar sector took place under the chairmanship of the minister in December 1976. A photograph of the event showed a banner, stretched across the wall behind the presiding functionaries, with the legend in Spanish: "The protection of state secrets is our contribution to the economy" (*ATAC*,

36 [1/1977], p. 22). Restrictions of greater or lesser severity were maintained from then onwards, as attested to by several academic researchers (e.g., Edquist, 1985, p. xii; Pollitt, 1997, p. 173). In contrast to the Ministry of the Economy and Planning, MINAZ evidently did not cooperate with the Economic Commission for Latin America and the Caribbean (ECLAC) in the preparation of its 1997 study of the Cuban economy, the sole acknowledgement of assistance in the section on the sugar industry being to the Grupo de Países Latinoamericanos Exportadores de Azúcar (GEPLACEA) (ECLAC, 1997, p. 283). While field costs have been published in some detail, processing costs continue to be shrouded in secrecy.

New Sources of Confusion: Changed circumstances following the collapse of the Soviet Union and the CMEA made it imperative to educate the managers and workers of Cuba's sugar industry on the need to economize, particularly in the use of imported resources, and production costs became a subject of intense political propaganda. This generated on and off a flood of figures, but threw up more questions than shed light on the meaning of the numbers. Aside from frequent inconsistencies and inaccuracies, some published figures turned out, on closer study, to be actually misleading. Anyone from outside the Cuban industry is bedeviled by idiosyncratic terminology that makes translation, without fuller access to internal regulations and accounting standards, hazardous. Neither within Cuba nor abroad can independent analysts examine MINAZ's accounts.

Most important, however, are the distortions engendered by centrally administered input prices, the dual currency/dual exchange rate system in operation after the decriminalization of dollar operations in 1993, and the demands made on producers by the regime. For these reasons, and hence not alone because of the lack both of a market-determined currency exchange rate and a charge on the use of land (Alvarez and Peña Castellanos, 2001, pp. 86–87), Cuba's costs of sugar production since the revolution are *sui generis* and not comparable with those of other countries. One official source listed the following factors, among others, as affecting the economic performance

of the Basic Units of Cooperative Production (*Unidades Básicas de Producción Cooperativa*, UBPCs), the new form of sugarcane cooperatives, six years after this type of enterprises providing the bulk of Cuba's cane supply was created (Porcell Prado, 1999, p. 45):

- High cost of employing workers mobilized from other industries;
- Lack of budgetary control in the sugarcane plantations;
- Non-fulfillment of purchasing programs because items do not arrive, owing to “directed” purchases;
- Increases in the prices of spare parts and services;
- High charges for road repairs; and
- Absence of internal control and deficient book-keeping.

No outsiders—and only very few Cuban insiders—have insight into the real costs of the country's sugar production. In this sense, the industry resembles a black box, where the inputs and outputs are more or less visible but little or nothing can be seen of what happens inside the box. Under these conditions, back-of-the-envelope calculations, working from rule-of-thumb benchmarks, are often more informative than attempts at fine-tuning.

Two guideposts, derived from numerous studies, provide universal points of reference in Cuba as elsewhere in the world. First, field costs—growing and harvesting the sugarcane, and transporting it to the factory—constitute the greater part of total costs. Second, a modern sugar industry is very capital-intensive. Much of the total cost in mechanized sugarcane agriculture is fixed, and so are most of the costs of a state-of-the-art sugar factory.

The credibility of financial claims and targets can also be tested by reference to key physical parameters. One such is the tc/ts (tons cane/ton sugar) ratio, which is the reciprocal of the industrial yield expressed as the percentage of sugar obtained from the processed sugarcane. The annual national averages of that parameter in Cuba ranged from 8.3 to 9.7 tons of sugarcane per ton of sugar in the 1980s, against 7.6 to 8.2 in the 1950s (calculated from Pollitt,

1997, p. 174). The comparable figures for the 1989/90–2001/02 crops are in the range of 8.9 to 10.8 (calculated from *Anuario Estadístico de Cuba 2003*, Table IX.3), indicative of a further decline in efficiency, unless offset by a fall in the unit sugarcane production costs and/or other savings.

GLOBAL FIELD AND FACTORY COST ESTIMATES²

Before the 1959 Revolution

The companies that ran Cuba's sugar industry before the revolution undoubtedly kept a sharp eye on costs, but no industry-wide data or analyses of sugar production costs have been found for that period. A 1951 World Bank report quoted the total costs of bagged sugar to port of three mills in 1949 at 3.67–4.75 cents per pound, of which 60.6–62.6 percent was the cost of sugarcane at the mill. The two dozen American-owned mills reportedly had an average cost of 4.20 cents per pound in 1949 (Pérez-López, 1991, pp. 111–13). These figures were consistent with Cuba's reputation as a relatively low-cost sugar producer and with its market behavior before the revolution.

From the 1960s to the 1980s

Production costs appear to have increased substantially between the 1950s and 1960s, to judge by a comparison of published figures for field and factory wage bills when these were adjusted for crop size, throughput per crop day, and sugar yield per ton of sugarcane, although no totals could be deduced from this (Hagelberg, 1974, pp. 66–67, 127, 129, 161). Labor costs, not including social security, accounted for 24.82 percent of raw sugar production costs in 1962, the second largest item after raw materials and direct inputs with 60.04 percent, according to the then director of Cuba's sugar mills (Menéndez Cruz, 1964, p. 6). Fragmentary information thereafter pointed to production costs in the range of 7–8 cents a pound in the mid-1970s, rising to slightly more than 9 cents in an efficient mill towards the end of the decade. Adjustment of the latter figure for lower overall efficiency resulted in an estimate of average

costs of 10.4 cents a pound in 1984 (Pérez-López, 1991, pp. 116–17; figures in Cuban currency translated into dollars at par).

Between 1984 and 1990, total costs fluctuated between 177.71 and 217.21 pesos per metric ton (or between 8.1 and 9.9 cents a pound), according to data quoted from a 1990 MINAZ statistical yearbook (Alvarez and Peña Castellanos, 2001, p. 19). The share of agricultural costs was 68.3–80.9 percent of total costs. With the exception of 1984 and 1985, the factory costs deducible from these figures moved in a narrow range of 61.58–65.02 pesos per metric ton of sugar. The exceptionally low factory cost of 33.93 pesos in 1985 may possibly be explained by the relatively high industrial yield of sugar on sugarcane that year, the peak figure in the 1980s.

The 1990s

Documents circulated in connection with the submission of the 1998 state budget to Cuba's National Assembly provided information on the sugar-related subsidies paid in the years 1993–97 and proposed for 1998. In explanation of the appropriations to MINAZ it was stated that “the costs of the 96/97 campaign came to 330 pesos per metric ton [of sugar].” Factory expenses were said to have accounted for 59 percent of total expenses, reversing the normal ratio between field and factory costs. Nevertheless, a total cost of 330 pesos seemed credible at first sight, working out to 15 cents a pound, at dollar-peso parity, a figure that coincided with the guesstimates of some foreign observers at the time. However, that figure could not be reconciled with the level of aid from the budget unless it was understood to embrace only the prescribed sugarcane price paid by the mills, to which had to be added the budgetary supports provided to the loss-making UBPCs in order to arrive at an estimate of the true cost. Making allowance for a fraction of the supports to have gone to non-sugar activities, the total field and factory costs in 1996/97 were conservatively estimated to have been on the order of 439 pesos per metric ton of sugar (19.9 centavos/

2. Hagelberg and Alvarez (2005, pp. 177–84) examine in detail the relationship between field cost estimates and sugarcane prices, as well as budgetary supports and bank financing not covered in this paper.

pound), of which the field share was 244 pesos (Hagelberg, 1998).

Assuming an industrial yield of 10.5 percent, i.e., 9.5 tons of sugarcane per ton of sugar, and a field cost component of 60–65 percent, total costs were put at 445–482 pesos per metric ton of sugar (20.2–21.9 centavos/pound) for 1997/98 (Alvarez and Peña Castellanos, 2001, p. 87). This was based on a MINAZ official's estimate of 30.31 pesos as the cost of a metric ton of sugarcane in the 1997/98 season.

A shift in policy, putting greater emphasis on costs, resulted in a stream of figures from the late 1990s onwards. Official sources variously claimed reductions in production costs of 67, 72, and 74 pesos per metric ton of sugar in the 1998/99 crop, compared with 1997/98, without revealing absolute numbers for either year. In one interview, however, Carlos Lage said that the drop of 74 pesos was equal to a decline of 18 percent, which pointed to costs of 411 pesos (18.6 centavos/pound) and 337 pesos (15.3 centavos/pound) in 1997/98 and 1998/99, respectively. Minister of the Economy and Planning José Luis Rodríguez meanwhile put the reduction at 22 percent, but gave no absolute figure either (Hagelberg, 2000a, pp. 127–28).

The Last Five Years

Cuba's media reported a welter of production cost figures during the 1999/2000 harvest, giving the impression that the mills were now totting up their financial accounts daily along with their laboratory reports. It is therefore likely that the published figures referred solely to cash expenditures at the factory level. Acclaimed national winner, with the lowest production costs at the end of the campaign, was the Antonio Maceo mill in Holguín province, with costs of 267.99 pesos per metric ton of sugar (12.2 centavos/pound), in first place among 21 factories purportedly with costs of 300 pesos (13.6 centavos/pound) or less. The latter level was the ceiling contemplated for the 2002 crop, Sugar Minister Rosales del Toro declared in an interview with *Granma's* sugar correspondent, Juan Varela Pérez (Hagelberg, 2000b, pp. 397–98).

The first four provinces to fulfill their targets in the 2000/01 season reportedly averaged costs of between 318 pesos and 330 pesos per metric ton of sugar (14.4–15.0 centavos/pound). These figures were believed to represent mill costs that valued sugarcane at the price paid by the factories to the growers, which in many cases did not cover the farm costs of production, and imported inputs at the official accounting exchange rate of one peso to the dollar (Hagelberg, 2001, p. 329).

A sweeping structural reform of Cuba's sugar industry, announced in June 2002, signaled the end of an era. The sugarcane area was to be drastically reduced—by exactly how much it is impossible to say from the conflicting data (Hagelberg, 2004, p. 125). The average sugarcane yield on the retained area was to be quickly restored to 54 metric tons per hectare and the industrial yield to 12 percent, so as to be able to produce up to 4 million metric tons of sugar a year when export revenues exceeded costs. Of the 156 existing sugar mills, only 104 had worked in the 2001/02 season (*Opciones*, June 27, 2002), but 71 were now to be permanently closed.

These measures were to put the industry on a sound economic and financial footing. President Castro promised “a saving of 40 million [currency not specified] for the country” from the reform (*Granma*, June 14, 2002). Four months later, speaking to sugar workers on October 21, 2002, he increased the saving to 200 million dollars, in addition to receipts of around 100 million dollars. Both figures, unsupported by any detail, were subsequently repeated by Minister Rosales del Toro (*Granma*, January 12, 2004). In a press interview on the restructuring, Manuel Cordero, secretary-general of Cuba's sugar workers trade union, explained that a ton of sugar meant the expenditure of 359 pesos (16.3 centavos/pound), which had to be cut to 260 pesos (11.8 centavos/pound) (*Trabajadores*, July 8, 2002). The latter figure, “of which 60 in dollars,” was also given as the cost target of the restructuring by Minister Rosales del Toro in his closing speech to the 48th Congress of the Cuban Association of Sugar Technologists (*Revista ATAC*, No.1/2003, p. 7).

While a thorough, step-by-step rationalization of the industry had been long overdue, the 2002 reform from the outset appeared fatally flawed since it lacked essential elements to ensure its functional effectiveness (Hagelberg, 2002). From the sparse information available, the negative consequences experienced so far are more easily defined than the gains:

- Sugar production fell from 3,706,000 metric tons, raw value, in 2001/02 to 2,251,000 tons in 2002/03, the first season after restructuring (*F.O. Licht's International Sugar & Sweetener Report*, 2005). The crop, in which 79 mills reportedly operated (Reuters, July 8, 2003), was hamstrung, among other problems, by “want of cohesion and consciousness of the changes,” in the words of Minister Rosales del Toro (*Juventud Rebelde*, July 6, 2003), or “deficiencies of a subjective kind, such as sloppiness [chapucerías] and lack of organization,” as the provincial committee of the Communist Party in Ciego de Avila, a major sugarcane region, put it (*Granma*, June 27, 2003). Some of the problems, notably lack or late arrival of parts and processing materials, were said to have been largely sorted out by the start of the 2003/04 harvest, in which production partially recovering to 2,520,000 metric tons (*F.O. Licht's op.cit.*). However, the 2004/05 harvest reportedly ended at around 1.3 million metric tons (Reuters, May 30, 2005), the lowest level since 1908. A prolonged and very severe drought undoubtedly was the principal factor in this dismal result, for which President Castro himself began to prepare the country already in early March (Reuters, March 8, 2005). But organizational shortcomings also resurfaced. The Villa Clara weekly *Vanguardia* of January 16, 2005, reported that the start of the campaign had been delayed by “shortages of tires, batteries, industrial gases, bolts and nuts, hydraulic systems for the combine harvesters, and other inputs.” Other provincial newspapers reportedly alluded to similar problems (Reuters, January 25, 2005). Towards the end of the crop, Reuters (April 25, 2005) again reported that, in addition to the drought, local experts blamed neglect of the industry for the large drop in output. Although
- just 56 of the 85 mills left after the restructuring were scheduled to operate in 2004/05 (*Granma*, December 13, 2004), potential economies of scale arising from the rationalization have so far clearly not been realized.
- Cuba's sugar exports fell from 3,068,855 metric tons, raw value, in 2002 to 1,799,782 tons in 2003, and the corresponding export earnings from 441,510,000 pesos to 281,747,000 pesos. Together with molasses and products made from sugar, the export receipts came to 448,067,000 pesos and 283,779,000 pesos, respectively (*Anuario Estadístico de Cuba 2003*, Table VII.12). Against that, the value of imports of this tariff class more than doubled from 25,880,000 pesos to 53,681,000 pesos (*ibid.*, Table VII.13). From the export statistics of the countries of origin, it appears that these Cuban imports consisted mainly of white sugar (*F.O. Licht's op.cit.*, various issues).
- According to MINAZ data, the sugarcane UBPCs engaged in the *Tarea Alvaro Reynoso* (the name given to the restructuring process) obtained an average yield of 34.8 metric tons per hectare in 2002/03, up from 33.4 tons recorded for all sugarcane UBPCs the previous year—an unremarkable improvement given that the higher figure appears to pertain to a more select cohort and many extremely low-yielding fields were abandoned. Nevertheless, average total production costs per ton of sugarcane were said to have risen from 26.54 pesos in 2001/02 to 27.86 pesos in 2002/03 (MINAZ, 2003, pp. 5–6).
- The restructuring made close to 100,000 employees redundant. Nearly three years after the event, a paragraph in the official announcement of a rise in the state minimum wage offered some insight into the social cost incurred—however justified any measure to lessen the hardship for the people affected may be: “On application of the restructuring of the sugar industry in 2002, 55,688 workers were placed in other jobs and 34,530 sent to study as a new concept of employment. All continue to receive the average monthly salary earned in the six months prior to the restructuring” (*Granma*, April 22, 2005).

COST OF IMPORTED INPUTS

The post-revolutionary technological development of the Cuban sugar industry rested to a large extent on a far greater use of imported goods, particularly in the field sector. The foreign exchange spent in producing sugar was a key consideration in the 2002 industry restructuring.

Two estimates of the magnitude of the import component of sugar production in the 1990s have been found. According to a statement by Lage in 1996, the cost of imported inputs ranged between \$120 and \$160 per metric ton (Alvarez and Peña Castellanos, 2001, p. 87). At an F.O. Licht sugar conference the following year, a MINAZ Vice Minister put the “foreign currency direct expenses” in the 1995/96 crop at \$120 per metric ton, “a significant reduction in relation to the previous season” (Llerena Montenegro, 1997, p. 10).

Official statements in the latter part of 2003 and early 2004 proclaimed as a target to bring costs down to 3–4 cents per pound, without spelling out what was meant by “costs” (Hagelberg, 2004, p. 127). According to Varela Pérez, “the *Tarea Alvaro Reynoso* [the restructuring process] poses among its objectives to lower the cost of a pound to four centavos (for domestic consumption and exports). In 1996, it was 6.88 centavos, and that was reduced to 5.2 in 2002” (*Granma*, February 9, 2004). Unless the industry operated with an undisclosed shadow exchange rate, these figures must be taken to refer to the foreign currency direct expenses, not the total production costs.

REFERENCE POINTS FOR A SUSTAINABLE CUBAN SUGAR INDUSTRY REVIVAL

Whatever the precise numbers, there can be no question that the costs of producing sugar in Cuba have risen greatly over the last five decades. This received scant attention from the country’s policymakers as long as the costs were amply covered by the unit value of exports, usually boosted far above world market levels by the prices received under preferential arrangements. More recently, however, export values have tended to leave only a narrow margin over the reported cost of imported inputs alone. In 1989, the

premium prices then paid by CMEA member states lifted the average unit value of the 7.1 million metric tons of Cuban sugar exports that year to all destinations, including 1.5 million tons to market economies, to 549.76 pesos a metric ton (24.94 centavos/pound), almost twice the average 1989 world price at dollar-peso parity. By contrast, Cuba’s sugar exports from 1998 to 2003, which fluctuated between 1.8 million and 3.4 million tons annually, on average earned 163.46 pesos a ton, or 7.41 centavos a pound (calculated from *Anuario Estadístico de Cuba 2003*, Table VII.12).

Nor would policymakers have had to worry about Cuba’s sugar industry losing international competitiveness, if the production costs of other major exporters had risen *pari passu*. But by all indications that was not the case. International league tables in this area raise issues where the old maxim that comparisons are odious applies with special force. Rankings, in general, are liable to be muddled by distorting direct and indirect subsidies and out-of-kilter currency exchange rates. In particular, Cuba’s statistical terminology and accounting standards constitute a minefield for error in interpretation.

Fortunately, a rough idea of Cuba’s standing in relation to market competitors can be had without resorting to debatable comparisons of the production cost estimates for different countries, which, even if more or less accurate when made, may have a short shelf-life. Although it does not answer the question of production costs, a stronger performance measure is the longer-run supply response on the part of major exporting countries, which reflects their market potency. Formerly the world’s foremost sugar exporter, Cuba has to date been overtaken in net trade by Brazil, Australia, Thailand, and France, to which Guatemala, Colombia, and Germany are likely to be added in the current year. Of course, French and German sugar production and exports, in particular, have long been artificially boosted by the market regime of the European Union. But preferential CMEA arrangements had a similar effect in respect of the Cuban sugar industry. When these ended, the national exchequer took over. As the 1997 ECLAC

study observed in the light of the values ruling at that time:

the sugar industry . . . receives important subsidies, but in turn sells its product to the state at a much lower price than the enterprises would obtain on exporting and changing their earnings at the market rate (20 pesos per dollar). In fact, the state collects a monopsonistic rent which it partially returns in subsidies in order to keep the sugar agroindustry going (ECLAC, 1997, pp. 82–83).

In 2001–03, the most recent years for which data are available, the identifiable supports for Cuba's sugar industry out of the state budget totaled 1,405 billion pesos from a "Sugar Price Compensation Fund," plus a total of 78.6 million pesos in 2002–03 under the heading "Compensation to sugarcane producers" (*Anuario Estadístico de Cuba 2003*, Table V.4).

Governments are generally pressed to come to the aid of industry in times of adversity. A contrapuntal recital of falling sugar export prices and rising oil import prices featured prominently in President Castro's justification, in his speech to sugar workers on October 21, 2002, of the Cuban sugar industry restructuring. Ironically, since June 2002, when the decision was announced, monthly average world market sugar prices have risen, albeit erratically. The ISA Daily Price, which on past experience fits actual Cuban unit export receipts better than the New York Contract No. 11 price, improved by 29 percent from an average of 6.79 cents per pound in January-May 2002 to 8.78 cents in the first five months of 2005, the most recent period for which figures were available at the time of writing. In the six years from 1998 to 2003, Cuban annual sugar export unit values ranged between 5.94 and 10.50 centavos per pound, for a weighted average of 7.41 centavos (calculated from *Anuario Estadístico de Cuba 2003*, Table VII.12), which compares with an ISA annual price range of 6.27–8.92 cents a pound and an average of 7.66 cents for the period. Far more efficient sugar exporters than Cuba found this price level unsatisfactory, but would have been happy with what President Castro called "the sugar garbage heap price" (*Granma Weekly Review*, February 11, 1990) when world

market quotations stood at more than 14 cents a pound.

World market sugar prices are notoriously unstable. Not many years ago, they were more volatile than the world market prices of other major primary commodities. Although they have fluctuated less in the last couple of decades, to extrapolate from past trend lines is hazardous because of large structural changes in the market, among other reasons. Further major structural changes are to be expected in the event of the successful conclusion of the Doha round of world trade negotiations and reform of the European Union sugar market regime, which should reduce protectionism and curb EU exports. On the other hand, a growing concern about the effects of obesity could impact negatively on global sugar demand and prices.

The evolution of the production costs of sugarcane and sugar in Cuba, in so far as it is distinct from that experienced by sugar industries elsewhere, has been shaped by particular external and internal forces: externally, the hostile actions of successive United States administrations since 1960, beginning with the closing of traditional sources of essential inputs resulting from the U.S. embargo, and the up-and-down of Cuba's relations with the Soviet Union and other socialist countries, and internally, the pressures of the politico-economic system adopted after the revolution. Equally, foreign and domestic developments will shape the country's sugar industry in future. One thing is certain, however: if Cuban sugar is to retain any significance on the world stage, the central command-and-control management system will have to be replaced by one more suited to modern agribusiness.

On first principles, high fixed costs pose a problem of critical mass, especially in respect of administration and specialized supporting services. For instance, a separate ministry, set up when sugar was Cuba's principal earner of foreign exchange and a substantial portion of gross domestic product, might well be regarded an intolerable burden in today's reduced circumstances, were its cost to be counted as an industry overhead. More generally, an unbroken decline in output will increasingly eat into the viability of the

industry's infrastructure, including vital activities such as research and development.

This makes it all the more important to guard against erroneous extrapolations from the competitive position of the Cuban sugar industry as a business and to have due regard for externalities. The energy crisis that gripped the island in the autumn of 2004, for example, invited the question whether the fall in sugarcane production following the 2002 industry restructuring and failure to make the appropriate investments in the mills had a heavy opportunity cost in terms of foregone power generation from bagasse. But

the concept of opportunity cost appears not to figure in Cuban cost calculations, one way or another (Alvarez and Peña Castellanos, 2001, p. 87), even though quite possibly—at least until the disastrous 2004/05 crop—the private cost of Cuba's sugar industry was greater than the social cost and the private return less than the social product.

By taking marginal land out of sugarcane and scraping surplus processing capacity, the 2002 restructuring had the potential of leading to a more cost-effective mode of production, although it is not certain that all the cuts were in the right places. By one 1990s estimate, Cuba's sugar production costs could have been reduced by up to 20 percent by solving organizational problems and increasing the sugarcane supply (ECLAC, 1997, p. 291). That was without a regime change. Given a choice, growers would surely not persist in what in a modern sugar industry can only be regarded as expensive eccentricities, such as having sugarcane fields weeded by urban students and workers mobilized from other sectors, or hauling harvested sugarcane with oxen. Given a chance, motivated managers and workers, with adequate supplies of fertilizer, herbicides, fuel, lubricants, equipment, and parts, would be able to attack the inefficiencies at the root of high production costs—inefficiencies that now go all the way from defective soil preparation and planting, poor germination, and weed-infested fields, that result in low agricultural yields, through dilapidated harvesting and transport gear affecting delivery schedules, to the frequent breakdowns of badly-maintained factories. So far, we

have no evidence that the 2002 measures produced a lasting reduction in unit costs.

Field costs offer the greatest potential for savings since they constitute the larger part of total sugar production costs. This, above all, means reversing the decline in sugarcane and sugar yields per land unit, something that cannot be done without timely and sufficient access to the necessary technical inputs and suitable equipment. But it also requires rigorous re-examination of traditional practices and particularly the costly habits that gained currency under the state extensive growth model during the 1980s.

A prominent Cuban agronomist has compiled a number of scenarios indicative of the potential cost savings in the choice of sugarcane growing technologies (Alvarez Dozíguez, 1997, p. 6; 1999, pp. 7–8; 2000a; 2000b; 2000c). These exercises showed a very wide range of costs and effectiveness, depending on the technology chosen and how it is employed, of such operations as soil preparation, planting, and weed control. They also implicitly demonstrated the folly of the pursuit of the one-size-fits-all solutions to which central management systems are inclined. And they made clear that cutting costs by the adoption of novel methods, such as minimum tillage, hinges in the first place on thorough research and second on enabling growers to acquire the knowledge and appropriate tools to do the job.

The same author more recently presented a comprehensive survey of the practices, from planning and management to harvesting and transport, employed by other major foreign sugar producers (Alvarez Dozíguez, 2004). At a world market raw sugar price of 6 cents per pound, sugarcane has to be produced at a cost of about 8 dollars per metric ton in order to break even, not taking into account income from by-products. The field production costs of the world's most efficient producers reportedly ranged from 8 to 10 dollars per ton of sugarcane in recent years (Alvarez Dozíguez, 2004, pp. 18–19).

Substantial new capital is normally an indispensable element of successful industrial restructuring to improve cost competitiveness. Arrangements with foreign finance and trade houses that for a while in the

1990s provided loans to import vital inputs (Alvarez and Peña Castellanos, 2001, p. 51) could not be a springboard for a sustained recovery because they were subordinate to an unreformed central command-and-control management system, a fact to which the high interest rates charged were possibly not unrelated. Far from injecting new capital, the overhaul of the Cuban sugar industry initiated in 2002 to all appearances implied a diversion of scant resources to non-core activities, the viability of which remains to be seen. The foreign capital needed to refurbish the industry in the absence of domestic funds cannot flow in as long as the Cuban government restricts foreign investment in the sugar sector to the areas of by-products and derivatives.

On the positive side, the down-sizing of its sugar industry has reduced Cuba's exposure to the vagaries of foreign markets and prices. Whereas in the 1980s sugar exports absorbed all but roughly 10 percent of production, domestic offtake was close to 30 percent of the 2002/03–2003/04 crops. That proportion—and with it, a lesser dependence on foreign markets—could be maintained in the event that sugarcane agriculture were to reach the targets set in 2002 and growing sugarcane as an energy crop for the production of fuel alcohol and electricity became

an economically attractive option. While the challenges are formidable, the long-run viability of a suitably dimensioned Cuban sugar agroindustry is wholly conceivable, provided it is given a more favorable politico-economic environment, furnished with the appropriate state-of-the-art technologies, and guided by the right price signals, in first place a proper quality-based sugarcane price system.

Once before, Cuba's sugar industry recovered from devastation—after the uprising against Spanish rule and the Spanish-Cuban-American War. In some of its measures and in its targets to restore yields and reduce costs, the 2002 restructuring contained elements of a future program to pull the industry out of its present slump. However, only three years after that process was announced, Fidel Castro declared that Cuba “will never return to living off sugar, [which] belongs to the era of slavery” and that the commodity that traditionally represented the country's first industry “today is its ruin” owing to the high consumption of fuel he claimed is involved (EFE, March 17, 2005). These words bode the further relegation of Cuba's sugar agroindustry, which will make its reconstruction in the future even more of an uphill task than it already was.

REFERENCES

- Alvarez, José, and Lázaro Peña Castellanos. 2001. *Cuba's Sugar Industry*. Gainesville, Florida: University Press of Florida.
- Alvarez Dozáguez, Armando. 1997. “Para un buen comienzo, atender bien la caña nueva.” *Cañaveral* (July-September):2–6.
- Alvarez Dozáguez, Armando. 1999. “Plantas indeseables: el segundo gran daño a los rendimientos agrícolas.” *Cañaveral* (July-September):2–8.
- Alvarez Dozáguez, Armando. 2000a. “Atender la caña según lo que rinda.” *Cañaveral* (January-March):2–7.
- Alvarez Dozáguez, Armando. 2000b. “Reducir costos y ganar en calidad.” *Cañaveral* (April-June):3–8.
- Alvarez Dozáguez, Armando. 2000c. “Reducir costos y sembrar mejor.” *CubaAzúcar* (July-September):2–8.
- Alvarez Dozáguez, Armando. 2004. “Tecnologías avanzadas en el cultivo de la caña de azúcar actualmente en el mundo.” Paper presented at the First National Seminar of Sugarcane Departments in Cuban Universities, University of Havana, 9–10 June.

- Anuario Estadística de Cuba 2003*, versión electrónica. 2004. La Habana: Oficina Nacional de Estadísticas.
- Castro, Fidel. 1978. *Informe al I Congreso del PCC*. La Habana: Instituto Cubano del Libro, Ed. Pueblo y Educación.
- Deerr, Noël. 1949–1950. *The History of Sugar*. 2 vols. London: Chapman and Hall.
- Economic Commission for Latin America and the Caribbean (ECLAC). 1997. *La economía cubana: Reformas estructurales y desempeño en los noventa*. Mexico: Fondo de Cultura Económica.
- Edquist, Charles. 1985. *Capitalism, socialism and technology: A comparative study of Cuba and Jamaica*. London: Zed Books.
- Fernández Martín, Raquel, Marili Martín García, and Eugenio Rodríguez Pérez. 1984. “Cálculo del costo de producción del azúcar crudo: su perfeccionamiento.” *Revista ATAC*, Año 43, No. 5, pp. 23–30.
- F.O. Licht’s International Sugar & Sweetener Report*. 2005. Vol. 137, No. 19 (June 24).
- Hagelberg, G.B. 1974. *The Caribbean Sugar Industries: Constraints and Opportunities*. New Haven: Antilles Research Program, Yale University.
- Hagelberg, G.B. 1998. “On the trail of Cuba’s sugar production costs.” *F.O. Licht’s International Sugar and Sweetener Report*, 130, 14 (29 April):221–24.
- Hagelberg, G.B. 2000a. “Cuba’s sugar industry: Fettered by ideology.” *F.O. Licht’s International Sugar and Sweetener Report*, 132, 8 (9 March):127–30.
- Hagelberg, G.B. 2000b. “Cuba edges towards change.” *F.O. Licht’s International Sugar and Sweetener Report*, 132, 24 (15 August):397–400.
- Hagelberg, G.B. 2001. “Cuba: 2001 and beyond.” *F.O. Licht’s International Sugar and Sweetener Report*, 133, 21 (13 July):327–30.
- Hagelberg, G.B. 2002. “Cuba’s sugar industry: Restructuring or requiescat?” *F.O. Licht’s International Sugar and Sweetener Report*, 134, 31 (8 October):493–99.
- Hagelberg, G.B. 2004. “Crunch time in Havana.” *F.O. Licht’s International Sugar and Sweetener Report*, 136, 8 (9 March):121–28.
- Hagelberg, G.B. and José Alvarez. 2005. “Cuba’s costs of sugar production: Past, present, and future.” In Jorge F. Pérez-López and José Alvarez (Eds.) *Reinventing the Cuban Sugar Agroindustry*. Lanham, Maryland: Lexington Books, pp. 171–88.
- Llerena Montenegro, Gilberto. 1997. “Cuban sugar cane agroindustry: Evolution and perspectives.” *F.O. Licht’s Second Annual World Sugar and Sweetener Conference*, Cancún, Mexico, 8–10 April. Mimeo.
- Menéndez Cruz, Alfredo. 1964. “Los costos y el análisis económico en la industria azucarera.” *Nuestra Industria—Revista Económica*, 2, no. 6 (April):3–9.
- MINAZ. 2003. “Informe resumen de los resultados alcanzados por las UBPC Cañeras en el período 1993—2003” (31 October).
- Palencia Méndez, Gonzalo. 1986. “Cálculo del costo de producción en la industria azucarera; su perfeccionamiento.” *Revista ATAC*, Año 45, No. 2, pp. 48–52.
- Pérez-López, Jorge F. 1991. *The Economics of Cuban Sugar*. Pittsburgh: University of Pittsburgh Press.
- Pérez-López, Jorge F. and José Alvarez (eds.) 2005. *Reinventing the Cuban Sugar Agroindustry*. Lanham, Maryland: Lexington Books.
- Pollitt, Brian H. 1997. “The Cuban sugar economy: Collapse, reform and prospects for recovery.” *Journal of Latin American Studies*, 29:171–210.
- Porcell Prado, Jaime. 1999. “Las UBPC seis años después.” *Cañaveral* (October-December):42–46.

- Reynoso, Alvaro. 1998 [1862]. *Ensayo Sobre el Cultivo de la Caña de Azúcar*, sixth ed. La Habana: Publicaciones Azucareras.
- Royce, Frederick S. 1996. *Cooperative Agricultural Operations Management on a Cuban Sugarcane Farm: "... and everything gets done anyway."* M.Sc. thesis, University of Florida.
- Seers, Dudley. 1964. "The economic and social background." In Dudley Seers (ed.), *Cuba: The Economic and Social Revolution*. Chapel Hill: University of North Carolina Press.
- Suárez Guerra, Marcio. 1983. "Perfeccionamiento de la contabilidad de los gastos de producción y cálculo del costo de la caña de azúcar." *Economía y Desarrollo* 73 (March-April), pp. 182–215.